

A PILOT STUDY EXAMINING THE IMPACT OF A BRIEF HEALTH EDUCATION
INTERVENTION ON FOOD CHOICES AND EXERCISE IN A HISPANIC COLLEGE
STUDENT SAMPLE

JULIE BLOW

Department of Psychology

APPROVED:

Theodore V. Cooper, Ph.D., Chair

Wendy Francis, Ph.D.

Lawrence Cohn, Ph.D.

Osvaldo Morera, Ph.D.

Sharon Davis, Ph.D.

Bess Sirmon-Taylor, Ph.D.
Interim Dean of the Graduate School

Copyright ©

by

Julie Blow

2014

Dedication

This dissertation is dedicated to those who have supported my achievement of higher education. First, my parents, who instilled in me the value of an education and made me feel like pursuing one could be more than just a dream. Second, my husband, whose support, encouragement, and sacrifice over the past eleven years has been immense and is appreciated more than words can express. Third, my mentor, whose guidance throughout all these years means so much to me and has shaped me into the person that I am today. Last but never least, my son Lucian. Your warmth, joy, intelligence and curiosity touch me and inspire me every day. You motivated me to complete my work and not give up even in the face of many obstacles. This is for you.

PREVIEW

PREVIEW

A PILOT STUDY EXAMINING THE IMPACT OF A BRIEF HEALTH EDUCATION
INTERVENTION ON FOOD CHOICES AND EXERCISE IN A HISPANIC COLLEGE
STUDENT SAMPLE

by

JULIE BLOW, M.A.

DISSERTATION

Presented to the Faculty of the Graduate School of
The University of Texas at El Paso
in Partial Fulfillment
of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY

Department of Psychology
THE UNIVERSITY OF TEXAS AT EL PASO
May 2014

UMI Number: 3623378

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI 3623378

Published by ProQuest LLC (2014). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

Acknowledgements

I would like to acknowledge the Prevention and Treatment in Clinical Health Laboratory for their support of this project. Specifically, those who assisted greatly with the data collection and management for this project: Dessaray Gorbett, Nicole Kimura, Erica Landrau, Taylor Adams, Reyna Puentes, Sofia Lopez, and Francisco Sagredo.

PREVIEW

Abstract

It has been suggested that intervention efforts should focus on prevention of weight gain and the adoption of healthy eating and physical activity behaviors. There is a dearth of literature as to what theoretically-based interventions would be most amenable and efficacious in a Hispanic college student sample. This study assessed the impact of a pilot intervention based on components derived from Self-Determination Theory (SDT) and the Transtheoretical Model (TTM) that focused on increasing healthy eating and physical activity in Hispanic college students. Measures in the study included demographics, theoretical constructs from SDT and the TTM, eating behavior, and a food and physical activity diary. Participants ($N=267$) were randomized to either the Fit U intervention group or the self-monitoring only group. Both groups received training on completing food and exercise diaries, while the Fit U group also received a brief health education and motivation based intervention. Both groups returned to check-in after one week and provided follow-up data after two weeks. Inferential analyses used hierarchical regression models to predict total calorie intake, fruit and vegetable intake, eating behavior, physical activity, and perceived competence for diet and exercise. Logistic regression models were used to examine changes in motivation to engage in a healthy diet and physical activity at follow-up. Findings suggest those in the Fit U condition reported lower calorie intake ($\beta = .143$, $p = .023$), improvement in healthy eating behaviors ($\beta = -.157$, $p < .001$), increased perceived competence for diet ($\beta = -.145$, $p = .007$) and exercise ($\beta = -.167$, $p = .003$) at follow-up, and progression through the stages of change for exercise ($OR = .297$, $p = .003$). These findings suggest the feasibility and relative efficacy of the Fit U intervention and warrant further investigation on a larger scale.

