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Beliefs and Intentions of U.S. Registered Dietitians Toward Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients and Making Referrals

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BELIEFS AND INTENTIONS OF U.S. REGISTERED DIETITIANS TOWARD EVALUATING PSYCHOLOGICAL FACTORS RELATED TO FOOD AND WEIGHT CONCERNS OF WEIGHT MANAGEMENT CLIENTS AND MAKING REFERRALS

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A DISSERTATION

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ABSTRACT

Dietetics practice standards state that registered dietitians (RDs) evaluate psychological factors related to food and weight concerns of weight management clients and make appropriate referrals; however, not all dietitians agree with these standards. RD beliefs and behavioral intentions were examined through correlational survey research with a simple random sample of 5,458 of the nation's 74,723 RDs. The Dietitian Beliefs and Intentions Questionnaire (DBIQ), based on the Theory of Planned Behavior (Ajzen, 1988), was developed to investigate beliefs and intentions of RDs toward evaluating psychological factors and making referrals. The DBIQ was piloted for psychometric properties before use in collecting data in the final study phase. Test-retest reliability was confirmed using paired *t*-tests and the Spearman-Brown coefficient.

Multiple linear regression analysis techniques with cross-validation were used to develop prediction equations to test the null hypotheses (a) there is no difference between predicted and actual intention scores for evaluating psychological factors and (b) there is no difference between predicted and actual intention scores for referring weight management clients to psychological services. Regression models were used to determine the best predictor of intention to perform the practice behaviors. As expected, PCA with internal consistency reliability analyses resulted in four components for each intention variable: intention, attitude, perceived behavioral control, and subjective norm. Composite scores were created and used in analyses. The researcher failed to reject both null hypotheses. The best predictor for intention to evaluate and intention to refer was perceived behavioral control ($p < .001$). All TpB predictors were significant for both practice be-

haviors ($p < .001$). Having taken a course of study in psychology or related field was a significant predictor for intention to evaluate ($p = .027$); working in a practice setting with psychology professionals was a significant predictor for intention to refer ($p = .048$).

It is reasonable to expect that dietitians can improve skills in the area of evaluating psychological factors and making referrals. When the possibility exists that psychological issues are adversely affecting nutritional status, dietitians must identify and refer clients to appropriate services and work collaboratively with other professionals to address client needs.

DEDICATION

This work is dedicated to my advisor, Dr. Retta R. Evans, and to the entire Health Education faculty at the University of Alabama at Birmingham. I cannot write all of what I want to say here because the dissertation would be so full of amazing stories and memories that no one would ever read the research! Dr. Retta Evans "Blazes" through my life like a shiny gold star, helping me to better see my academic strengths (while at the same time having great fun, especially in Cow Town!). Thank you, Dr. Evans, Retta, for your patience, kindness, and personal warmth throughout the process. You are indeed an outstanding mentor and a dear colleague. Dr. Brian Geiger brightens my outlook through service learning. Thank you for introducing me to Living Waters for the World, a faith-based water purification mission helping people acquire "Living Water for the Body and Soul," and for setting a strong example of serving others, Brian. You helped me gain professional confidence and understanding of the concepts of health behavior theory and practice. Dr. David Macrina kept me from drowning in the depths of my topic. That was one of your goals for me and you accomplished it nicely, Dr. Macrina. Dr. Cynthia Petri helped us to reactivate Eta Sigma Gamma and has moved us to be more professional as leaders. Thank you, Dr. Petri. Dr. Laura Talbott is a friend and colleague, and a giver of good advice. Thank you, "Dr. Laura." Dr. Wajih Ahmad encouraged me over the past four years in the program; I appreciate your encouragement. Dr. Scott Snyder continues to teach me more about statistics each time we meet to discuss my research. Your positive encouragement and sound teaching and assessment methods in statistics are appreciated; it is a rare teacher who says "I need you to understand this" and says it in a way that students believe it. My committee members are spectacular and encouraged the com-

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CHAPTER 1

INTRODUCTION

Registered dietitians (RDs) represent the largest group of professionals with the primary focus of working with the public to provide education and guidance for food and weight related issues. Members of this profession function as nutrition experts, especially in the area of obesity and weight management. Given the heterogeneous etiological makeup of obesity and the refractory nature of obesity treatment, dietitians must conduct comprehensive nutrition assessments, make accurate nutritional diagnoses, plan and implement relevant nutrition interventions, and monitor the progress of their clients. Included in this process are evaluations of relevant factors, such as psychological factors, with appropriate referrals to meet the needs of a weight-loss resistant population and to meet dietetics practice standards (Lacey & Pritchett, 2003).

Nutrition assessment is not a static process, but an "ongoing, dynamic process that involves not only initial data collection, but also continual reassessment and analysis of the client's or community's needs assessment" (Kieselhorst, Skates, & Pritchett, 2005, p. 645.e1). According to the American Dietetic Association (ADA), nutrition assessment includes (a) evaluating dietary intake for adequacy and appropriateness; (b) evaluating health and disease condition(s) for consequences related to nutrition (i.e., family history, medical history, co-morbidities, physical findings and anthropometric measurements, medication management, complications and risks, diagnostic evaluations, procedures and tests, and habits and restrictions related to physical activity); (c) evaluating "psychosocial, socioeconomic, functional, and behavioral factors related to food access, selection, preparation, and understanding of health condition…[using] validated developmental, cultural, ethnic, lifestyle, and func-

tional and mental status assessments" (p. 645.e1-e.2); (d) evaluating "client(s) knowledge, readiness to learn, and potential for behavior changes…history of previous nutrition care services/medical nutrition therapy" (p. 645.e2); (e) identifying comparison standards; (f) identifying areas that may pose problems in making nutritional diagnoses; and (g) documenting and communicating time of the assessment, data collected and comparison standards, perceptions and motivation of clients, changes in understanding or food-related behaviors and reason for referral or discharge, if appropriate (p. 645.e2).

The ADA position statement on weight management, authored by Cummings, Parham, and Strain in 2002, and reaffirmed in 2006, lists the appropriate psychological data to include in the nutrition assessment of weight management clients. This includes evidence of depression, post traumatic stress disorder (PTSD), binge eating disorder, bulimia, psychiatric history, untreated psychological disorders, and other psychological treatment barriers.

RDs use psychological data to make decisions regarding weight-loss interventions and as the basis for referrals. Examples of referral decisions would include referring to specialist dietitians, licensed professional counselors, behavioral counselors, psychotherapists, and psychiatrists. Referral issues include, but are not limited to, clinical and sub clinical eating disorders; co-morbidities, such as depression, post traumatic stress disorder (PTSD), and anxiety; and other documented psychological issues that are believed to be barriers to changes in nutritional status.

Referrals are indicated in nutrition assessment, and also in nutrition intervention. Nutrition intervention "involves (a) selecting, (b) planning, and (c) implementing appropriate actions to meet clients' nutrition needs" (Kieselhorst et al., 2005, p. 645.e2-e3). Indicators for the nutrition intervention standard that reference the practice of referrals are (a) Indicator 3.8, which states that the RD "identifies resources and/or referrals needed" (p. 645.e3), and (b) Indicator 3.16.6, which states that the RD documents "referrals made and resources used" (p. 645.e3).

Although evaluating psychological factors and making referrals are essential elements of RDs' responsibilities, there traditionally has been limited insurance reimbursement for these services. In many facilities, dietitian assessment and referral are basic services performed by RDs covered by the facility under DRGs (diagnosis-related groups) and ordered by MDs, though some facilities have assumed fee-for-service billing structures for RD consults to demonstrate the contribution of the dietitian to the health care of the patient.

In many cases now, patients are under managed care with varying rules and regulations among providers. The following is an excerpt from the position of the American Dietetics Association about managed care:

> Until recently, the lack of billing infrastructure has handicapped nutrition providers who wish to bill for their services and has made it difficult to track the outcomes of nutrition care. With the publication of current procedure terminology codes for medical nutrition therapy (MNT) and the implementation of MNT benefits in Medicare part B for diabetes and nondialysis kidney disease, commercial payers, including managed care organizations (MCOs) are likely to implement or expand their coverage of MNT. A large body of evidence supports the efficacy and cost-effectiveness of MNT coverage within managed care plans. This evidence includes cost analyses of conditions treated by MNT, and clinical trial data confirming the efficacy of MNT in improving patient outcomes. (Chima & Pollack, 2002, p. 1471)

Other dietitians have demonstrated that insurance carriers will pay for bariatric surgery and non-surgical forms of weight management, though this action varies widely by state (Tsai, Asch, & Wadden, 2006; Molini, Krenkel, Wirshing, St. Jeor, & Plodkowski, 2007). Of 16 Pennsylvania-based insurance companies responding to a research survey,

> all plans provided some coverage for bariatric surgery. Nine out of 16 companies (56%) stated that they covered individual dietary counseling, but only five paid for intensive counseling.

> Less than 50% of plans reimbursed other forms of lifestyle modification or weight loss medication. Surgery was covered significantly more often than all other treatment modalities ($p <$ 0.02 for all comparisons). No differences in reimbursement were found by plan type or by number of enrollees. Insurance reimbursement for obesity in Pennsylvania does not consistently reflect recent evidence for the benefits of lifestyle modification. Given the increasing evidence for the clinical and cost-effectiveness of nonsurgical weight loss therapy, coverage policies may begin to change. (Tsai et al., 2006)

To date, there are no uniform codes for dietetic services reimbursement. Whether a facility is covering the dietitian's salary in the facility budget, whether an insurance company is reimbursing for services rendered, or whether a client is paying out of pocket for private consultation, the dietetic practice standards remain the same. The manner in which a dietitian's workload is established varies by practice setting and departmental guidelines; however, whenever a dietitian comes in contact with a client related to weight management, it is the responsibility of the dietitian to work with that client according to the practice standards.

There has been limited dietetics practice research conducted on a national scale and published for the benefit of the profession. Research at this level is important because RDs make autonomous practice decisions based on professional judgment and critical thinking. Exploring the beliefs and intentions of RDs toward meeting the practice standards related to evaluating psychological factors and making referrals may assist the profession in evaluating professional practice behavior across the profession. Determining the best predictors of these two dietetic practices would be helpful to the profession, as well.

Study Problem

RDs are expected to use professional judgment and critical thinking to make practice decisions about evaluating psychological factors so that proper nutritional diagnoses and referrals for psychological diagnoses and treatment can be made. One psychological factor related to food and weight concerns would be "depression." An RD who has reason to believe a client is exhibiting symptoms of depression that are adversely affecting the client's nutritional status may refer the client to psychological services for further evaluation, diagnosis and treatment, while at the same time addressing the nutritional issues (as part of a treatment team or individually) to the extent possible within the scope of dietetic practice. The example of depression and obesity is used throughout this dissertation, as recent research findings indicate a bidirectional causal relationship between the two conditions (Markowitz, Friedman, & Arent, 2008).

While professional practice standards are published by the ADA that call for evaluating psychological factors and making referrals (Kieselhorst et al., 2005), it is recognized that staffing patterns and facility-specific protocols directly affect what can be realistically accomplished by practicing dietitians. Additionally, all RDs do not agree that dietitians should evaluate psychological factors; some feel it is outside the scope of training and responsibility of the position even though it is a practice standard. Referral practices might be limited by administrative dictates, in some instances. These observations are made on the basis that the researcher is a participant observer in the profession of dietetics and has participated in numerous such discussions in the practice arena. There is a gap between the published practice standards and stated opinions of members of the dietetics profession about the practice standards.

The purpose of the present study was to examine beliefs and intentions of U.S. RDs toward evaluating psychological factors related to food and weight concerns of weight management clients and making referrals to determine the best predictor variable for each practice behavior. A correlational,

predictive research design was used with a simple random sample of 5,148 of the nation's 74,723 RDs, randomized to three phases of the research (elicitation phase, pilot phase and final phase). A valid and reliable survey instrument, "Dietitians Beliefs and Intentions Questionnaire (DBIQ)" was constructed to measure beliefs and behavioral intentions of RDs toward evaluating psychological factors related to food and weight concerns of weight management clients and toward referring weight management clients to psychological services, as appropriate. The questionnaire was developed using concepts from the Theory of Planned Behavior (TpB; Ajzen, 1988), which posits that intention to perform a behavior is the most proximal measure to the performance of the behavior. (Further information about the TpB is provided in Chapter 3.) The questionnaire was pilot tested to determine psychometric properties to ensure validity and reliability before using it to gather data for the study. An a priori power analysis was performed to determine the number of participant responses needed in the statistical analyses.

Significance of the Problem

Efforts to reduce obesity carry long-term success rates so low that some researchers suggest it is unethical to treat the condition at all. In the article, "The High Cost of False Hope" published in the *Journal of the American Dietetic Association,* Wooley and Garner (1991) describe the destructive physical and emotional consequences of weight cycling seen with repeated bouts of weight loss and regain, such as worthlessness, helplessness, and hopelessness. Other researchers have documented the psychological and physiological cost of weight cycling (Brownell & Rodin, 1994a, 1994b; Foreyt et al., 1995; Foster, Wadden, Kendall, Stunkard, & Vogt, 1996). While researchers look for answers to the complex problem of obesity, it has been hypothesized that potential solutions will need to consider more closely the contributing factors of individual cases of obesity so as to tailor obesity treatment. Since RDs represent the largest group of professionals trained specifically to perform nutritional assessments and formulate nutrition treatment plans, it is critical that members of this profession remain aware and

informed of obesity research findings, especially related to etiology and treatment, so that the progress and gains made through interdisciplinary research efforts may be translated to weight management efforts via evidenced-based approaches.

Psychological factors influencing eating behaviors and/or contributing to increased body weight have been identified in the professional obesity literature, along with factors in other domains of health that are outside the scope of this research. Psychological factors related to obesity include, but are not limited to, alexithymia (Hund & Espelage, 2005), anxiety disorders, post traumatic stress disorder (PTSD), bipolar disorder, bulimia, binge eating disorder (BED), addictions (Cummings et al., 2002), depression (Markowitz et al., 2008; Stunkard, Faith, & Allison, 2003; Telch & Agras, 1996; Thakore, Richards, Reznek, Martin, & Dinan, 1997; Werrij, Mulkens, Hospers, & Jansen, 2006) night-eating syndrome (Pawlow, O'Neil, & Malcolm, 2003), among others. Frequency of weight stigmatization has been found to be positively associated with BMI (Puhl & Brownell, 2006), as has stress (deCastro, 2004; Kivimaki et al., 2006; Kouvonen, Kivimaki, Cox, Cox, & Vahtera, 2005; Laitinen, Ek, & Sovio, 2002; Leitenberg, Gibson, & Novy, 2004; Rutledge & Linden, 1998; Woolsey, 2002). Use of medications prescribed to treat psychiatric and psychological conditions also has been associated with weight gain, including that of certain antipsychotics, antidepressants, mood stabilizers, and anxiolytics (Delvin et al., 2000; Keith et al., 2006), steroids, cyproheptadine and insulin (Cummings et al., 2002).

Study Objectives

The objectives of the present study were:

1. To develop a theory-based valid and reliable questionnaire to examine beliefs and intentions of RDs related to (a) evaluating psychological factors related to food and weight concerns of

weight management clients and (b) referring weight management clients to psychological services, as appropriate;

2. To pilot test the questionnaire via USPS mail and email with a simple random sample of 300 of the nation's 74,723 RDs registered with the Commission on Dietetic Registration (CDR) to determine psychometric properties and response rates;

3. To administer the questionnaire to a simple random sample of 5,128 RDs to determine if intention scores could be predicted from the study IVs, and, if so, to determine the best predictor of behavioral intention to (a) evaluate psychological factors related to food and weight concerns of weight management clients and (b) refer weight management clients to psychological services, as appropriate.