Table of Contents

Acknowledgements.....	v
Abstract.....	vi
Table of Contents.....	vii
List of Tables	ix
Introduction.....	1
Obesity and Overweight in Hispanics.....	2
College students	3
Theoretical Models	5
Interventions	8
Aims and Hypotheses	10
Methods.....	12
Participants.....	12
Measures	12
Procedure	16
Results.....	23
Participant Characteristics	23
Baseline Differences by Condition	24
Baseline Differences by Attrition	24
Calorie Intake.....	25
Fruit and Vegetable Intake.....	26
Physical Activity.....	26
Eating Behaviors.....	26
Perceived Competence for Diet	27
Perceived Competence for Exercise	28
5 A Day Stage of Change Movement	29
Exercise Stage of Change Movement.....	30
Weight.....	31
Waist Circumference	31

Discussion	32
Calorie Intake	32
Fruit and Vegetable Intake	32
Physical Activity	34
Eating Behavior	35
Perceived Competence for Diet	35
Perceived Competence for Exercise	37
5 A Day Stage of Change Movement	38
Exercise Stage of Change Movement	40
Weight and Waist Circumference	41
Strengths and Limitations	42
Conclusions and Future Directions	42
References	44
Appendix	67
Vita	97

List of Tables

Table 1: Flow of Participation	54
Table 2: Participant Characteristics	55
Table 3: Interventionists' Characteristics	57
Table 4: Participant Characteristics by Condition	58
Table 5: Hierarchical Regression Predicting Average Calorie Intake at Follow-up	59
Table 6: Hierarchical Regression Predicting Eating Behavior at Follow-up.....	60
Table 7: Hierarchical Regression Predicting Perceived Competence for Diet at Follow-up	61
Table 8: Hierarchical Regression Predicting Perceived Competence for Exercise at Follow-up.	63
Table 9: Logistic Regression Predicting 5 A Day Stage of Change Movement.....	65
Table 10: Logistic Regression Predicting Exercise Stage of Change Movement	66

Introduction

In the United States, 32.2% of men and 35.5% of women are obese, and an even greater number, 72.3% of men and 64.1% of women, are overweight (Flegal, Carroll, Ogden, & Curtin, 2010). Obesity, which is defined as a body mass index (BMI) of 30 or greater (Centers for Disease Control and Prevention [CDC], 2010) is associated with many diseases, such as coronary heart disease, Type 2 diabetes, certain cancers, hypertension, stroke, osteoarthritis, and high cholesterol (Weight Control Information Network, 2007). Overweight status, which is defined as a BMI between 25 and 29.9 (CDC, 2010), is associated with health risks similar to that of obesity (Weight Control Information Network, 2007). Even moderate weight excess can increase the risk of premature death or developing diseases associated with obesity (Surgeon General, 2007).

Clinical guidelines recommend weight loss for overweight individuals who meet the following criteria: a body mass index of 25 or greater, a high waist circumference (i.e., greater than 35 inches in women and 40 inches in men), and at least two risk factors such as physical inactivity, smoking, and personal or family history of high cholesterol, hypertension, or diabetes (Weight Control Information Network, 2007). Those who are overweight and do not meet the above criteria are advised to prevent further weight gain or to attempt moderate weight loss, as a loss of a mere 5 to 15% of body weight can reduce the risk of developing diseases associated with obesity, particularly heart disease (Surgeon General, 2007).

It has been suggested that, rather than focusing on weight loss as an outcome, attention should be paid to changes in behaviors that are associated with weight management in order to prevent further weight gain. For instance, low intensity exercise, such as walking, in order to burn an additional hundred calories a day, or merely eating a hundred calories fewer a day, may

be sufficient to stave off weight gain (Hill, Wyatt, Reed, & Peters, 2003). Current guidelines for dietary intake suggest that for adults aged 18-30, one and a half to two cup servings of fruit and two and a half to three cup servings of vegetables a day is ideal (United States Department of Agriculture [USDA], 2011). For physical activity, current guidelines recommend at least 150 minutes per week of moderate intensity aerobic activity and at least two days a week of strength training for adults aged 18-64 (World Health Organization [WHO], 2011). Thus, interventions focused on healthy eating and increasing physical activity warrant consideration and assessment.

OBESITY AND OVERWEIGHT IN HISPANICS

The rates of obesity and overweight in Mexican-American populations in the U. S. are significantly higher than the national average, with 35.9% of men and 45.1% of women being obese, and 80% of men and 76.9% of women being overweight (Flegal et al., 2010). Even though obesity and overweight in Hispanic populations are clearly important to address, research is limited as to what types of interventions are appropriate for this group. In terms of increasing healthy eating behaviors and physical activity, there is a dearth of literature as to what type of intervention would be amenable to this particular population. It has been observed that Hispanics are less likely to report seeking evidence-based treatment for weight loss (Tsai et al., 2009), which suggests that this population would benefit from interventions that are culturally-sensitive in order to engage participants.

Some studies suggest that taking cultural constructs into consideration when developing an intervention prioritizing the population of interest may be beneficial in promoting behavior change (Cousins et al., 1992; Diaz, Mainous, & Pope, 2007; Domel, Alford, Cattlet, Rodriguez, & Gench, 1992; Suris, del Carmen Trapp, DiClemente, & Cousins, 1998). However, few studies

have quantitatively measured cultural constructs or assessed their impact on weight and weight control (Diaz et al., 2007). Moreover, other cultural constructs that may be useful to incorporate into interventions to increase healthy eating and physical activity are not as well-defined in the literature. One approach that has been well-received is incorporating healthier versions of familiar foods into diet plans in order to encourage the adoption of improved dietary behavior (Foreyt, Ramirez, & Cousins, 1991).

There is also a dearth of literature with regard to what theoretically-based components should be incorporated into healthy eating and physical activity interventions for Hispanic populations. In previous weight loss studies, the interventions were loosely based on theoretical models (Cousins et al., 1992; Domel et al., 1992; Foreyt et al., 1991), and only one used empirically based measures to assess the relationship between overweight/obese status and theory, more specifically the Transtheoretical Model (Suris et al., 1998). Another study assessing correlates of overweight and obesity in a Hispanic community sample assessed constructs from multiple theoretical models (Blow, Torres, & Cooper, manuscript submitted for publication). However, the efficacy of incorporating those constructs into an intervention in which the aim is to increase healthy eating behaviors and physical activity levels has not yet been assessed, particularly in normal-weight individuals.

COLLEGE STUDENTS

College is an important time of transition for many young adults. Young adults entering college are experiencing a greater amount of independence, especially with regard to making decisions about health-related behaviors, such as diet and exercise. These transitions can often lead to weight gain for many students. Indeed, studies have identified freshman (Anderson,

Shapiro & Lundgren, 2003; Lloyd-Richardson, Bailey, Fava, & Wing, 2009) and sophomore years (Lloyd-Richardson et al., 2009) not only as critical periods for weight gain, but also as ideal times in which to implement weight gain prevention efforts.

One study that assessed 106 colleges nationwide found that nearly 32% of women and men had a BMI that would place them in an overweight or obese category (American College Health Association, 2009). The same study found that only 8.5% of college students reported eating five or more servings of fruits and vegetables daily and just over 45% of students reported exercising at least three times in the past week. Findings are similar with regard to weight status in one study conducted at the University of Texas at El Paso (UTEP), a Hispanic Serving Institution (Hu, Taylor, Blow, & Cooper, 2011). However, Hu and colleagues observed even lower rates of consuming five or more servings of fruits or vegetables daily (2%), but higher rates of exercise in comparison to the national average (63%). Studies have shown that the more fruits and vegetables one consumes, the more health benefits one derives (Hung et al., 2004). For instance, individuals who consume more than five fruits and vegetables daily have a 20% lower risk of stroke (He, Nowson, & MacGregor, 2006) and coronary heart disease (He, Nowson, Lucas, & MacGregor, 2007). While the findings with regard to exercise in the UTEP population are promising, it is still important to encourage even more students to adopt and maintain regular physical activity. One recent review has observed the multitude of benefits of engaging in regular exercise, not only in terms of controlling weight, but also in the prevention of chronic diseases associated with obesity and overweight, such as high blood pressure, heart disease, and diabetes (Warburton, Nicol, & Bredin, 2006).