Research Questions

The research questions developed for the study were:

1. What is the best predictor of U.S. RDs' intentions to evaluate psychological factors related to food and weight concerns of weight management clients?

2. What is the best predictor of U.S. RDs' intentions to make psychological referrals related to food and weight concerns of weight management clients, as appropriate?

Null Hypotheses

The null hypotheses developed for the study were as follows:

1. There is no difference between U.S. RDs' actual intention scores to evaluate psychological factors related to food and weight concerns of weight management clients and predicted intention scores based on (a) attitude score, evaluation; (b) subjective norm score, evaluation; (c) perceived behavioral control score, evaluation; (d) number of years of practice in the United States; (e) number of hours of professional development related to eating disorders, (f) course of study (includes a graduate

certificate, minor or major in psychology or related field, does not include a graduate certificate, minor or major in psychology or related field), (g) practice setting primarily related to eating disorder treatment or not primarily related to eating disorder treatment, (h) practice setting related to psychology practice or not primarily related to psychology practice, (i) personal history of clinical eating disorder (BN or BED), and (j) personal history of self-assessed subclinical eating disorder (BN or BED).

2. There is no difference between U.S. RDs' actual intention scores to refer weight management clients to psychological services, as appropriate, and predicted intention scores based on (a) attitude score, referral; (b) subjective norm score, referral; (c) perceived behavioral control score, referral; (d) number of years of practice in the United States; (e) number of hours of professional development related to eating disorders, (f) course of study (includes a graduate certificate, minor or major in psychology or related field, does not include a graduate certificate, minor or major in psychology or related field), (g) practice setting primarily related to eating disorder treatment or not primarily related to eating disorder treatment, (h) practice setting related to psychology practice or not primarily related to psychology practice, (i) personal history of clinical eating disorder (BN or BED), and (j) personal history of self-assessed subclinical eating disorder (BN or BED).

Delimitations

The scope of this research was limited in the following ways. While RDs assess many factors related to nutritional status, the area of assessment and referral considered in the study was limited to psychological factors. Additionally, the scope of the research was limited to the broad concepts of the TpB: intentions, behavioral beliefs, normative beliefs, and control beliefs. Specific beliefs within these categories were not identified in this study.

Limitations

The study is limited to dietitians holding current registration status with the Commission on Dietetic Registration (CDR). Additionally, the study is limited to RDs practicing in the United States.

Assumptions

For the purpose of this study, the following assumptions were made: (a) the researcher had access to the name and correct contact information for each RD holding registration status with the CDR; (b) the CDR accurately drew the random sample used in the study; (c) RD participants accurately completed and submitted the on-line questionnaire; and (d) the content jury were competent professionals that complied with study requests in a timely manner.

Summary

Obesity is a multifaceted, heterogeneous chronic condition that requires treatment based on contributing factors to individual cases of obesity. RDs constitute the largest group of health care practitioners trained to provide nutritional assessment, make nutritional diagnoses, plan and implement nutrition interventions, and monitor client progress, and, as such, must remain informed of scientific gains in the understanding of obesity treatment and weight management through current research efforts. Research on psychological issues affecting eating behavior and body weight has specific relevancy to RDs.

Because evaluating psychological factors and making referrals leaves much to the professional judgment of dietetic practitioners, the researcher sought to establish currently held RD beliefs and behavioral intentions regarding these practice behaviors by conducting survey research with a simple random sample of 5,148 of the nation's 74,723 RDs. A valid and reliable survey instrument was developed to examine beliefs and behavioral intentions of RDs to evaluate psychological factors related to

food and weight concerns of weight management clients and to refer weight management clients to psychological services, as appropriate. The Dietitian Beliefs and Intentions Questionnaire (DBIQ), based on the Theory of Planned Behavior (Ajzen, 1988), was pilot-tested for its psychometric properties to ensure validity and reliability before using it to gather data for the final phase of the study.

CHAPTER 2

LITERATURE REVIEW

The Nature of Obesity: Genetic and Environmental Factors

Obesity is a multifaceted, heterogeneous chronic condition defined as an excess accumulation of body fat that represents an imbalance in the energy balance equation. It is estimated that 30.4% of adults in the United States are obese, according to data gathered from the National Health and Nutrition Examination Survey (NHANES), a rate that has doubled since 1980 (Baskin, Ard, Franklin and Allison, 2005). The increasing obesity rate is a concern for health care practitioners, mental health professionals, health educators, exercise scientists, and others. Researchers continue to investigate the obesity phenomenon from many etiological perspectives; yet, the epidemic continues with the threat of reaching pandemic proportions, as the increased numbers of obese children reach adulthood (Uwaifo & Arioglu, 2005).

Body mass index (BMI) is the ratio of total body weight (kg) divided by height (m) squared ($BMI = kg/m^2$), and has been found to closely correlate with body fatness in the general population; BMI is used to define overweight ($BMI \geq 25\ kg/m^2$) and obesity (class I, $BMI \geq 30\ kg/m^2$; class II, $BMI \geq 35\ kg/m^2$; class III, $BMI \geq 40\ kg/m^2$); however, other measures, such as hydrostatic weighing, bio-impedance and skinfold measures, more accurately assess body fat percentage and are especially useful in the assessment of athletes and others who have a higher percentage of muscle mass than the general population (Vaughn, 2002). National Institutes of Health (NIH) and The National Heart, Lung, and Blood Institutes (NHLBI) guidelines suggest that body fat percentages in excess of 22% for males or 32% for females increase risk of chronic disease (National Heart, Lung, and Blood Institute, 1998).

While many factors affecting energy balance have been identified, essentially all can be categorized as behavioral (e.g. food selection and physical activity) and/or physiological (e.g. metabolism) factors influenced by genetics and the environment (Figure 1).

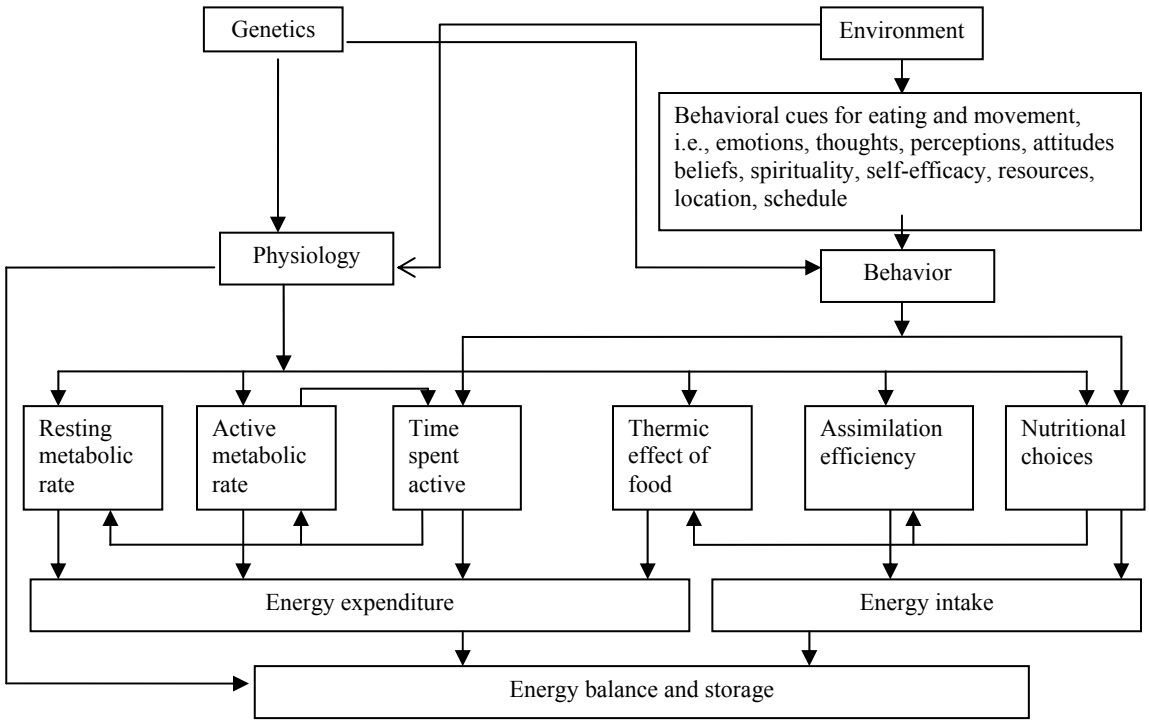

Figure 1. Relationship of genetics and environment to energy balance and storage.[1]
[1]From "Obesity: the integrated roles of environment and genetics," by J. R. Speakman, 2004, *Journal of Nutrition, 134*(Suppl.), 2092S. Copyright 2004 by the American Society for Nutritional Sciences. Adapted with permission of the author.

Researchers investigating the impact of energy expenditure on weight status found that relatively low daily energy expenditure/utilization was significantly correlated ($r = -0.39$, $p < 0.001$) with rate of weight gain (Weinsier et al., 1998). Bassett (2004) used pedometers to document activity levels in an Old Order Amish community, recording high levels of activity (mean for men = 18,425 steps; mean for women = 14,196 steps) and low levels of obesity (prevalence rates for men = 0%; prevalence rates for women = 9%). In contrast, 2005 data from the Centers for Disease Control

(CDC) for the general U.S. population on leisure-time activity showed 25% of adults reporting no physical activity at all, and 37.7% of adults reporting insufficient levels of activity (USDHHS, 2007). The combination of decreased activity, increased dietary density and portion size, with a greater number of meals eaten outside the home, contribute to an "obesigenic" environment, of which stress is thought to be a factor (deCastro, 2004; Kivimaki et al., 2006; Kouvonen et al., 2005; Laitinen et al., 2002; Leitenberg et al., 2004; Rutledge & Linden, 1998). "Putative contributors" to the obesity epidemic, other than the most commonly studied factors of decreased activity and increased marketing of high caloric food, have been identified by Keith et al. (2006) as sleep deficit, increased endocrine disruptors in the food chain, ambient temperature variance reduction, smoking decrease, effects of certain pharmaceuticals, changes in ethnicity and age distributions in the population, increasing age of childbearing, in utero or intergenerational oocyte effects, greater BMI associated with "greater reproductive fitness yielding selection for obesity-predisposing genotypes" (p. 1590), and effects of assortive mating whereby "the probability that two individuals mate is positively related to their degree of phenotypic similarity" (p. 1590).

Obesity and Stress

An online search using the key words "obesity and stress" was conducted for related peer-reviewed, published studies within the past 10 years indexed in the following databases: Academic Search Premier, CINAHL, Health Source: Nursing/Academic Edition, Professional Development Collection, PsychInfo, and PubMed. For the purposes of this dissertation, research is limited to studies of adult human participants, though animal studies were reviewed briefly. It is interesting to note that certain species of animals react similarly to stressors as do humans (i.e., laboratory mice lose body mass and subordinate Syrian hamsters gain body mass in response to stress; Solomon, Foster, Bartness, & Hubman, 2007); finding an animal model that simulates changes in humans relative to stress allows

researchers to conduct studies that would otherwise be impossible (Jayo, Shively, Kaplan, & Manuck, 1993; Rebuffe-Scrive, Walsh, McEwen, & Rodin, 1992). Of the large number of studies that met inclusion criteria for this review, six recent studies were identified that represent the types of studies conducted on stress, obesity and eating behavior found in the professional literature and will be discussed in detail to provide examples of study designs, methodology and measures used in stress-obesity research. The studies listed in this section are not presented as an exhaustive description of stress-obesity studies, but rather a sample chosen to illustrate the nature of the literature.

General Features of Studies Linking Stress, Obesity, and Eating Behavior

A general characteristic of the stress-obesity research is that studies range from simple to complex and from physiological to psychological, with measures of varying types and sensitivity. For example, some studies use abdominal adiposity as a variable, with the measure of abdominal adiposity ranging from calculations of waist-to-hip ratio (WHR; Epel et al., 2000; Gluck, Geliebter, & Lorence, 2004; Steptoe, Kunz-Ebrecht, Brydol, & Wardle, 2004; Yancura, Aldwin, Levenson, & Spiro, 2006) to MRI scans separating visceral from subcutaneous abdominal fat (Marniemi et al., 2002). In studies investigating dietary intake as a variable, measures range from 24-hour dietary recall (Smith, Baum, & Wing, 2005) to a computerized monitor that measures the rate and volume of food consumed in a laboratory setting (Elfhag, Barkeling, Carlsson, & Rossner, 2003). In studies of cortisol secretion, some researchers measure urinary cortisol, while others measure plasma cortisol or salivary cortisol. This is important because each of these measures represents differing pathways cortisol follows in the human body.

Study design and methodology vary throughout the stress-obesity literature, from survey research to experimental studies, including cross-sectional, longitudinal cohort, and case-controlled studies using a variety of analytical techniques, such as univariate and multivariate ANOVAs and struc-

tural equation modeling. Hypotheses tested in the stress-obesity literature include that (a) stress is associated with increased cortisol levels, and increased cortisol levels are associated with central obesity and/or the metabolic syndrome, (b) stress is associated with changes in eating behavior, both increased and decreased, and increased eating behavior (especially binge eating) results in obesity, or that (c) both a and b are true.

Specific Examples of Studies Linking Stress, Obesity, and Eating Behavior

"Coping, Affect, and The Metabolic Syndrome in Older Men: How Does Coping Get Under the Skin?" (Yancura et al., 2006). In this study, the metabolic syndrome was defined as a complex set of interrelated factors of obesity, high blood pressure, elevated lipids, and elevated blood glucose. The purpose of the study was to test a model "in which the relationship between stress and the metabolic syndrome was mediated by appraisal, coping and affect" (p. P295). The hypothesis was that affect would be influenced by appraisal and coping along pathways that are "differentiated by emotional valence" (p. P296).

The data analyzed in this study was taken from the Normative Aging Study (NAS), which has followed 2,280 men in a longitudinal study since the 1960s. The 1994-1997 wave participants were asked to complete the Health and Social Behavior Survey (HSB) one month before their triennial physical examinations. Psychosocial data from the HSB and physical data from the medical examinations were analyzed. Of the total 801 HSB questionnaires completed in the 1994-1997 wave, 247 had missing data; therefore, these participants were excluded, along with 36 other men who were found to be diabetic. Data for excluded participants was analyzed for comparison with the study sample, and it was found that excluded participants ranked both higher and lower on the physiological measures, depending on the criteria for exclusion. The final sample used for the study was 518 participants with a mean age of 68.17 years (Yancura et al., 2006).

Measures used in the study were defined for stress, appraisal, coping, affect, obesity, lipids, blood pressure and glucose. Recent stress episodes were rated on a seven-point scale from not troublesome at all to the most troublesome. These stressful episodes were appraised as "threat, harm-loss, challenge, at a loss for what to do next, and annoyed or worried about others" (Yancura et al., 2006, p. P297). Coping was measured using two factors from the California Coping Inventory (CCI). These factors were the positive action coping factor and the negative action coping factor; both subscales demonstrated high internal consistency. Affect was measured using the Positive and Negative Affect (PANAS) scales. Participants rated the extent to which 10 emotions were experienced on each of the two scales on a five-point rating scale from "very slightly or not at all" to "extremely." Obesity was measured using BMI. Abdominal circumference at the height of the umbilicus was obtained and hip circumference was measured at the point where the buttocks most greatly protruded. WHRs were calculated in centimeters. Lipids were measured in terms of fasting high-density lipoprotein cholesterol (HDL-C) and triglycerides (TRI). Blood pressure was measured using averaged systolic and diastolic measurements taken in the right and left arms in supine, sitting and standing positions. Fasting glucose measurements were taken with a 100g glucose challenge and glucose measurement at 2-hour post challenge. Information on covariates, such as medication usage and smoking self-report, was gathered by clinical interviewers (Yancura et al., 2006).