Yet another concern with regard to college students, particularly females, is the use of unhealthy behaviors to control or maintain weight. One study assessing weight control practices

in Hispanic and white female college students found high rates of reported skipping meals and fasting (76%) as well as bingeing (46%), and non-negligible rates of engaging in extreme forms of dieting (17%; Shamaley-Kornatz, Smith, & Tomaka, 2007). This suggests the need for interventions with an educational component that focuses on making healthier food choices as a means of controlling weight while discouraging the adoption of potentially maladaptive weight control behaviors.

Taken together, these findings warrant assessing the efficacy of interventions for college students that are designed to encourage the adoption and maintenance of a healthy diet and regular physical activity regimen.

THEORETICAL MODELS

There were two theoretical models of interest in the current study: Self-Determination Theory (SDT; Ryan & Deci, 2000) and the Transtheoretical Model (TTM; Prochaska & Velicer, 1997).

SDT is a motivation-based model, which purports that successful behavior change occurs when one moves from being amotivated to being externally motivated, and finally to being internally motivated. SDT includes three constructs: autonomy, competence, and relatedness. Autonomy refers to the belief of control over circumstances and the decisions one makes. Competence refers to the belief in one's ability to make changes (self-efficacy), and relatedness refers to the belief of being connected to others in one's endeavors and that those efforts are supported by others. SDT posits that interventions which increase autonomy, competence, and relatedness are ideal in order to elicit internally motivated behavior change (Ryan & Deci, 2000).

Many studies have used SDT-based weight loss, physical activity, and dietary behavior interventions with promising results. Studies that assessed weight loss as an outcome variable have found that SDT-based interventions yielded significant weight loss generally (Teixeira et al., 2006; Williams, Grow, Freedman, Ryan, & Deci, 1996), and relative to control groups (Mata et al., 2009; Silva et al., 2010). It has also been observed that SDT-based interventions can increase autonomous self-regulation, intrinsic motivation, and perceived competence for exercise, and level of physical activity relative to general non-theory based interventions (Mata et al., 2009; Silva et al., 2010). The aforementioned studies, however, have not focused on Hispanics. One study conducted that assessed multiple theoretical models and their relation to weight in an overweight and obese Hispanic community sample found that the SDT constructs related to weight were perceived competence for diet and exercise, such that lower weight was associated with greater perceived competence for diet and exercise (Blow et al., manuscript submitted for publication). It seems plausible that perceived competence can be increased when one not only considers potential barriers to the implementation and maintenance of a healthy diet and exercise intervention, but also strategies to overcome those barriers. Thus in the current study it seemed appropriate to assess the efficacy of including intervention components designed to increase perceived competence, particularly for diet given the low level of fruit and vegetable consumption in this particular college student population (Hu et al., 2011).

TTM is a motivation-based model that seeks to increase readiness to change a behavior using five stages of change: precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage one is currently not thinking about behavior change and may not even feel that the particular behavior is an issue (i.e. weight is not affecting health or that no benefit would be gained from weight loss or weight gain prevention). In the

contemplation stage, one may recognize the need to engage in behavior change, and is thinking of change but has not yet committed to taking action. One in the preparation stage is planning behavior change with the intention of changing his or her behavior within the next month. Individuals in the action stage are currently engaged in behavior change, while those in the maintenance stage are continuing behavior change with the intention of preventing relapse into former, maladaptive behaviors. It is thought that identifying an individual's stage of change is beneficial in determining how to intervene (Prochaska & Velicer, 1997).

TTM has been studied extensively and has been found to be an appropriate model to use to determine readiness to change across multiple health behaviors (Laforge, Velicer, Richmond, & Owen, 1999). Studies have found that an individual's stage of change is related to motivational readiness to change in terms of increasing physical activity and improving nutrition (Robinson et al., 2008). Stage of change can also be matched to certain behaviors, such as intensity of exercise (Sarkin, Johnson, Prochaska, & Prochaska, 2001) as well as weight reduction (Prochaska, Norcross, Fowler, Follick, & Abrams, 1992).