The plan for statistical analysis included three stages. In Stage 1, the researchers investigated if the metabolic syndrome measurement model used in the study adequately fit the data. In Stage 2, eight observed variables were used to calculate four second-order metabolic syndrome variables to maximize power in the model. In Stage 3, the stress and coping variables were linked to the metabolic syndrome to "test if affect mediated between coping and the metabolic syndrome" (Yancura et al., 2006, p. P298).

Results of analyses indicated that initially the data was not a good fit for the mediation model. Non-significant paths were deleted and additional paths were included "between positive and negative coping and from stress to negative affect to obtain adequate model fit" (Yancura et al., 2006, p. P299). The final model did not include nonsignificant paths "from negative coping, negative affect, and positive affect to the metabolic syndrome" (p. P299), and adequately fit the data. Findings showed age was negatively associated with the metabolic syndrome and "affect did not mediate between coping and the metabolic syndrome" (p. P299). The path from positive coping to the metabolic syndrome was the only significant path found. This finding was described as "most intriguing," suggesting a protective mechanism of positive coping and health. The authors suggested further research in this area to understand how positive coping affects health.

Since participants had been followed for several decades, information was available from historical medical data. The study used advanced statistical procedures in structural equation modeling to examine the complex relationships between stress and obesity/metabolic syndrome rather than simply reporting the relationships exist, as in most other studies on stress and obesity. Researchers used the findings of prior research in this area (Grundy et al., 2005) to develop a set of markers to indicate the presence of the metabolic syndrome that had sufficient power to detect the condition, and the markers were measured at the time of the study to confirm the values (the researchers did not use old lab values from historical information). Cases with missing data were systematically excluded from the study (still leaving a sample of greater than 500 participants) and researchers gathered information on excluded cases to compare with the study findings. According to the researchers, one of the major limitations of the study was that the metabolic syndrome develops slowly, and some of the more proximal measures related to stress might be related to affect but were not identified in the study due to the relatively short length of the study. Due to the geographic location of the study, the level of homogeneity was high; however, gender and racial differences in the metabolic syndrome were present.

"Stress and Weight Gain in Parents of Cancer Patients" (Smith et al., 2005). The objective of this longitudinal case-control study was to investigate weight changes resulting from the effect on health behaviors of chronic stress in parents of children with newly diagnosed cases of cancer in comparison to parents with healthy children. The study hypothesis was that parents of children diagnosed with cancer would report greater levels of distress, greater calories consumed, and lower levels of physical activity in comparison to parents of healthy children, and that the parents of children with cancer would demonstrate a greater level of weight change over the three months of the study (Smith et al., 2005).

Participants in the study were parents of healthy children ($n = 49$) and parents of children with a diagnosis of cancer ($n = 49$). Of the parents of healthy children, 28 were female and 21 were male. Of those with children diagnosed with cancer, 32 were female and 17 were male. The age of the participants ranged from 19-58 years. Participants were recruited as follows: parents of children with cancer were recruited through the Children's Hospital of Pittsburgh not more than 2 weeks after diagnosis. Parents of healthy children were recruited via local newspaper advertisements and neighborhood flyers. Eligibility to participate in the study included being in a care-giving role for a child between 1 and 18 years old and free of a major illness in the past 3 months. Females who were pregnant or planning to be pregnant during the study period were excluded (Smith et al., 2005).

Study methodology included assessing the participants within two weeks of the cancer diagnosis (Time 1) and again three months later (Time 2). Participants received $15 per session and sessions were scheduled at Children's Hospital of Pittsburgh and the University of Pittsburgh Cancer Institute. Measures for the study included the following: body weight assessed with a calibrated digital scale (weight in street clothes without shoes); eating behavior assessed with a 24-hour dietary recall (analyzed using the Minnesota Nutrition Data System) and the Three-Factor Eating Questionnaire (assessment of dietary restraint, disinhibition and hunger); physical activity measured with the Paffenbarger Activity Questionnaire (assessment of usual activity levels during the preceding week with accompany-

ing estimates of energy expenditure); time spent watching television and sitting (in hours); current stress measured using the Perceived Stress Scale short form (assessment of life as unpredictable, uncontrollable, and overloaded); background stress measured with the Recent Life Changes Questionnaire (assessment of prospective life change and recent history of 55 major life events); and mood measured by the Profile of Mood States (65-item scale measuring fatigue, tension-anxiety, confusion-bewilderment, anger-hostility, depression-dejection, and vigor; Smith et al., 2005).

Data analysis techniques compared characteristics of parent groups using one-way ANOVAs and chi square statistics. Chi square analysis was used to determine the percentage of parents from each group who gained weight. A two by two repeated measures ANOVA was used to examine body weight (groups were: healthy, non healthy; times were: Time 1, Time 2). Behavioral variables also were examined with repeated measures ANOVA, including "total calories expended in physical activity, hours spent watching television, calories consumed, and percent of calories from fat" (Smith et al., 2005, p. 245). The researchers then used two by two repeated measures ANOVAs (groups: weight gained, weight lost; times: Time 1, Time 2) to analyze the differences in diet and physical activity between two subgroups of the participants: the 20% of the sample who gained the most weight and the 20% of the sample who lost the most weight. To verify that the parents of children diagnosed with cancer were the most stressed of the groups, comparisons were made using univariate ANOVAs on Time 1 scores of "Impact of Child's Illness" (p. 245).

The data were analyzed for explanations of weight change (Smith et al., 2005). Results showed "parents of cancer patients were more likely to gain weight (weight change ranged from -8 to 20 pounds) and experienced significantly more weight gain over the three months than parents of healthy children (weight change ranged from 7 to 9 pounds)" (Smith et al., 2005, p. 244). The degree of weight gain was associated with the level of psychological distress experienced by the parents. Physical activity level and caloric intake were reported by parents of cancer patients to be lower than

those of parents of healthy children and physical activity was calculated to be the largest difference between groups (Smith et al., 2005, p. 244).

The researchers noted the difference in physical activity over diet most likely reflected the changes in daily life routines that occurred following a diagnosis of cancer. Findings from the study indicated that the parents of children with cancer expended 400-500 kcal/week in activity in comparison to 1400-1500 kcal/week expended by parents of healthy children. Dietary intake averaged 300 kcal/week less in parents of children with cancer. While differences in energy expended in physical activity and energy consumed through diet were not found to be correlated with changes in body weight individually, collectively they fit the data through changes in the overall energy balance as seen in changes in body weight. Overall, "parents of children recently diagnosed with cancer reported significant psychological distress and experienced weight gains averaging 1.76 kg over 3 months compared to weight stability in non-stressed parents" (p. 249). A conclusion drawn by the authors was that a major life stressor such as having a child diagnosed with cancer is associated with a gain in body weight. Further, that long-term body weight changes should be studied, focusing on physical activity changes as well as dietary changes as a result of stress.

"Central Adiposity and Cortisol Responses to Waking in Middle-Aged Men and Women" (Steptoe et al., 2004). This study explored the link between central obesity and cortisol levels. The objective of this study was to investigate "whether central adiposity indexed by waist/hip ratio is related to cortisol responses to waking and other measures of salivary cortisol over the work day" (p. 1168). Participants were 196 men and women between the ages of 47 and 59 years who were part of the Whitehall II study, a prospective epidemiological study of 10,308 British civil servants designed to assess "psychobiological correlates of socioeconomic position" (p. 1169). Study participants were drawn "systematically" from "higher and lower occupational grades." All were from London and planned to continue

working for at least three years. No participants had a history of coronary heart disease, had been positive for cancer in the past five years, were diabetic, nor were diagnosed or treated for high blood pressure or psychiatric illness (Steptoe et al., 2004).

Study measures included saliva cortisol levels taken on a work day at the following times: on waking, after thirty minutes, and "within eight 30-min time windows through the day and evening (0800-0830, 1000-1030 … 2200-2230)…Participants also stated the time they woke up and the times at which each sample was obtained" (Steptoe et al, 2004, p. 1169). Other measures used were anthropometric and blood measures obtained by a research nurse: height, weight, BMI (calculated), waist circumference, hip circumference, nonfasting blood measurements of total cholesterol and high-density lipoprotein (HDL) cholesterol. Information on smoking and consumption of alcohol was obtained by questionnaire resulting in classification of smokers/nonsmokers and on the basis of daily alcohol consumption/less frequent consumption. Complete data on saliva cortisol levels were obtained from all 189 participants. Measure of cortisol response upon waking was calculated by finding the difference between waking values and those taken 30 minutes later. Values taken greater than 10 minutes after waking were excluded. Extreme outliers were excluded. There was no variation in exclusions by waist/hip ratio, sex, or socioeconomic position (Steptoe et al., 2004).

Data from a total of 172 participants (n = 89 males, n = 83 females) were analyzed. Cortisol values were analyzed at waking, at 30 minutes following waking, at the average value taken over the day, the minimum evening value, and "the slope of cortisol decline over the day…computed as the difference between cortisol measured 30 minutes after waking and the minimum evening value" (Steptoe et al., 2004, p. 1169). Partial product-moment correlations were used in analysis of associations between waist/hip ratio and cortisol parameters, controlling for age, socioeconomic position, smoking, age, waking time, and alcohol consumption. Data from males and females were analyzed sepa-

rately, and use of HRT (hormone replacement therapy) was used as a covariate for women (Steptoe et al., 2004).

Results of the investigation showed that in men, "waist/hip ratio was positively correlated with the cortisol response to waking" ($r = 0.29$, $p = 0.009$) and the cortisol response to waking and average cortisol values over the day were positively correlated ($r = 0.30$, $p = 0.005$; Steptoe et al., 2004, p. 1170), but the same correlations were not seen in women. The researchers initially attributed this finding to the fact that all of the female participants in the study were postmenopausal and some were receiving HRT treatment; however, upon further investigation, HRT treatment was found not to be responsible for the differences in response.

In summary, the study findings "confirm the previously described association between cortisol responses to waking and central adiposity in a larger sample of men, and indicate that this aspect of cortisol dynamic may be particularly interesting in the investigation of neuroendocrine dysfunction in central obesity" (p. 1171). The researchers listed similar studies whereby the positive association was found also in women. The researchers used limitations of similar studies to improve methodological procedures for more sensitive indexing of saliva cortisol measures on waking than previous studies and in controlling for covariates in the statistical analysis (Steptoe et al., 2004).

"Cortisol Stress Response is Positively Correlated With Central Obesity in Obese Women With Binge Eating Disorder (BED) Before and After Cognitive-Behavioral Treatment" (Gluck et al., 2004). This study "compared cortisol stress response in obese women with and without BED (binge eating disorder), both before and after treatment, and examined the relation between central fat (WHR) and cortisol stress responsivity" (p. 203). Cortisol is released during stress and has the capacity to increase both hunger and eating behavior; therefore, the researchers studied whether endogenous cortisol release as a result of stress mediated stress-induced eating. These relationships had not previously been studied in obese

women with BED and are important because "about 30% (18-46%) of obese individuals presenting for weight loss treatment have Binge Eating Disorder (BED)" (Mitchell and Mussell, as cited in Gluck et al., 2004, p. 202).

Participants were "healthy overweight women" recruited for an outpatient study conducted at the New York Obesity Research Center of St. Luke's/Roosevelt Hospital. Exclusion criteria included "significant medical illnesses, dieting, smoking, use of most prescribed medications, substance abuse or dependence within the last 6 months, or previous psychiatric hospitalization" (Gluck et al, 2004, p. 203). The study protocol included (a) physical examination and (b) completion of the Questionnaire on Eating and Weight Patterns (QEWP) for use in diagnosing BED. Among the 24 participants, 13 were classified as non-BED and 11 were classified as BED. Two of the non-BED participants left the study because of time constraints, leaving 11 non-BED and 11 BED female participants. There was no significant variance in the two groups based on age, body mass index (BMI), or waist-to-hip ratio (WHR); however, morning cortisol levels were found to be higher in women using oral contraceptives; therefore, oral contraceptive use was used as a covariate in cortisol analyses (Gluck et al., 2004).

Study measures included (a) anthropometric measurements of body composition, including waist circumference and hip circumference; (b) blood measurements of cortisol and insulin; and (c) body weight. Study methods consisted of the following steps:

1. After a 12-hour fast, blood was drawn through an intravenous catheter at approximately 9:00 a.m., to obtain basal cortisol values, and then periodically for the next two hours for an unrelated study.

2. After a two-hour rest, participants underwent a cold pressor test (CPT), immersing for 2 minutes the nondominant hand.

3. Blood samples were taken at -10 and 0 minutes for baseline measurements, then at 2, 5, 15, 30, 45 and 60 minutes, and assayed for insulin and cortisol.

4. After all initial testing was completed, 20 participants remained in the study. These participants were randomly assigned to a 6-week program consisting of either (a) weekly cognitive behavioral therapy (CBT) and diet (900 kcal/day liquid ProCal diet; $n = 5$ BED, $n = 5$ non-BED) or (b) a Wait List ($n = 5$ BED, $n = 5$ non-BED).

5. Body weight was assessed weekly in the CBT/diet group and biweekly in the Wait List group (Gluck et al., 2004).

Results for cortisol showed morning basal cortisol levels were significantly higher in BED participants than in non-BED participants. Additionally, AUC (area under the curve) for cortisol was significantly greater ($F = 4.5$, $p = .047$) in BED participants than in non-BED participants (after controlling for insulin). Results for correlations showed in the BED group only, "WHR was significantly correlated with AUC for cortisol ($r = .81$, $p = .002$) and peak cortisol response (at 15 minutes; $r = .80$, $p = .003$)" (Gluck et al., 2004, p. 205). Results of the intervention showed the CBT and diet group lost more weight than the Wait List group ($p = .006$). In addition,

> after the intervention period, there were no BED group or treatment-group differences in WHR, morning basal cortisol, or AUC cortisol following CPT. However, WHR remained significantly correlated with AUC for cortisol ($r = .87$, $p = .002$) and peak cortisol ($r = .81$, $p = .008$), only in the BED group in both intervention conditions. (p. 205)

These findings of greater levels of basal cortisol and increased cortisol following stress are similar to previous studies with bulimia nervosa, extending the findings of the relationship between stress and eating to BED. The findings support the idea that stress plays a role in binge eating episode initiation as hypothesized in the study model of the stress-eating relationship, "where total output of cortisol after stress serves as a mediator between stress and binge eating" (Gluck et al., 2004, p. 205).

"Visceral Fat and Psychosocial Stress in Identical Twins Discordant for Obesity" (Marniemi et al., 2002).

The objective of this study was to investigate the relationship between psychosocial stress, body fat distribution, and obesity given identical genetic factors. The study subjects were 28 adult twin pairs (monozygotic; $n = 12$ female, $n = 8$ male) selected from the Finnish Twin Cohort averaging a difference in body weight of 17 kg. The Finnish Twin Cohort includes all pairs of adult twins born in Finland before 1958 that were alive in 1975. All pairs under the age of 60 years were mailed a questionnaire to identify those pairs discordant for obesity. Discordance was defined as at least 4 kg/m^2 difference in body mass index (BMI), and the obese cotwin was at least 27 kg/m^2 while the lean cotwin was less than 25 kg/m^2. Medical histories that revealed one or both of the cotwins had an endocrinological or psychiatric disease, or were on medication affecting lipids or glucose metabolism, excluded the pair (Marniemi et al., 2002, p. 36).

Of the 28 pairs identified, 2 pairs were excluded because there was too small a difference in body weight between the twins, 1 pair was excluded because one of the twins was found to have diabetes mellitus not previously diagnosed, 2 pairs were found to be dizygotic, and 3 pairs could not be examined by MRI technology, either due to claustrophobia or malfunction of the MRI equipment; the final sample included 20 pairs of twins. The 20 pairs of twins were medically examined and divided into groups based on two criteria: "in Group A the visceral fat area of the obese cotwin was higher and, in Group B, lower than the gender-specific median value" (Marniemi et al., 2002, p. 35).

Measures used in the study were: (a) adiposity and distribution using MRI measurements and other body composition assays; (b) blood pressure and metabolic rate; (c) exercise test; (d) biochemical measures of fasting serum and 24-hour urinary cortisol, serum adrenocorticotropic hormone (ACTH), corticosteroid-binding globulin (CBG), testosterone, and serum and urine catecholamine; (e) sleep measures (nocturnal body movements, ballistocardiac and respiratory activities); and (f) psycho-

logical measures using the Beck Depression Inventory, the Nottingham Health Profile, and the Hamilton Rating Scale for Depression (Marniemi et al., 2002).

A statistical comparison was made between groups on the level of intrapair differences and results of the study showed that "daily urinary cortisol and noradrenaline excretion were higher in the obese cotwins in group A but not in group B" ($p = 0.026$; $p = 0.020$, respectively; Marniemi et al., 2002, p. 41). Serum cortisol measures showed a similar trend that was not significant statistically. Other findings were that (a) the obese cotwins in group A consumed approximately 2.5 times as much alcohol as the lean cotwins; however, in group B, this finding was reversed; (b) active sleep was higher and quiet sleep was lower, both at a statistically significant level, in the obese cotwin in Group A only. Finally, psychological testing revealed an association between psychological distress symptoms and abdominal visceral adiposity only in Group A. The authors concluded that

> when genetic factors are identical, high visceral fat accumulation, but not obesity in general, appears to be in association with the hormonal, behavioural, psychological and physiological markers of increased psychosocial stress. Therefore, our findings are consistent with the hypothesis that psychosocial stress induces hormonal changes leading to intra-abdominal fat deposition. (Marniemi et al., 2002, p. 41)

"Stress and Body Shape: Stress-Induced Cortisol Secretion is Consistently Greater Among Women With Central Fat" (Epel et al., 2000). The objective of this study was to investigate whether women over a range of BMIs with high WHR display consistently elevated cortisol response to repeated laboratory stressors. The hypotheses were that high WHR women, in comparison with low WHR women, would "(a) respond to a novel laboratory stressor with greater cortisol reactivity, (b) fail to habituate to repeated stressors by showing high cortisol reactivity on subsequent exposures, and (c) report psychological traits and responses to stressors indicative of ineffective coping" (Epel et al., 2000, p. 625).

The researchers tested "the novel and exploratory hypothesis that the above differences between WHR groups would be the strongest among lean women" (p. 625).

Study participants were 59 premenopausal white women between the ages of 30 and 46, in good health. Of the 59, 30 had a high WHR and 29 had a low WHR, according to established guidelines (Epel et al., 2000). The BMIs of women in the study ranged from 19.6 to 39.8 kg/m^2. Participants were selected for each of the WHR groups (low, high) so that the average BMI in the groups was equivalent. Participants were excluded based on factors with potential influence on fat distribution or cortisol reactivity, such as

> current smoking or past history of smoking, regular alcohol use (> 7 drinks per week), current or past history of endocrine disorders, eating disorders, depression, hypertension, medication use (including oral contraceptives), irregular menstrual cycle, more than three pregnancies, recent weight changes, excessive exercise (> 2 hr/d), and past hospitalization for psychiatric or addictive disorders. (Epel et al., 2000, p. 623)

The exclusions were designed to eliminate potential confounders in the relationship between endogenous cortisol and body shape.

Recruitment procedures included flyers, radio announcements and newspaper ads. Responders included 700 women, of whom 157 were eligible after a health screen. Of the 157 eligible participants, 72 met the criteria for WHR. Dropping out of the study immediately were 12 eligible women (n = 3 low WHR, n = 9 high WHR); an additional high WHR participant dropped out after the first session. Researchers followed up the participants who dropped out to analyze available data and reported that lean women with high WHR were overrepresented in these participants. Further analysis indicated the dropouts could have resulted in sample bias against the study hypothesis.

Measures used in the study were psychological/cognitive and physical measures. Psychological/cognitive measures included use of the COPE, a visual analog scale using 14 adjectives to describe

mood, the Rosenberg Self-Esteem Scale, the Optimism-Pessimism Scale, the Positive and Negative Affect Schedule, and the Social Stress Index, all described by Epel et al. (2000). Physical measures included body height and weight, BMI (calculated), waist circumference, hip circumference, WHR (calculated), percent body fat, salivary cortisol, and AUC cortisol (summary measure of secreted cortisol over time calculated after each laboratory session). Based on physical measures, four groups of participants were created: overweight, low WHR; overweight, high WHR; lean, low WHR; and lean, high WHR (Epel et al., 2000).

The study methods included having the participants complete laboratory sessions on each of four consecutive days. The sessions started between 4:00 p.m. and 5:30 p.m. each day and lasted three hours. The timing of the sessions corresponded with the lowest basal cortisol levels and the highest stress responsiveness. Three of the sessions were stress sessions and one was a control session; the stress session included 45 minutes of psychosocial challenges adapted from the Trier Social Stress Test that were identical each day with a randomized ordering of tasks. Cortisol was assessed using saliva samples collected at matched time intervals during the duration of each session: "while resting (15 and 30 minutes), before stress (45 minutes), during stress (60 and 70 minutes), at the cessation of stress (90 minutes), and during the recovery period (120 and 150 minutes, 30 and 60 minutes after stress, respectively)" (Epel, et al., 2002, p. 626).

The main outcome investigated was reactivity of salivary cortisol (AUC) to repeated challenge. Repeated measures ANOVAs were used to test cortisol habituation differences to stress. Results were

> women with a high WHR evaluated the laboratory challenges as more threatening, performed more poorly on them, and reported more chronic stress. These women secreted significantly more cortisol during the first stress session than women with a low WHR. Furthermore, lean women with a high WHR lacked habituation to stress in that they continued to secrete signifi-

> cantly more cortisol in response to now familiar challenges (days 2 and 3) than lean women with a low WHR. (Epel et al., 2000, p. 623)

Conclusions drawn by the researchers were that there is an association of central fat distribution to "greater psychological vulnerability to stress and cortisol reactivity" (Epel et al., 2000, p. 623), especially among lean women who were not able to habituate to stress that was repeated. According to the researchers, "the current cross-sectional findings support the hypothesis that stress-induced cortisol secretion may contribute to central fat and demonstrate a link between psychological stress and risk for disease" (p. 623). The authors included an important discussion of the role of genetics in fat patterning, indicating that 50% of the variance in fat distribution can be accounted for by genetics, leaving 50% of the variance for influences of the environment, and emphasized that psychological response to stress also has genetic components (Epel et al., 2000).

In summary, the research that describes the obesity-stress-eating behavior relationship is diverse, using a wide variety of measures and designs to explore the relationship. General characteristics of studies conducted in the past ten years published in peer-reviewed journals were presented in this section; studies discussed in more detail offered specific examples of stress- obesity research, including studies using salivary, plasma and urinary cortisol measures, naturalistic and laboratory stressors, physical and psychosocial stressors, anthropometric and CT/MRI measures of adiposity, dietary and activity variables, and a variety of study designs. While researchers do not interpret research findings unequivocally, it is generally agreed that stress contributes to the problem of obesity.

Other psychological factors related to obesity have been identified in the literature to include, but are not limited to, alexithymia (Hund & Espelage, 2005; Pinaquy, Chabrol, Simon, Louvet, & Barbe, 2003), anxiety disorders, post traumatic stress disorder (PTSD), bipolar disorder, bulimia, addictions (Cummings et al., 2002), depression (Cummings et al., 2002; Markowitz, Friedman, & Arent, 2008; Stunkard et al., 2003), binge eating disorder (Fassino, Leombruni, Piero, Abbate-Daga, &

Rovera, 2003, Grucza, Przybeck, & Cloninger, 2007) night-eating syndrome (Allison et al., 2006; Friedman, Even, Thuile, Rouillon, & Guelfi, 2006; Pawlow et al., 2003), and others. In addition, frequency of weight stigmatization has been found to be positively associated with BMI (Puhl & Brownell, 2006).

Secondary to the psychological issues, medications prescribed to treat psychiatric and psychological conditions have been associated with weight gain. These medications include certain antipsychotics, antidepressants, mood stabilizers, and anxiolytics (Delvin, Yavonski, & Wilson, 2000; Keith et al., 2006), steroids, cyproheptadine and insulin (Cummings et al., 2002).

Additionally, researchers have demonstrated a positive statistical association between adult obesity and adverse or traumatic childhood experiences (Aaron & Hughes, 2007; Felitti, 1991; Felitti 1993; Gustafson & Sarwer, 2004; Noll, Zeller, Trickett, & Putnam, 2007; Springer, Sheridan, Kuo & Carnes, 2003; Thomas, Hyppönen, & Power, 2008; Williamson, Thompson, Anda, Dietz, & Felitti, 2002). In a study conducted by Williamson et al. (2002) with a cohort of 13,177 adult members of an HMO in California, researchers found that 66% of the sample identified they had experienced one or more of the following types of abuse: child sexual abuse (CSA), child physical abuse (CPA), fear of physical abuse, or verbal abuse. Their findings were that

> physical abuse and verbal abuse were most strongly associated with body weight and obesity…Obesity risk increased with number and severity of each type of abuse. The population attributable fraction for "any mention" of abuse (67%) was 8% (3.4-12.3%) for BMI greater than or equal to 30 and 17.3% (-1.0-32.4%) for BMI greater than or equal to 40. (p. 1075)

The authors concluded that abuse in childhood is associated with adult obesity. While causal pathways have not been defined in these relationships, links of statistical association have been made between adverse childhood experiences and alexithymia (Hund & Espelage, 2005), anxiety disorders, PTSD, depression (Polusny & Follette, 1995; Stunkard et al., 2003; Wilhelm et al.,2006); bulimia (Wonder-

lich et al., 2001; Wonderlich, Wilsnack, Wilsnack, & Harris, 1996); binge eating disorder (Fassino et al., 2004; Wonderlich et al., 2001); and low self-esteem (Wonderlich et al., 2001), all of which have been further linked to obesity by association. Additionally, having grown up with an alcoholic parent (Mathew, Wilson, Blazer, & George, 1993) has been shown to be significantly associated with depression, which has been correlated with obesity through a causal relationship (Markowitz et al., 2008).

Whether related by association or causation, the statistical links described in this chapter are provided as a rationale for considering factors and scenarios that may be useful as items on screening tools that RDs may decide to use with clients seeking assistance with weight management. For instance, a client history of child abuse or being an ACoA (adult child of an alcoholic) could be seen as a potential risk factor for depression; in combination with food and weight concerns, this may indicate a referral by the RD to psychological services. However, client history in the absence of symptomology would not necessarily indicate a referral, such as in the case of resilience (Carle & Chassin, 2004; Werner & Smith, 2004; Wilcox, Richards, & O'Keeffe, 2004).

While the literature contains results of studies related to the association of multiple types of child abuse and obesity, the following studies are cited for an example of one type of child abuse—CSA. This example is used because published studies were identified that represent a variety of research designs and outcomes. Noll et al. (2007) conducted a prospective study with a group of females that had been sexually abused ($n = 84$) in comparison with a control group with similar demographical characteristics ($n = 89$). Height and weight markers were collected at the beginning of the study and at six developmental stages. The researchers hypothesized that "in comparison with their nonabused peers, abused female subjects would be more likely to (a) manifest obesity by early adulthood and (b) manifest high-risk growth trajectories throughout development" (p. e61). Study results demonstrated that, while obesity rates were similar across groups during childhood and adolescence, by ages 20-27 (young adulthood), abused female subjects "were significantly more likely to be obese (42.5%) than

were comparison female subjects (28.4%)… [and] that abused female subjects, on average, acquired body mass at a significantly steeper rate from childhood through young adulthood than did comparison female subjects…" (p. e61). The authors suggested that psychosocial difficulties, such as depression, and "psychobiological" conditions, such as HPA axis dysregulation, both of which are found in common between CSA and obesity, may explain these findings; the authors called for a systematic investigation of these connections.

Van Hanswijck de Jonge et al. (2003) administered the Young Schema Questionnaire—Short form YSQ-S, a 75-item questionnaire addressing 15 core beliefs, to a group of morbidly obese adults scheduled for surgical intervention for obesity. The hypothesis was that those with a history of CSA would have core beliefs that were less healthy than those without a CSA history. Findings indicated obese participants with a history of CSA exhibited a stronger connection between body weight and core beliefs than the nonabused group, and that core beliefs were less healthy. The abused group could be characterized "as having more negative views of themselves (defectiveness/ shame), a more negative view of other people (vulnerability to harm; social isolation), and a greater tendency to try to anticipate and meet others' desires rather than their own (subjugation)" (van Hanswijck de Jonge et al., 2003, p. 320). These views of self are related to weight management in that the behavioral changes required to achieve and maintain weight loss are complex and require a significant amount of time and planning for self-care. Clients with a negative self-image and low self-esteem, carrying feelings of shame, defectiveness and social isolation, may find it difficult to make the investment of time, attention and effort in self-care activities, focusing instead on the needs and desires of others. Since weight management involves a series of self-care activities, from menu-planning and procurement of healthy foods to keeping medical and/or dietetic appointments, exercising, etc., issues affecting self-care are critical to the success of weight management efforts.

Andrews (1995) reported an association between shame and a history of CSA, and concluded that bodily shame serves as a mediator between CSA and depression. Shame is considered an affect, which is primal in relationship to cognitions, drives and language (Zupaic & Kreidler, 1998). Kaufman identified shame as central to "conscience, indignity, identity, and disturbances in self-functioning" and, as such, "is the cause of low self-esteem, poor self-functioning or body image, self-doubt and insecurity, and diminished self-confidence" (as cited in Zupaic & Kreidler, 1998, p. 30). Shame that is carried by CSA survivors is a core issue that is treated in the context of therapeutic relationships and other supportive environments.

Gufstason & Sarwer (2004), Weiner & Stephens (1996), and Wiederman, Sansone, and Sansone (1999) documented that adaptive functioning via barrier weight is thought to serve as an imagined or real barrier to sexual advances or assault in some clients. In support of this hypothesis, it was noted that one-third of patients applying for an obesity treatment program reported using obesity "as a defense against sexual proposals or to reduce spousal jealousy" (King, Clark, & Pera, 1996, p. 284). Crossing a barrier weight carries the potential of triggering "memories, flashbacks or nightmares as individuals return to a weight at which they were abused or secondary to feelings of vulnerability" (p. 284).

Rothschild (2000) suggested that exercising carries the same potential of triggering "body memories," or physical flashbacks, especially when engaging in activities that induce sweating or uncomfortable bodily sensations. In the same way that eating behaviors can be examined on a continuum from refusal to eat (anorexia) to eating without regard to hunger (binge eating), it has been suggested that exercise behaviors can be examined on a similar continuum from refusal to exercise (exercise resistance) to excessive exercise (exercise addiction; White, 1996). The importance of assessing and recommending treatment for exercise resistance is magnified when considering the connection between exercise and BMI, improved mood status, self-esteem and body image (Hausenblas, 2006).