TTM has also been successfully applied in overweight populations of Mexican-American women with regard to their progress in a weight-loss treatment program (Suris, et al., 1998). In an overweight and obese Hispanic community sample, it was found that higher weight was associated with greater endorsement of the positive aspects of weight loss, as well as being in the contemplation stage for exercise (Blow et al., manuscript submitted for publication). This suggests a readiness to take steps to implement changes to diet and exercise behavior that could potentially result in weight loss or prevention of weight gain. Further, in a population of UTEP students, it was found that 36.9% reported being in precontemplation, contemplation, or preparation stages for exercise, while 98.2% reported being in the aforementioned stages for fruit

and vegetable intake (Hu et al., 2011). This finding suggests that enhancing motivation to engage in maintaining a healthy diet and exercise program by highlighting the benefits of each behavior while minimizing the negative aspects is a viable avenue for an intervention within this population.

INTERVENTIONS

Numerous interventions in college students and young adult populations have focused on weight loss and preventing weight gain. These interventions include: self-monitoring (Levitsky, Garay, Nausbaum, Neighbors, & DellaValle, 2006), daily weighing (Gokee LaRose, Tate, Gorin, & Wing, 2010), making small or large changes to energy balance (Gokee LaRose et al., 2010), nutrition (Matvienko, Lewis, & Schafer, 2001), healthy lifestyle courses and seminars (Hivert, Langlois, Berard, Cuerrier, & Carpentier, 2007), and online interventions (Gow, Trace, & Mazzeo, 2010). However, many studies utilized weight or prevention of weight gain as the primary outcome variable (Gokee La Rose et al., 2010; Gow et al., 2010; Levitsky et al., 2006) and did not assess changes in weight-related behaviors. Moreover, other previous studies' samples were derived from special populations, in particular females (Levitsky et al., 2006; Matvienko et al., 2001) and primarily overweight and obese populations (Gokee La Rose et al., 2010).

There are few current studies using college student samples that observe the effects of self-monitoring diet and exercise behavior on weight and weight-related behaviors. However, other studies conducted with non-student populations have observed similar trends. Self-monitoring of diet (Burke et al., 2012; Yon, Johnson, Harvey-Berino, Casey Gold, & Howard, 2007) and exercise has been found to be efficacious for sustained weight loss (Helsel, Jakicic, &

Otto, 2007). Though it has been posited that modalities such as electronic formats (i.e. Personal Digital Assistants) are more convenient and therefore more amenable to adherence, it has been found that the modality used to self-monitor is not as important as the actual act of self-monitoring (Burke et al., 2012; Yon et al., 2007). Moreover, the level of detail used in self-monitoring is not as important as the level of adherence to self-monitoring (Helsel et al., 2007). However, the use of self-monitoring with feedback has been found to improve weight loss over self-monitoring alone, and can even enhance adherence to self-monitoring (Burke et al. 2012). As previously stated, these studies were conducted with older, primarily female, and non-Hispanic populations, with weight loss being the primary outcome of interest. Whether similar findings would be observed in Hispanic college students with regard to weight related behaviors warrants further investigation.

One study of particular interest assessed movement through the stages of change in the TTM model in an intervention targeting multiple behaviors related to weight and weight management (Johnson et al., 2008). The intervention provided computer-generated reports to participants that were tailored on various TTM constructs (i.e. stage of change, decisional balance, self-efficacy, and process of change). Significant effects were observed for healthy eating, exercise, and fruit and vegetable intake. However, the sample consisted of overweight and obese adults (mean age 45.37), and only 7% of the sample were of self-reported Hispanic ethnicity.

In terms of intervention modality, many studies have assessed the efficacy of using the internet in order to deliver interventions (Chambliss et al., 2011; Krukowski, Harvey-Berino, Ashikaga, Thomas, & Micco, 2008; Morgan, Lubans, Collins, Warren, & Callister, 2009). While many studies have observed promising results using online interventions, findings from one

study suggests that the inability to highly tailor behavioral feedback via computerized programs may have resulted in a lack of significant difference between treatment conditions (Chambliss et al., 2011). Moreover, one study assessing preferences for various intervention efforts in college students observed that the majority of students indicated a preference for interventions offered on campus as opposed to online or other physical locations (Gokee LaRose, Gorin, Clarke, & Wing, 2011). This suggests that an intervention offered on campus would be a viable and well-received format for college students in the current study.