The Role of the RD in Weight Management

The generalist RD is used as a reference category in discussing the role of the RD because it is assumed that standards of practice applicable to this category also would apply to specialist RDs (Emerson et al., 2006). The American Dietetic Association (ADA) defines the practice of dietetics as "the integration and application of principles derived from the sciences of food, nutrition, management, communication, and biological, physiological, behavioral, and social sciences to achieve and maintain optimal human health" (Maillet, Skates, and Pritchett, 2005, p. 635). The definition places this reference "within a flexible scope of practice boundaries to capture the breadth of the profession" (p. 635). The ADA delineates the role of the RDs in general, and in the treatment of obesity specifically, via position statements, standards of practice, standards of professional performance, and statements of scope of dietetics practice (American Dietetic Association, 2007).

All standards of practice and standards of professional performance fall under the umbrella of the scope of dietetics practice framework in three broad areas: foundational knowledge, evaluation resources and decision aids (Maillet et al., 2005). Foundation knowledge includes the definition of dietetics, the five characteristics of the dietetics profession (code of ethics, body of knowledge, education, autonomy, and service) and educational resources. Evaluation resources include the code of ethics and the standards of practice and professional performance used to ensure a dietitian is "following accepted practice in his or her day-to-day work, to determine whether a particular competency falls within the scope of his or her work, or to ensure that his or her role description is accurate and comprehensive" (p. 634). Decision aids include a decision analysis tool, a decision tree and definition of terms. Documentation used in decision analysis and with the decision tree include: credentials, organizational privileging, individual professional development portfolio, evidence-based practice (research, ADA papers and ethics opinions, national guidelines and ADA practice guides), and practice-based evidence (p. 636).

In addition to the dietetics practice structure listed above, it is critical to note that the ADA adopted a nutrition care process model, rather than a model of standardized nutrition care. This important distinction allows for individualized care rather than standardized care in order to allow qualified dietetics professionals to reflect "both the state of the science and the state of the art of dietetics practice" to meet individualized patient and group needs (Lacey & Pritchett, 2003, p. 1062). This model supports the characteristics of autonomy, critical thinking, decision making, problem solving and collaboration that are central to the practice of dietetics. The requirement of critical thinking in the model calls for dietetics professionals to "conceptualize, think rationally, think creatively, be inquiring, and think autonomously" (p. 1062).

While these core principles guide the RD in the treatment of obesity (and dietetics in general), critical factors in the specific strategies used by RDs with obese patients or clients include the nature of the practice setting, level of dietetics knowledge of an individual RD, skills and competencies, and policies and procedures of health care systems and federal regulatory organizations. RDs work with obese patients and clients in an array of settings: hospitals (i.e., rural, general, tertiary care), outpatient clinics and private practices, physician practices, long term care facilities, rehabilitative settings, sports settings, home health, behavioral health settings, public health settings, and worksite settings, among others. These settings affect not only the policies and procedures RDs must follow in a particular facility, but also the amount of time RDs have to spend with patients and clients, and the nature of the relationship that can be established with patients, clients and groups within the given time frame.

The relationship between the RD and patient has been identified as the centerpiece of the ADA nutrition care process and model and this relationship varies. For instance, hospital-based RDs may have only one opportunity to work with patients prior to discharge to provide dietetic counseling, whereas RDs working in outpatient clinics and private practice often work with patients and clients over a period of several visits or more, allowing for more thorough nutrition assessment, nutrition di-

agnosis, nutrition intervention, and evaluation of clients. RDs working in behavioral health and residential rehabilitation settings may work even more closely with clients, in conjunction with psychological professionals, often to address issues seen in eating disordered clients. RDs working in home health might have more prolonged and frequent exposure to clients by counseling them in their living environment, allowing for evaluation of food products, cooking methods, and portion sizes.

ADA Guidelines for the Practice of Dietetics

The ADA provides guidance in the role of the generalist RDs in weight management through at least three published documents, in addition to the code of ethics. The three documents are: (a) "Nutrition Care Process and Model: ADA Adopts Road Map to Quality Care and Outcomes Management" (Lacey & Pritchett, 2003); (b) "American Dietetic Association: Standards of Practice in Nutrition Care and Updated Standards of Professional Performance" (Kieselhorst et al., 2005); and (c) "Position of the American Dietetic Association: Weight Management" (Cummings et al., 2002).

"Nutrition Care Process and Model: ADA Adopts Road Map to Quality Care and Outcomes Management" (Lacey & Pritchett, 2003). The ADA nutrition care process details four steps in the nutrition care of all clients. The first step, nutrition assessment, involves the collection of pertinent patient data for the purpose of identifying nutrition-related problems. It can be initiated by a referral or through findings in nutrition screening. The definition provided by the ADA of nutrition assessment is

> a systematic process of obtaining, verifying, and interpreting data in order to make decisions about the nature and cause of nutrition-related problems. The specific types of data gathered in the assessment will vary depending on a) practice settings, b) individual/groups' present health status, c) how data are related to outcomes to be measured, d) recommended practices, such as ADA's Evidence Based Guides for Practice, and e) whether it is an initial assessment or

> a reassessment. Nutrition assessment requires making comparisons between the information obtained and reliable standards (ideal goals). Nutrition assessment is an on-going, dynamic process that involves not only initial data collection, but also continual reassessment and analysis of patient/client/group needs. Assessment provides the foundation for the nutrition diagnosis at the next step of the Nutrition Care Process. (Lacey & Pritchett, 2003, p. 1064)

The nutrition assessment guidelines describe appropriate data sources and assessment tools, types of data collected (including psychological and emotional factors), nutrition assessment components, critical thinking skills utilized, documentation guidelines, and consideration for continuation of care (Lacey & Pritchett, 2003).

The second step in the nutrition care process is the formulation of the nutritional diagnosis. The nutritional diagnosis differs from the medical diagnosis in that it can change as the patient's condition changes whereas a medical diagnosis does not change as long as the medical condition does not change. The components of the nutritional diagnosis are: problem (diagnostic label), etiology (cause, contributing risk factors), and signs and symptoms (defining characteristics). Of interest to the present study is the manner in which psychological or psychosocial issues are identified in this component of the nutritional assessment. According to "Nutrition Care Process and Model: ADA Adopts Road Map to Quality Care and Outcomes Management" (Lacey & Pritchett, 2003), "the related factors (etiologies) are those factors contributing to the existence of, or maintenance of pathophysiological, psychosocial, situational, developmental, cultural, and/or environmental problems" (p. 1065). An example of a nutrition diagnostic statement is "excessive caloric intake (problem) 'related to' frequent consumption of large portions of high fat meals (etiology) 'as evidenced by' average daily intake of calories exceeding recommended amount by 500-kcal and 12-pound weight gain during the past 18 months (signs)" (p. 1065).

Step three of the nutrition care process is nutrition intervention, defined by the ADA nutrition care process as

> a specific set of activities and associated materials used to address the problem…This step involves a) selecting, b) planning, and c) implementing appropriate actions to meet patient/client/groups' nutrition needs. The selection of nutrition interventions is driven by the nutrition diagnosis and provides the basis upon which outcomes are measured and evaluated…All interventions must be based on scientific principles and rationale and, when available, grounded in a high level of quality research (evidenced-based interventions). (Lacey & Pritchett, p. 1066)

In the case of obesity treatment, the predominant evidence-based strategies for weight management currently are behavioral or cognitive-behavioral weight reduction strategies combined with diet/exercise (Foster, Makris, & Bailer, 2005; Shaw, O'Rourke, Del Mar, & Kenardy, 2006). Behavioral and cognitive-behavioral strategies lend themselves well to collaboration with behavioral medicine and psychology/counseling professionals, as well as health behaviorists. In addition, there has been report of the use of interpersonal therapy in addressing BED, which is associated with obesity (DeAngelis, 2002). The nutrition intervention step of the nutrition care process provides an opportunity to plan and document referrals, as appropriate.

The last step in the nutrition care process is nutrition monitoring and evaluation. According to the ADA nutrition care process document,

> *Monitoring* refers to the review and measurement of the patient/client/group's status at a scheduled (preplanned) follow-up point with regard to the nutrition diagnosis, intervention plans/goals, and outcomes, whereas *Evaluation* is the systematic comparison of current findings with previous status, intervention goals, or a reference standard. Monitoring and evaluation use selected outcome indicators (markers) that are relevant to the patient/client/group's

> defined needs, nutrition diagnosis, nutrition goals, and disease state. (Lacey & Pritchett, 2003, p. 1067)

Specific recommendations for times and outcomes to be monitored and evaluated are included in ADA's Evidence Based Guides for Practice, along with other sources of evidence-based protocols. ADA is in the process now of developing an "Evidence Based Guide for Practice" related to weight management.

"American Dietetic Association: Standards of Practice in Nutrition Care and Updated Standards of Professional Performance" (Kieselhorst et al., 2005). The standards of practice in nutrition care and updated standards of professional performance (Kieselhorst et al., 2005) add clarity to the conceptual framework of the Nutrition Care Process and Model (Lacey & Pritchett, 2003). The four steps of the nutrition care process are described in four standards: nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation. The first step, nutrition assessment, will be described in detail in this section, as it is directly related to the research questions. The indicators for the nutrition assessment are that each RD evaluates dietary intake; health and disease condition(s); "psychosocial, socioeconomic, functional, and behavioral factors related to food access, selection, preparation, and understanding of health condition" (Kieselhorst et al., 2005, p. 645.e1-e2); evaluates the client's potential for behavior change; identifies comparison data; identifies potential areas of difficulty in making the nutritional diagnosis; and documents the assessment and reason for "discharge/discontinuation or referral, if appropriate" (p. 645.e2). Further clarification in the area of interest for the present study is standard 1.3.1 which states the RD "uses validated developmental, cultural, ethnic, lifestyle and functional and mental status assessments" (p. 645.e2). This statement is somewhat ambiguous in that it does not clarify whether the RD uses data obtained by assessments completed by other health care professionals or whether the RD uses the instrument to collect the data

directly from the patient/client. While it has been established that RDs do not diagnose psychological conditions, it has not been clearly stated what type of screening tools may be utilized to refer suspected cases of nutrition-related psychological conditions to psychology professionals for diagnosis and treatment.

"Position of the American Dietetic Association: Weight Management" (Cummings et al., 2003). The position statement of the ADA on weight management expired in December, 2006; the position was reaffirmed and publication of an updated version of the position is scheduled for 2007 (American Dietetic Association, 2007). It is the ADA's position that "successful weight management to improve overall health for adults requires a lifelong commitment to healthful lifestyle behaviors emphasizing sustainable and enjoyable eating practices and daily physical activity" (Cummings et al., 2003, para 1). The ADA promotes the use of multidisciplinary treatment teams and recognizes the RD as the team member with primary responsibility for assessment and recommendations related to the patient's food/eating behavior. The RD also is able to assess and make recommendations related to activity, as long as the patient is approved for exercise by the physician. The ADA's position is that the RD's role is complex and challenging, that specialized training is desirable, and that continuing professional development is important. RDs must stay within the scope of practice, making referrals as necessary. The position states that

> the RD can play a pivotal role in modifying weight status by helping to formulate reasonable goals which can be met and sustained with a healthy eating approach as outlined in the Dietary Guidelines for 2000. Any changes in dietary intake and exercise patterns which decrease caloric intake below energy expenditure will result in weight loss but it is the responsibility of the RD to make sure the changes recommended are directed toward improved physiological and psychological health. A thorough clinical assessment should help define possible genetic,

> environmental, and behavioral factors contributing to weight status and is important to the formation of an individualized intervention. (Cummings et al., 2003, para 1)

A feature of the position statement is the recognition of the high cost to employ a treatment team to adequately address the complexities of weight management; this cost often is not reimbursable by third party payers. When strategies are utilized that decrease the cost of obesity treatment, such as limiting the length and/or frequency of sessions, using groups, self-help or lay-led resources, the outcome of treatment may be compromised. ADA recommends policy changes that would allow obese individuals to obtain adequate treatment that is covered by insurance reimbursement (Cummings et al., 2003).

Evidenced-Based Practice Strategies for Weight Management

The treatment of obesity can carry long-term success rates so low that some researchers suggest it is unethical to treat the condition at all. In the article, "The High Cost of False Hope," published in the *Journal of the American Dietetic Association*, Wooley and Garner (1991) describe the destructive physical and emotional consequences of weight cycling seen with repeated bouts of weight loss and regain, including regaining to a weight higher than the original starting point before the diet, with emotional consequences of worthlessness, helplessness, and hopelessness. Timmerman and Gregg (2003) found that food preoccupation was related to dieting, regardless of the caloric level consumed; however, others have found that in the context of lifestyle health changes, healthy eating patterns do not have this effect (Spear, 2006). Other researchers have noted higher success rates for obesity treatment (Crerand, Wadden, Roster, Sarwer, Paster, & Berkowitz, 2007; Wadden, Butryn, & Byrne, 2004). Yet, the American public continues to spend billions of dollars dieting in pursuit of their desired weight—with or without professional help.

As in all professions, time is required to translate research into practice. In the case of obesity treatment, not only has time been a factor, but also the line of research used as a basis for establishing best practices. For instance, researchers at Case Western Reserve University published research in the late 1990s that questioned the benefits of weight loss in light of the almost certain regain (Ernsberger & Koletsky, 1999). It is not surprising, following these concerns, that the size acceptance movement, previously named "intuitive eating," has gained momentum by introducing an alternate strategy in the treatment of obesity—that of working toward metabolic fitness rather than weight loss (Bacon, Stern, Van Loan & Keim, 2005). Markers such as blood pressure, cholesterol levels and prevention of weight gain are used as indicators of successful intervention rather than weight loss. Intuitive eating principles offer an alternate approach for RDs to use in talking with patients/clients about obesity, by talking about internal hunger cues vs. external cues to eat (such as pre-planned meal regimens). The size acceptance movement helps clients become more connected and aware of bodily sensations such as hunger, encouraging them to learn to utilize food to meet the physiological needs of the body rather than for emotional relief. While the size acceptance movement has gained acceptance with some, most evidence-based research recommendations continue to suggest the use of behavioral and cognitive-behavioral techniques in conjunction to diet/exercise strategies to treat obesity through weight management. The ADA provides evidence-based protocols for some disease conditions; however, the protocol for obesity treatment or weight management has not been published to date.

Although the ADA guides practicing RDs to utilize evidence-based practice methods, survey research conducted with a national sample of RDs indicates that the majority of RDs surveyed search the professional research literature only once per month or never (Byham-Gray, Gilbride, Dixon, & Stage, 2005). RDs holding PhDs had higher scores on the research-related survey than those with masters or bachelor's degrees. "Results indicated that RDs' ability to incorporate an evidence-based approach is largely determined by their education and training, work experience, and professional asso-

ciation involvement" (p. 1574). In addition to increasing recruitment of RDs into doctoral programs, research-focused learning strategies can be incorporated in greater depth into all levels of dietetics preparation (Byham-Gray et al., 2005), including continuing professional development. RDs that enter the profession with a substantial background in reading and interpreting the professional literature will be positioned well to use the professional literature to improve the practice of dietetics.

Prevailing Research and Analytical Methods Used to Study RD Practice Related to Evaluating Psychological Factors

Studies Focusing on U.S. RD Practice Related to Evaluating Psychological Factors

A search for U.S. RD surveys relevant to the present study topic was conducted using multiple databases (Academic Search Elite, PubMed, CINHL, Pre-CINHL, Dissertation Abstracts, Health Source Academic Edition, Professional Development Collection, and Pych Info) and within the *Journal of the American Dietetic Association* electronic search feature, with limited results. Surveys conducted in other countries were excluded due to the variance in practice perspectives among RDs in other countries, especially on the topic of obesity treatment (Barr, Yarker, Levy-Milne and Chapman, 2004; Campbell & Crawford, 2000). Further, the search was limited to national surveys, in an attempt to identify surveys that would be most applicable to the present study in terms of methodology.

Results of the database search yielded no studies that surveyed a random sample of RDs across the U.S. regarding the intention to evaluate psychological factors related to food and weight concerns of weight management clients or to make referrals, as a primary research objective. Three studies were identified that informed the present study, either by content or methodology, and a fourth study informs the literature about online survey response rates among dietitians.

"*The 2005 Commission on Dietetic Registration (CDR) Entry-level Dietetics Practice Audit" (Rogers & Fish, 2006).* Rogers and Fish conducted a study with the primary objective "to provide quantitative measures of activity involvement levels, frequency of involvement, and assessed risk for a wide variety of activities that might constitute entry-level [dietetic] practice" (p. 959). The study updated information from the field to reflect current dietetic practices in an effort to meet testing standards for the registration examinations for RDs and dietetic technicians.

The 2005 CDR practice audit surveyed 4,000 U.S. RDs in years 1 through 5 of dietetic practice (800 per year) to assess RD involvement and frequency of involvement in 162 activities considered to be "core" dietetic practices. The sample was determined by stratifying RDs by credential and by years since registration for cohorts from years 1 through 5 since registration; 800 RDs were randomly selected for each of the five cohorts (n = 4,000). The authors noted that due to the large sample, there was increased risk for type 1 error. The survey was distributed via U.S. mail, with a response rate of 64% (total, n = 2,541; year 1, n = 500; year 2, n = 516; year 3, n = 497; year 4, n = 525; year 5, n = 503). Of these, 2,483 RDs were practicing at the time of the survey. To boost response, the survey used reminder postcards and a follow-up survey mailing to non-respondents. There was no mention of incentives used to improve the rate of return. Data was collected from May31 through July 18, 2005 (Rogers & Fish, 2006).

The survey instrument was developed by the Dietetics Practice Audit committee starting March 2004, building on the foundation of the 1989 Role Delineation and 2000 Practice Audit instruments. The preliminary instrument was developed using a cognitive interviewing protocol with the assistance of RTI International, with 34 RD and DTR (registered dietetic technician) participants from a "variety of settings." The RDs and dietetic technicians were individually interviewed face-to-face in the following locations: Chicago, IL, Los Angeles, CA, and Washington, DC. Participants were asked to think aloud as they responded to probes in answering the survey questions. The authors noted that

"numerous modifications were recommended to improve the validity and reliability of the instrument" (Rogers & Fish, 2006, p. 957). The methodological details for these modifications were not provided, nor were the methods used to ensure the validity or reliability of the instrument.

In addition to the battery of practices, profiling questions were developed to gather demographic and employment information. The instruments that were developed for practicing RDs and technicians were identical except for 26 activities not included on the technician survey that were included on the RD survey. Pilot testing was conducted by the CDR on a sample of 200 entry-level RDs and 50 entry-level dietetic technicians, with a response rate of 18% ($n = 46$). The number of RDs included in this response was not stated; the response included a combination of RDs and DRTs The surveys were received and reviewed by a survey contractor, Readex Research, "resulting in minor instrument enhancements" (Rogers & Fish, 2006, p. 958). The nature of the modifications was not disclosed in the study publication; however, the 162 items included in the final survey were published in the article.

Data analysis included descriptive statistics of percentages and frequencies for the following six measures for each of the core practice activities: (a) percent of RDs involved; (b) percent of RDs who supervise or manage; (c) percent of RDs who perform themselves; (d) percent of RDs who assist; (e) mean scaled involvement; and (f) and mean frequency of RD performance. Further analysis included comparing measures from year 2 with year 1, measures from year 3 with both years 2 and 1, and so forth. Significant differences were determined at the 95% confidence level. The purpose of the comparisons was to find the cut-point for dietetic practice to be considered "entry-level." While other analyses may have been performed in the study, the only other one described compared RDs holding master's degrees with RDs holding bachelor's degrees. The statistical tests used in analysis were not disclosed in the publication. Overall results of the study indicated that there was a significant difference in how RDs practice at year 5 following registration; based on these findings, the ADA endorsed

the existing practice of defining "entry-level" as the first three years following registration. This definition reduced the number of usable surveys to 1,477 (Rogers & Fish, 2006).

Of the 162 survey items, two were relevant to the present study: (a) Number 109: Recommend that clients receive physical, social, behavioral, or psychological services; and (b) Number 116: Evaluate influence of psychological status on eating behaviors. Results for these two survey items showed that for Number 109: Recommend that clients receive physical, social, behavioral, or psychological services, 9% responded "assist others" and 74% responded "performed myself" when asked the question, "In the last year, in what way(s) have you been involved with this activity (if any)?" Frequency responses were reported for those who "assist others" as 14 days out of a 20-day work month, and 11 days out of a 20-day work month for those who replied "performed myself." Results for Number 116: Evaluate influence of psychological status on eating behaviors, 6% responded "assist others" and 79% responded "performed myself" when asked the involvement question, listed above. Frequency responses were reported for those who "assist others" as 8 days out of a 20-day work month, and 7 days out of a 20-day work month for those who replied "performed myself" (Rogers & Fish, 2006). Other pertinent study findings were that RDs with master's degrees at entry level are not more involved or active in clinical areas than RDs with bachelor's degrees. The study concluded that RDs with master's degrees are more involved in academic areas, which offsets the number working in clinical areas.

Limitations of the study are that it: (a) does not provide details concerning the validity and reliability of the testing instrument; (b) does not differentiate between RD referral practices for physical, social, behavioral and psychological services; (c) does not provide details concerning statistical tests used in data analyses; (f) does not provide information past the entry-level stage of practice (years 1 through 3 following dietetic registration); and (g) does not provide information differentiating dietetic practice by practice setting (even though this was collected in demographic information). In addition,

the measures used for assessing frequency of RD practices were not sensitive enough to gain an understanding of patient involvement with the area of interest in the present study. For example, a RD could indicate he or she evaluated psychological factors 10 days of the 20 work days in the month; however, within one day, he or she could evaluate 1 or 10 patients—the measure used in the study is not sensitive to capture how many actual times a task is performed in a given month.

Strengths of the study are that it: (a) provides a broad picture of entry-level dietetic practice through a large national sample; (b) uses a study sample obtained through randomization within each category, stratified by year following registration; and (c) has a high response rate of 64%. The research provided information useful to decision making in the development of dietetic registration examinations for RDs and dietetic technicians.

"Applying the Theory of Planned Behavior to Promotion of Whole-grain Foods by RDs" (Chase, Reicks, & Jones, 2003). The authors began with a brief and concise description of the benefits and importance of consuming whole-grain foods, as well as referencing sources of data regarding RD knowledge and beliefs about whole-grain food consumption. Concepts of the Theory of Planned Behavior (TpB) were also presented. The stated purpose of the study was to use the TpB to account for RDs' intentions to promote whole-grain foods and to use the data to develop continuing education for RDs related to the promotion of whole-grain foods to clients (Chase et al., 2003).

The study sample was a "randomly selected national sample of RDs" (Chase et al., 2003, p. 1640); however, later in this section the researchers indicated the "names and mailing addresses of 2,000 RDs were obtained at random from the ADA mailing list from employment categories in which RDs were most likely to interact with patients or clients" (p. 1640). The method of arriving at this sample size was not discussed. The stratification categories are not defined, making replication difficult without obtaining further information from the researchers. Additionally, demographic informa-

tion cannot be compared with other studies when the categories of RDs are not known (Chase et al., 2003).

The study used an initial survey, a reminder postcard, and another survey mailing for those who did not respond previously. An incentive used to improve response rate was a $1 donation to America's Second Harvest for each returned survey. Statistical tests used in data analysis were listed as: (a) descriptive statistics, (b) Pearson correlation coefficients used to determine associations and (c) stepwise regression analysis used to determine variables at the $p < 0.05$ significance level that explained the "variance in intention to promote whole-grain foods" (Chase et al., 2003, p. 1640).

The development of the survey instrument was described in brief in the methodology section. The initial survey items were based on a literature review and interviews with six clinical RDs. The basis of the selection of the six clinical RDs was not mentioned. Three expert reviewers on the university level examined the initial survey. Survey items were briefly described. A pilot test was conducted with 40 RDs from the Minneapolis-St. Paul area, which resulted in slight revisions to the survey. The Cronbach alpha coefficients were provided for the scales of attitude and perceived behavioral control; however, the measure of normative beliefs was based on the product of scores on only two items, usually not enough to form a composite score for a factor. The format of the survey was a four-page machine-scannable form (Chase et al., 2003).

Survey results were that 776 surveys were returned (39% response rate) and 628 surveys were used in data analysis because those RDs classified themselves as regularly interacting with patient/clients. No information was gathered on nonrespondents to address nonresponse error; therefore "generalizability of the findings to the target population of RDs" was limited…the results should be considered preliminary, requiring further testing to ensure external validity" (Chase et al., 2003, p. 1640). Demographics were provided for the 628 RDs who responded to the study that indicated they regularly interact with patient/clients. Of these, 438 worked in direct patient care. Other work cate-

gories were: other/business, food service, consultation, research and education, and public health/community nutrition.

The results and discussion section included a table that provided the "multiple regression analysis of intention to promote whole grains on the theory of planned behavior-independent variables" (Chase et al., 2003, p. 1640) of attitudes, subjective norm, and perceived behavioral control. The findings were that "in this preliminary study, the model based on the TpB was useful in explaining intention to promote whole grains to a moderate extent ($df = 3$, $F = 74.5$, R squared $= 0.278$, $p < .001$)" (p. 1640). The data indicated that the theory's constructs explained 27.8% of the variance in RDs' intention to promote whole-grain foods, which was consistent with another study that found the theory's constructs explained 27% of physicians' intentions and 39% of physicians' behavior related to promoting practices to improve health of their patients.

This study addressed additional variables external to the TpB, such as knowledge related to whole-grain foods, exposure to whole-grain information, and experience as a RD, that did not explain additional significant variance. "Only 60% were correct in identifying whole-grain products according to a corresponding sample food label. Only 21% identified the current recommendation, although 42% indicated they did not know there was a recommendation" (Chase et al., 2003, p. 1641). According to the researchers, there was insufficient diversity of response for intention to account for a higher percentage of variance explained by the independent variables (attitudes, subjective norms, and perceived behavioral control) in the analysis, due to the high level of positive intention to encourage whole-grain food consumption (likely = 42%, very likely = 50%; Chase et al., 2003). The fact that the promotion of whole grain foods is not a controversial topic in nutrition most likely accounted for the lack of diversity in response.

The final section of the article indicated a need for focus on "increasing [RDs'] self-efficacy regarding the ability to promote whole grains" (Chase et al., 2003, p. 1641). The authors indicated that

normative beliefs were very important in predicting intention, which indicated that continuing education provided within work groups or with supervisors might be warranted (Chase et al., 2003).

"Continuing Education Needs of RDs Regarding Nutrigenomics" (Rosen et al., 2006). Rosen et al., (2006) described their study, published in the *Journal of the American Dietetic Association*, in terms of continuing education needs of RDs in the area of nutrigenomics. While this study topic was different than the present study, the methodology was similar and informs the present study. The purpose of this study was to assess continuing education needs of RDs relative to the application of nutritional genomics in clinical practice settings. While nutritional genomics is not new to dietetics and encompasses current practices of counseling patients with inborn errors of metabolism and other genetic problems related to nutrition, it is an area of practice that is expected to grow in response to the findings of nutritional research in the area of genetics.

The design of the study included a mailed survey instrument sent to a cross-sectional random sample of 2,500 U.S. RDs, including RDs from categories of RDs identified as likely to be employed in a clinical setting. The ADA mailing list categories used to achieve this sample were not disclosed (Rosen et al., 2006). The methodology for the study was based on Dillman's methodology (TDM; Dillman, 1978; Dillman, 1990; Dillman, 2006). Dillman's methodology for mailed surveys has been the subject of global research for several decades, as survey research is critical to many fields worldwide. Dillman's methodology is considered to be the standard for mail surveys in the area of the social sciences. The methodology is based on the social-exchange theory that people engage in behaviors they consider rewarding and avoid behaviors they consider costly (Dillman, 1978, pp. 162-163).

Dillman named his original methodology "Total Design Method" to "convey the importance of considering all visible elements of the survey contact and manipulating them in concert to create a positive social-exchange situation" (Dillman, 1990, p. 20). After continued research, an application

was developed for business surveys, which Dillman named "Tailored Design Method" (Dillman, 2006). Dillman's methodology is used throughout the world by many disciplines in an effort to obtain higher response rates than if the methodology was not used. An important caveat to the process is that recommendations for mail surveys have gone essentially unchanged since the 1970s research—not because the need for change was not investigated, but because research continues to uphold the current practices. However, Dillman revised his thinking that his recommended methodology must be followed explicitly and instead now recommends tailoring the use of personalized contacts in the number and manner that fits the population (Dillman, 2006).

The methodology of the nutrigenomics survey included three-waves: (a) initial mailing with cover letter and consent form in the fall of 2004; (b) reminder post-card; and (c) second survey for those who did not respond to the initial mailing. An incentive was provided to those who completed and returned the survey—a four-page patient handout resource explaining the concept of nutritional genomics with a listing of products and services.

Of the 2500 surveys mailed, 995 were returned (40%) and 913 were complete and usable. Statistical analyses were conducted using SAS 8.2 software. Frequency distributions and Kruswal-Wallis tests were used for ordered categorical variables to determine differences in mean values by year of registration. Associations based on responses from the survey were calculated with Spearman correlation analysis at the $p = .05$ level of significance. Of the 913 participants, 415 were registered before 1984, 337 were registered between 1985 and 1999, and 161 were registered after 1999. Almost all of the participants agreed that nutrigenomics is an important topic for continuing education and indicated the preferred method of continuing education was seminars/conferences (60%). Another 11% preferred reading journal articles (Rosen et al., 2006).

The nutrigenomics study measured knowledge, practices, attitudes and educational preferences of RDs related to nutrigenomics. This study followed the whole-grain food promotion study by

several years and included one of the same researchers. While the TpB used in the whole-grain food promotion study was not used in total in the nutrigenomics study, elements of this theory were seen in the choice to measure RD attitudes toward the behavior of counseling patients/clients about nutrigenomics. Knowledge was assessed by including content items on the survey related to the definition and application of nutrigenomics. Attitudes were assessed in five categories that were determined to have adequate internal consistency to be used as composite variables:

> perceived benefits (three items) and barriers (eight items) to application of nutrigenomics by RDs; perceptions of consumer motivators (six items); barriers (four items) to the application of nutrigenomics; and ethical, legal, and social issues related to the application of nutrigenomics (seven items). All attitude statements had five response options from strongly disagree to strongly agree. Scores for each category were computed by summing the responses across the items that comprised each of the categories. (Rosen et al., 2006, p. 1242-1245)

Practices and interest in continuing education were measured on the survey through items that asked RDs to respond to questions about interest of colleagues and respondents in learning more about nutrigenomics, performance of counseling sessions in the area of nutrigenomics, and exposure to nutrigenomics. Results were as follows:

> Only about 25% agreed or strongly agreed that their colleagues were interested in learning more about nutrigenomics, while 75% of respondents agreed or strongly agreed that they were interested in learning more. Most RDs (84%) reported that they had not provided counseling to clients related to nutrigenomics in the past year, that they had not had any previous exposure to nutrigenomics (68%), and that they had not encountered the term *nutrigenomics* in their clinical setting (80%). Of the 28% who reported having some exposure to nutrigenomics, the most common source was through professional publications or seminars/conferences. (Rosen et al., 2006, p. 1243)

Study advantages included the use of Dillman's methodology. Though the cost of a postal mail study increases with the additional mailouts used to establish and maintain contact with the study participants, these participant contacts are thought to increase response rate by creating an emotional response on the part of the study participants that would create a higher level of willingness to complete and return the surveys. A study limitation was a low response rate, which the authors thought perhaps was related to response bias. No further information about nonresponders was obtained, limiting the ability to generalize the findings.