AIMS AND HYPOTHESES

Given the prevalence of overweight and obesity in college students in the border region, as well as the profoundly low rates of fruit and vegetable intake, the aims of current study were to assess the efficacy of a healthy eating and physical activity intervention (Fit U) for college students that focused on: 1) providing tailored feedback with regard to body composition and total energy expenditure 2) increasing fruit and vegetable intake, healthy eating behavior, and physical activity, and 3) increasing motivation and competence to engage in a healthy diet and physical activity. Hypotheses were that the Fit U intervention group would demonstrate significant changes in primary outcomes (i.e. total calorie intake, fruit and vegetable intake, eating behavior, and physical activity) and secondary outcomes (i.e. motivation and competence to engage in a healthy diet and physical activity) in comparison to a self-monitoring only group. As the current study is a pilot study with a short follow-up period, weight loss was not assessed as a primary outcome. Rather exploratory analyses for changes in weight and waist circumference were conducted. However, assessing changes in behaviors that are critically associated with weight loss, such as changes in fruit and vegetable intake, eating behavior,

physical activity, motivation and competence will inform future larger scale interventions prioritizing Hispanic college students.

PREVIEW

Methods

PARTICIPANTS

A power analysis for multiple linear regression, as outlined in Cohen, Cohen, West, and Aiken (2003), was conducted to obtain the necessary sample size. For Step 1, 15% of the variability was assumed for the control variables and an additional 2.5% variability was assumed in Step 2 for condition. Power set to .95 with one predictor results in a necessary sample size of 262 participants total to detect a significant effect in the current study.

Students ($N = 267$) were recruited from university psychology courses. Eighty-eight percent of those recruited at baseline were retained at follow-up, resulting in a complete sample size of 235 (See Table 1). Participants were female with an average age of 20.7 years ($SD = 4.42$). Self-reported fruit and vegetable intake at baseline was 2.16 ($SD = 1.37$) daily servings. Self-reported cardiovascular exercise per week at baseline was 255.78 ($SD = 265.39$) minutes. The average BMI for males was 25.69 ($SD = 5.07$) and 25.01 ($SD = 14.38$). The average waist circumference was 35.08 inches ($SD = 5.52$) for males and 31.87 inches ($SD = 4.46$) for females (see Table 2).

MEASURES

Measures were counterbalanced within the survey packet in order to eliminate bias that may result from the order in which the measures appear. There were six different orders of survey packets such that the demographic measure always appeared first and the groupings of theoretical measures were maintained yet counterbalanced across theory. The following paper and pencil measures were completed by participants:

A brief screening form (see Appendix A) was used in order to determine eligibility to participate in the proposed study. Inclusion criteria were being aged 18 or older and being of

Hispanic ethnicity. Exclusion criteria were being pregnant or nursing and currently participating in a formal diet and/or exercise program.

Typical demographic information was obtained, such as age, sex, and ethnicity (see Appendix B). In addition, information regarding risks associated with obesity and overweight were gathered, such as smoking status, physical activity level, and family or personal history of Type 2 diabetes, high blood pressure, heart disease, and high cholesterol. The reliability for all measures was assessed using coefficient alpha.

The Perceived Competence Scale for Diet (PCS D; Deci & Ryan, 1985; see Appendix C) is a 4-item measure that assesses confidence in one's ability to maintain a healthy diet. Scores are derived by taking an average of the four items, and higher scores indicate greater perceived competence for diet. The psychometric properties of this measure have previously been established (Deci & Ryan, 1985). Internal reliability for the PCS D was .93.

The Perceived Competence Scale Exercise (PCS E; Deci & Ryan, 1985; see Appendix D) is similar in scoring, number of items, and interpretation to the PCS D, but the scale instead assesses confidence in one's ability to maintain a regular exercise program. The psychometric properties of this measure have previously been established (Deci & Ryan, 1985). Internal reliability for the PCS E was .92.

The Exercise Stage of Change: Short Form (ESC; Marcus, Selby, Niaura, & Rossi, 1992; see Appendix E) is a single item measure which asks whether the participants is currently engaged in or plans to engage in regular exercise. The answer the participant chooses determines whether s/he is in the precontemplation, contemplation, preparation, action, or maintenance stage of change (Marcus et al., 1992).