Sampling Limitations

A recurrent sampling limitation in the studies described in this section centers on the fact that the profession of dietetics is broad, involving at least four academic areas of emphasis: medical dietetics, community nutrition, food service/hospitality management, and business/entrepreneur. Other strategies for categorizing the professional dietetics responsibilities have been used resulting in classifications such as administrative, clinical, community, business and research. Since the professional responsibilities of the more than 74,700 U.S. RDs can be classified in such broad terms, it is possible that a RD can graduate and work for an entire career without ever counseling a client. This presents a problem for researchers trying to establish the target population of RDs that counsel clients, for the purposes of survey research.

The RD roster maintained by the CDR is subdivided into categories that are not described on the ADA Web site, but are referred to in descriptive studies that use samples and sampling techniques. One study refers to a random sample of RDs generated by the ADA of RDs "likely to work in a clinical setting" (Rosen et al., 2006, p. 1243); another study refers to a random sample of RDs generated from the ADA mailing list "from employment categories in which RDs were most likely to interact with patients or clients" (Chase et al., 2003, p. 1640). On one hand, this classification of RDs as likely to

work in clinical settings, or as likely to interact with patients or clients, creates a more homogeneous group to survey regarding patient care issues; however, without more specific information about the classifications, the reader is not able to properly evaluate sampling techniques used in research such as sample size and randomization. It cannot be determined from the information provided in the studies what percentage of the population was sampled, or exactly who the population included.

To address this limitation in the present study, both the ADA and the CDR were contacted to gather more information on the listings of the 74,723 RDs in the U.S. It was found that the CDR maintains a complete listing of the nation's RDs; however, any type of sub-divided listings is self-reported and does not completely account for the entire populations of RDs working with patient/clients. ADA categories also are self-reported and not inclusive of the total population of RDs working with patient/clients. The ADA maintains a roster of all U.S. RDs from which a simple random sample can be obtained; however, the list contains dietitians practicing in other countries that have registration privileges in the United States. This presents an additional sampling problem because if the internationally practicing dietitians are eliminated from the population, the demographics of sample and the population cannot be compared adequately to ensure the sample represents the population. To address this limitation in the present study a simple random sample was selected for the study—all possible RDs were included in the universe to allow for demographic comparison. Responses from RDs who self-reported they do not work with patient/clients in the United States were excluded from analyses.

Measurement Limitations

Each of the three studies described in this section varied in measurement. The entry-level practice study measured the involvement and frequency of involvement of entry-level RDs in 162 tasks. A problem with this system of measurement is that frequency of performing a specific task was

measured in number of days the task was performed per month rather than average number of times the task was performed per month. For instance, if the RD made one referral on a specific day, the entire day counted; however, it is possible for the RD to see many patients on a specific day. A more sensitive measure would have been to ask the RD to report how many times on average per month referrals were made. An even more valuable measure would have been to ask how many referrals were made vs. how many referrals were indicated on average per month.

The whole-grain food promotion study used the TpB as a basis to measure RD intention to promote whole-grain foods to patients/clients. The study used a survey to gather data on the theory's measures of behavioral intention, attitudes, subjective norms, and perceived behavioral control, as well as variables external to the theory such as knowledge related to whole-grain foods, exposure to whole-grain information, and experience as a RD. The limitation of this system of measurement was that the frequency of promotion behavior was not directly measured to compare to intention to perform the promotion behavior. This is a limitation of the present study, as well. Circumstances that warrant the use of theory-based measurements include studies where behavioral measurement is difficult or when factors that make up behavioral choices are of interest to the researchers.

Design Limitations

Design limitations of the postal mail surveys were minimized by utilizing Dillman's methodology (Dillman, 2006). The three postal mail surveys utilized a three wave process: mail survey, reminder post card, and another survey mailed to those who did not respond to the first survey. Potential limitations in the instrument development stage were not identified, since steps to ensure validity and reliability were not fully discussed in every study. The entry-level practice audit researchers reported that steps were taken to measure validity and reliability, but since the development of the survey instrument was outsourced, the details of these steps were not disclosed. The nutrigenomics study

did not provide information regarding the validity or reliability of the instrument or pilot testing. Another design limitation was in the fact that no study described the use of a validation sample.

The design of the present study included the following guidelines to address design limitations: use of a theory-based (TpB) survey instrument tested for psychometric properties during pilot testing and use of Dillman methodology with a simple random sample of RDs that included an initial survey, with three reminder contacts. The instrument developed in this project was developed in stages recommended for TpB questionnaire development (Francis et al., 2004), discussed in detail in Chapter 3, including elicitation questionnaires to a random sample of 30 members the study sample not used in the final survey, content jury review, pilot testing with a random sample of 300 members the study sample not used in the final survey, and statistical analyses to determine psychometric properties of the instrument prior to the final study sample. Final analyses and development of two multiple regression equations for prediction (one for intention to evaluate and one for intention to refer) utilized a validation sample not used to create the equations.

Analysis Limitations

Each of the three studies used different statistical analyses. The entry-level dietetics study used comparisons between responses of cohorts of RDs with significant differences recorded at the $p = .05$ level. Delineations were made between cohorts based on responses. A limitation of this study is the lack of sensitivity of the measures used for analysis, which greatly affected the study findings. By asking RDs to indicate the number of days per month they engaged in the study behaviors, rather than how many times they performed the behavior per month, RDs who performed the behavior one time per day were counted the same as those who might have performed the behavior 10 times per day, for example.

The second study, the whole-grain food promotion study, used multiple linear regression analysis for explanation, to determine the percentage of variance the IVs of attitudes, subjective norms, and perceived behavioral control explained in RDs' intention to promote whole-grain foods. Other analyses included descriptive statistics, such as percentage correct on content items used to assess knowledge. The authors mentioned a limitation in the fact the results were polarized on the positive end of the scale for RDs' intention to promote whole-grain foods, a fact the authors believe could have reduced the percentage of variance explained by the model. This analysis issue was considered in the present study.

The third study, the nutrigenomics study, used descriptive statistics to describe categories of patients counseled by the study RDs in percentages, and to report measures of knowledge, practice, attitudes and educational preferences. The study also used non-parametric Kruskal-Wallis tests to determine differences by year of registration. A limitation noted in the study was that data was not available for non-responders to compare to those who responded. Additionally, a limitation noted in each of the three studies is that a validation subset of the data was not used to validate findings of statistical analysis.

A fourth study is cited (Skipper & Lewis, 2006), though not critiqued as a practice study, because the researchers used an online survey methodology deemed important to the present study in that it provided data for online survey response rates for dietitians. Using an online survey methodology permitted the research to be completed within the established research budget. Published data indicated the response rate for this national electronic dietetic survey (that used postal mail for a small number of participants who did not have email addresses) of 45% for RDs (57% for employers and 76% for educators), with no significant difference noted between online survey question responses and paper and pencil survey question responses. The study was conducted using Dillman methodology (2006), i.e., personalized contacts, repeated contacts, and a cover letter presenting a problem of inter-

est to the participants asking the participants to help solve the problem. The first three contacts contained email cover letters explaining the purpose of the study; the email messages contained a link to the survey Web site. The fourth contact to non-responders contained a printed cover letter and questionnaire, and a stamped, preaddressed envelope in which to return the completed questionnaire. In addition to the non-responders, those individuals with non-working email addresses received paper surveys. This was the first published dietetics study identified in the literature to use a Web-based questionnaire; while not a dietetics practice study (and therefore not analyzed) it provided valuable information about potential response rates for RDs to online surveys.

Summary

Chapter 2 addressed the professional obesity literature. Obesity is a multifaceted, heterogeneous chronic condition with multiple, complex components. Stress, depression, and other psychological issues, as well as adverse childhood experiences, have been found to be statistically correlated with obesity, though exact etiological pathways are not defined except for depression. A bidirectional relationship of causation has been determined for depression and obesity. Dietetics practice standards were presented and discussed. Dietetics practice standards state that dietitians should evaluate psychological factors related to food and weight concerns of weight management clients and make appropriate referrals. Not all dietitians agree fully with the appropriateness of the dietetic standards as stated, as demonstrated in the present study. Evidence-based interventions for weight management have not been published by ADA as yet, leaving important decisions about nutritional assessment, diagnosis, intervention, and monitoring to the professional judgment and critical thinking of its members.

Methodology and findings of three dietetics practice studies with bearing on the present study in methodology and/or content were reviewed. A fourth study was reviewed for response rate to an online questionnaire. Limitations in the published dietetics practice studies were briefly discussed;

these limitations focused mainly on sampling methods, measurement specificity, and lack of validation samples in published findings. Proposed steps of the present study designed to overcome these limitations were presented.

The purpose of the present study was to examine beliefs and intentions of U.S. RDs toward evaluating psychological factors related to food and weight concerns of weight management clients and beliefs and intentions toward making referrals, as appropriate, to determine the best predictor variable for each practice behavior. A correlational, predictive research design was used with a simple random sample of the nation's 74,723 RDs, randomized to three phases of the research (elicitation phase, pilot phase and final phase). A valid and reliable survey instrument, "Dietitians Beliefs and Intentions Questionnaire (DBIQ)," was constructed to measure beliefs and behavioral intentions of RDs toward evaluating psychological factors related and toward referring weight management clients to psychological services. The study aims to fill a research gap between dietetics practice standards and dietetics practice by examining overall categories of behavioral, normative, and control beliefs as predictors of intention to perform the two practice behaviors of interest. Future studies may examine specific behavioral, normative and control beliefs of RDs toward evaluating psychological factors and making referrals.

CHAPTER 3

METHODOLOGY

This chapter addresses the procedures that were used to answer the research questions for the study. The following topics are discussed: theoretical framework, research design, study population, study sample, instrument, variables, pilot study, data collection and data analyses.

Theoretical Framework

A critical component of the present study is the theory on which it is based. The Theory of Planned Behavior (TpB; Ajzen, 1988; Armitage & Conner, 2001) evolved from Fishbein's (1967) Theory of Reasoned Action (TRA), and was used as the theoretical basis of 832 studies published in two research databases (222 in Medline and 610 in PsychINFO) from 1985 to January 2004 (Francis et al., 2004). Health researchers Francis et al. (2004) developed a manual entitled "Constructing Questionnaires Based on the Theory of Planned Behavior: A Manual for Health Services Researchers," which was published by the Centre for Health Services Research, University of Newcastle, United Kingdom. This manual served as a guide to developing the study questionnaire. Other professions that have used the Theory of Planned Behavior in research are: medicine, behavioral medicine, dietetics, nursing, psychology, psychiatry, business management, information services, addiction treatment, exercise physiology, sports psychology, leisure studies, nutrition, human lactation, education, criminal justice, safety, infection control, public health, AIDS research and AIDS care, sex research, violence research, and youth studies, as evidenced by the listing of journals in Appendix B that have published TpB studies.

The Theory of Planned Behavior posits that human behavior is guided by (a) beliefs and evaluations about likely behavioral outcomes (behavioral beliefs), (b) beliefs about and motivation for compliance with normative expectations held by others (normative beliefs), and (c) beliefs about and perceived power of factors that facilitate or impede behavioral performance (control beliefs). Behavioral beliefs lead to an attitude toward a behavior, normative beliefs lead to what is termed "subjective norm," and control beliefs lead to perceived behavioral control. Combined, these attitudes, norms and beliefs form a behavioral intention that is assumed to be the "immediate antecedent of behavior" (Aizen, 2006). The relationships between these constructs are illustrated in Figure 3. It is noted that actual behavioral control is a factor inasmuch as it differs from perceived behavioral control.

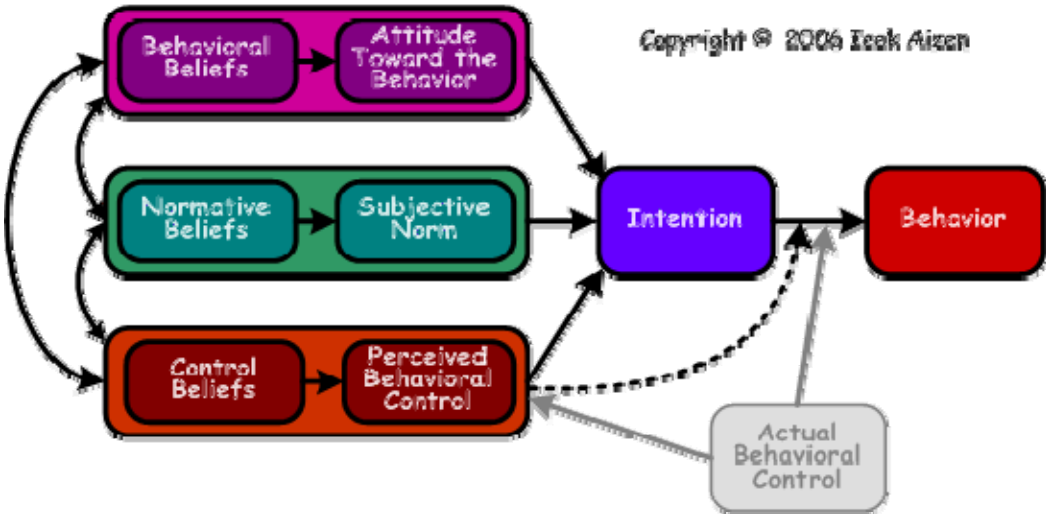

Figure 2. Relationship of constructs of the TpB.[1]
[1]From "TpB Diagram," by I. Ajzen, 2006, Icek Ajzen Web site: http://people.umass.edu/aizen/tpb.diag.html. Copyright 2006 by Icek Aizen. Used with permission of the author.

The TpB was used to develop questionnaire items to measure the attitudes, subjective norms, and perceived behavioral control of dietitians towards the practice behaviors of interest. These measurements, as well as those of other predictor variables, were used to create a multiple linear regression

prediction equation to answer each of the research questions presented in this chapter. Items were developed to measure intention of dietitians to perform the practice behaviors and were used in comparison with predicted intention scores derived from multiple linear regression prediction equations to test the null hypotheses.

Research Design

Survey research using a descriptive design is common and important to the field of health education (Cottrell & McKenzie, 2005) for learning about the characteristics and needs of groups and individuals. Survey researchers select and study population samples for the purpose of generalizing the results to the populations. For this reason, steps must be taken to increase the likelihood the results will be valid representations of the populations being studied. The present study utilized nonexperimental, cross-sectional predictive correlational survey methodology to select a simple random sample of RDs from the 74,723 member population of RDs in the U.S., to develop a valid and reliable theory-based survey instrument, and to pilot the survey before administration to a final group of RDs to examine RDs' behavioral intentions, attitudes, subjective norms, and perceived behavioral control related to (a) evaluating psychological factors related to food and weight concerns of weight management clients and (b) referring weight management clients to psychological services, as appropriate.

The study results are generalizable to the profession if (a) the sample is properly drawn and represents the population of RDs (b) the survey instrument is valid and reliable; (c) the study methodology is sound; (d) the response rate is sufficient to represent the population; and (e) the data collected in the study is properly managed, analyzed, and interpreted. It is the belief of the researcher that these factors were properly considered so that the study findings are representative of, and of value to, the dietetics profession. Dietitian response rates documented in the literature were used to plan the sam-

ple size that would yield the number of responses necessary for proper levels of statistical power in analyses, determined through a priori power analysis.

Study Population

The study population consisted of all RDs currently registered with the ADA Commission on Dietetic Registration (CDR). RDs must meet minimal certification requirements equal to a bachelor's degree in nutrition and a practicum experience, either in the form of an internship following graduation or in a series of practical experiences planned to meet the requirements of an accredited coordinated undergraduate program in dietetics. Additionally, RDs must pass a certification examination and maintain certification through continuing professional development equal to 75 continuing professional education credits each five years. Demographics of the study population are presented in Table 1.

Table 1

Demographics of the Study Population (N = 74,741 at Time of Record)

Variable	*f*	% of sample
Ethnicity		
American Indian or Alaskan Native	280	0.4
Asian	3839	5.1
Black or African American	2109	2.8
Hispanic or Latino	1940	2.6
Other	992	1.3
White	60,138	80.5
No response	5443	7.3
Gender		
Male	2,273	3.0
Female	68,542	91.7
No response	3,926	5.3

Using the total population of all RDs for the study population differs from the methodology of two of the published studies cited in Chapter 2 that used stratified random sampling. Researchers in

these studies used ADA self-report categories to identify RDs with a higher probability of working with patient/clients. Using ADA self-report categories carries with it the potential for participant bias because not all RDs join practice groups and therefore would not be represented on the ADA self-report category lists. The researcher in the present study used a simple random sample from the CDR listing of all possible RDs to increase generalizability.

Study Sample

The study sample size is influenced by the objectives and research questions and the size of the population. Completed usable surveys are necessary for (a) an elicitation questionnaire ($n = 25$), (b) a pilot study ($n = 100$), and (c) final survey ($n = 432$). The number of usable surveys from the final DBIQ administration needed was calculated using a 95% confidence level, a 5% confidence interval, and a population size of 74,723 and found to be 382, with an additional 50 additional for validation ($n = 432$). To yield the number of usable surveys calculated above, the researcher originally specified a sample size of 2,830, based on the 39%-64% return rate found in similar dietetic studies and allowing for an estimated 20% loss of surveys from RDs not directly working with clients and/or not having worked in the United States. The first sample of 2,830 drawn for the study by the CDR varied slightly in requested specifications in that it was drawn only from RDs with email addresses (90% of RDs have a recorded email address) instead of from the listing of all RDs; therefore, a second sample of 2,830 was requested and provided by the CDR. As the study progressed, it became necessary to use both randomly drawn samples in the study, subtracting 202 duplicate names. In total, 5,458 participants were randomized into the three phases of the study: elicitation phase, $n = 30$; pilot phase, $n = 300$; final phase, $n = 5,128$.

The Instrument

The questionnaire developed for the study, the DBIQ, was based on the TpB, following guidelines published by health researchers Francis et al. (2004). A content jury was used to evaluate the questionnaire. The content jury was made up of 5 invited jurors with expertise in the area of dietetics, health education theory, or psychology and counseling, as evidenced by peer-reviewed publications in these areas. During the evaluation process, three jurors were able to complete the entire questionnaire evaluation; therefore, 100% agreement was required to meet standards for acceptable inter-rater agreement and content validity at both the item and scale levels (Polit & Beck, 2006).

Psychometric Factors of the Instrument

Psychometric factors refer to a questionnaire's validity and reliability. Validity is "the degree to which an instrument measures what it purports to measure" (LoBiondo-Wood & Harper, as cited in Cottrell & McKenzie, 2005, p. 143). Use of a valid questionnaire is important in eliminating other explanations for study findings (McKenzie et al., as cited in Cottrell & McKenzie, 2005). According to Creswell (2005), content validity measures how well the questions represent all the possibilities of available questions, criterion-related validity measures how well the questionnaire scores correlate with an outcome or predict an outcome in the future, and construct validity measures the meaning or significance of the questionnaire scores and whether or not the researcher can generalize from them. Additionally, face validity measures whether or not the questionnaire appears to adequately cover the areas it is designed to investigate (Cottrell & McKenzie, 2005). Face validity is the weakest form of validity, since there are no systematic methods for measuring it.

Validity can be evidenced throughout the design of a research questionnaire. Content validity can be evidenced by "asking experts if the questions are representative of the area of interest" (Creswell, 2005, p. 165). Criterion-referenced validity can be evidenced by selecting an outcome to use in

correlating or relating scores or selecting a future outcome to use in correlating scores. Construct validity can be evidenced by using "statistical procedures, such as correlating scores with other scores; examin[ing] the correlation among questions on an instrument; or test[ing] a theory against the scores" (p. 165). Face validity can be evidenced by asking others to read and evaluate the questionnaire to determine if the instrument appears to measure what it is designed to measure.

Reliability means that "scores from an instrument are stable and consistent. Scores should be nearly the same when researchers administer the instrument multiple times at different times" (Creswell, 2005, p. 162). Scores should be consistent, in that closely related scores should be answered similarly. Most commonly used forms of reliability include: test-retest reliability, alternate forms reliability, alternate forms and test-retest reliability, inter-rater reliability, and internal consistency reliability (Creswell, 2005). Test-retest and alternate forms reliability mean that scores remain stable over time and forms of the test. Inter-rater reliability means there is consistency in how multiple raters score the questionnaire items or other features of the questionnaire.

Data analyses provide additional opportunities for providing evidence of the validity and reliability of the questionnaire and all statistical procedures should include a validation sample to confirm results. Data analyses were useful in providing evidence of construct validity for the questionnaire, such as "correlating scores with other scores; examin[ing] the correlation among questions on an instrument; or test[ing] a theory against the scores" (Creswell, 2005, p. 165).

Principal component analysis (PCA) with internal consistency reliability analysis of the pilot study data established adequate internal consistency reliability allowing for the computation of composite variables for each component. PCA is a type of factor analysis used when reducing data from many variables into a set of components smaller than the original set (Garson, 2006). The difference between factors (i.e., principal factor analysis) and components is that, while both are "dimensions identified with clusters of variables…factors represent the common variance of variables, excluding unique

variance, and is thus a correlation-focused approach seeking to reproduce the intercorrelation among the variables" (Garson, 2006, Factors and Components, para 1). PCA seeks a "linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on" (Garson, 2006, Types of Factoring, para 2). This method (principal axis) produces orthogonal (uncorrelated) factors by analyzing the total (common and unique) variance. In general, exploratory factor analysis (EFA) attempts to uncover a set of variable's underlying structure without prior theoretical hypotheses, while confirmatory factor analysis (CFA) attempts to ascertain whether or not the number of factors and the loading of variables conforms to a theoretical hypotheses made prior to analysis. For the purpose of the present study, a theoretical hypothesis was made that the data would reduce to four components specific to the TpB for each of two sets of items (evaluation and referral).

Factor loading (squared) is the percent of variance that is explained by the factor in the variable (Garson, 2006). According to Garson (2006), one standard in interpreting component loadings in confirmatory factor analysis is that loadings should be at least .7, to "confirm that independent variables identified a priori are represented by a particular factor, on the rationale that the .7 level corresponds to about half of the variance in the indicator being explained by the factor" (Interpreting factor loadings, para 1). Garson goes on to explain that the .7 standard is often unrealistic in real-life research, and that researchers will sometimes use a standard of .25 to .4, especially for exploratory analyses. For the purpose of the present study, component loading was set relatively high at .6 in an attempt to clearly separate items onto individual components, without unnecessarily losing items at a higher loading.

The capacity to form composite variables using the scores of significantly correlated items is important because multiple regression equations require the use of interval-level dependent and inde-

pendent variables. Scores of individual Likert-like items on a questionnaire are not considered to be interval-level variables; however, when there are multiple related items forming an internally consistent composite score (minimum of 3 items), this score can be treated as an interval-level variable in the multiple regression analyses (Raubenheimer, 2004).

According to statistical experts, "multiple regression shares all the assumptions of correlation: linearity of relationships, the same level of relationship throughout the range of the independent variable ('homoscedasticity'), interval or near-interval data, absence of outliers, and data whose range is not truncated" (Garson, 2008, para 3). It is also important that the tested model is specified correctly. Including "extraneous" variables or excluding important "causal" variables can dramatically impact beta weights and thus the interpretation of the effect of the independent variables on the model. Additionally, the data should be normally distributed on the dependent variable; otherwise, transformations would be indicated to address this problem (Garson, 2008).

Research Questions

The present study was designed to answer the following research questions:

1. What is the best predictor of U.S. RDs' intentions to evaluate psychological factors related to food and weight concerns of weight management clients?

2. What is the best predictor of U.S. RDs' intentions to make psychological referrals related to food and weight concerns of weight management clients, as appropriate?

Null Hypotheses

1. There is no difference between U.S. RDs' actual intention scores to evaluate psychological factors related to food and weight concerns of weight management clients and predicted intention scores based on (a) attitude score, evaluation; (b) subjective norm score, evaluation; (c) perceived be-

havioral control score, evaluation; (d) number of years of practice in the U.S. (e) number of hours of professional development related to eating disorders; (f) course of study (includes a graduate certificate, minor or major in psychology or related field, does not include a graduate certificate, minor or major in psychology or related field); (g) practice setting primarily related to eating disorder treatment or not primarily related to eating disorder treatment; (h) practice setting related to psychology practice or not primarily related to psychology practice; (i) personal history of clinical eating disorder (BN or BED); and (j) personal history of self-assessed subclinical eating disorder (BN or BED).

2. There is no difference between U.S. RDs' actual intention scores to refer weight management clients to psychological services, as appropriate, and predicted intention scores based on (a) attitude score, evaluation; (b) subjective norm score, evaluation; (c) perceived behavioral control score, evaluation; (d) number of years of practice in the United States; (e) number of hours of professional development related to eating disorders; (f) course of study (includes a graduate certificate, minor or major in psychology or related field, does not include a graduate certificate, minor or major in psychology or related field); (g) practice setting primarily related to eating disorder treatment or not primarily related to eating disorder treatment; (h) practice setting related to psychology practice or not primarily related to psychology practice; (i) personal history of clinical eating disorder (BN or BED); and (j) personal history of self-assessed subclinical eating disorder (BN or BED).

Independent and Dependent Variables

As previously stated, the two practice behaviors under investigation are (a) evaluating psychological factors related to food and weight concerns of weight management clients and (b) referring weight management clients to psychological services for issues related to food or weight concerns, as appropriate.

The dependent variable for Research Question 1 and Null Hypothesis 1 is the composite score of intention to evaluate psychological factors related to food and weight concerns of weight management clients. The independent variables were selected based on theory and prior research. Independent variables for Research Question 1 and Null Hypothesis 1 are:

1. Attitude score, evaluation (composite score; interval)
2. Subjective norm score, evaluation (composite score; interval)
3. Perceived behavioral control score, evaluation (composite score; interval)
4. Number of years of dietetics practice in the United States (interval)
5. Number of hours of professional development related to eating disorders (Level 1: 1-7 hrs, Level 2: 8-15 hrs, Level 3: 16+ hrs; categorical, dummy)
6. Course of study (includes a major, minor or graduate certificate in psychology or related field, does not include a major, minor or graduate certificate in psychology or related field; categorical)
7. Practice setting, as it relates to eating disorder treatment (primarily related to eating disorder treatment, not primarily related to eating disorder treatment; categorical)
8. Practice setting, as it relates to psychology practice (primarily related to psychology practice, not primarily related to psychology practice; categorical)
9. Personal history of bulimia or BED (personal history, no personal history; categorical)
10. Personal history of self-assessed subclinical history of bulimia or BED (personal history, no personal history; categorical)

The dependent variable for Research Question 2 and Null Hypothesis 2 is the U.S. dietitians' composite score of intention to make referrals to psychological services related to food and weight concerns of weight management clients, as appropriate. The independent variables were selected

based on theory and prior research. Independent variables for Research Question 2 and Null Hypothesis 2 are:

1. Attitude score, refer (composite score; interval)
2. Subjective norm score, refer (composite score; interval)
3. Perceived behavioral control score, refer (composite score; interval)
4. Number of years of dietetics practice in the United States (interval)
5. Number of hours of professional development related to eating disorders (Level 1: 1-7 hrs, Level 2: 8-15 hrs, Level 3: 16+ hrs; categorical, dummy)
6. Course of study (includes a major, minor or graduate certificate in psychology or related field, does not include a major, minor or graduate certificate in psychology or related field; categorical)
7. Practice setting, as it relates to eating disorder treatment (primarily related to eating disorder treatment, not primarily related to eating disorder treatment; categorical)
8. Practice setting, as it relates to psychology practice (primarily related to psychology practice, not primarily related to psychology practice; categorical)
9. Personal history of bulimia or BED (personal history, no personal history; categorical)
10. Personal history of self-assessed subclinical history of bulimia or BED (personal history, no personal history; categorical)

The first three variables of attitude, subjective norms, and perceived behavioral control listed for both hypotheses were derived from the Theory of Planned Behavior (Aizen, 1988) and have been used in dietetics practice studies cited in this dissertation. The number of years of dietetics practice in the United States, course of study, and practice setting are demographic variables that have been used in prior research discussed in this dissertation. Personal history of clinical or sub-clinical bulimia or BED and number of hours of CPE related to eating disorders are hypothesized by the researcher to be

possible predictor variables based on prior knowledge of the researcher, who is a participant observer (RD) in the research. Degree status and age were variables specifically chosen for exclusion in the data analysis. Degree status has been found previously not to be significantly correlated with clinical dietetic practice behavior in a published study (Rogers & Fish, 2006), conceivably because dietitians holding master's and doctoral degrees find their way to academic positions and do not necessarily utilize their higher educational status in practice settings. Age was excluded because it was found to be significantly correlated with number of years of dietetics practice during preliminary data analyses ($r = .853$, $p < .001$).

Study Phases

The phases of the study were as follows:

1. Phase 1: An elicitation questionnaire was constructed and reviewed by the content jury, and then administered to a random sample of 30 members of the population not used in the final survey to determine (a) the perceived positive outcomes for the performance of the behavior being studied, (b) the people thought to be the most approving or disapproving of the behavior under study and (c) the barriers or facilitating factors that would positively or negatively impact the study behavior. A $15 incentive, in the form of a coffee shop gift card, was offered to each participant who postmarked the returned elicitation questionnaire within 14 days of the date of the initial postmark.

2. Phase 2: The DBIQ was developed and pilot tested with a random sample of 300 participants (not used in the final survey) via USPS mail and email contacts that provided a link to the online survey hosted by the SurveyMonkey.com Web site. Prior to administering the pilot survey, a content jury evaluated the questionnaire. Three of the jurors completed the evaluation; therefore, only construct items achieving 100% agreement that content items were relevant and clear were retained so that acceptable levels of inter-rater agreement and content validity would be reached with three jurors

(Polit, Beck, & Owen, 2007). PCA with internal consistency reliability analyses of components and test-retest reliability estimates were performed to evaluate the psychometrics of the instrument before administering it to the full study sample.

3. Phase 3: The questionnaire was administered to the full study sample (n = 5128) online (n = 4168) and via USPS mail (n = 960) following principles of Dillman's methodology (2006; initial survey with personalized cover letter and three personalized follow-up contacts) using SurveyMonkey.com Web site survey administration services. The four questionnaire waves were sent automatically every 3 days to participants who had not yet responded at the time of the message delivery.

A link to the DBIQ was first emailed via the SurveyMonkey.com Web site to 4,662 dietitians with working email addresses. Of the 4,662 participant messages that were sent, 494 messages were returned undeliverable for one of the following reasons: the recipient was not known, the mailbox was full, or the message was blocked by a spam filter. These 494 participants, along with an additional 466 participants who did not provide an email address to the CDR, received a post card containing a link to the online survey. In all, there were 4,662 emails sent, 494 messages returned, and 960 postal cards sent for a total of 5,128 participants. Paper surveys were not used in the study because there was an insufficient response to the paper surveys used in the pilot testing phase such that the psychometric properties of the paper version of the DBIQ could not be established. There was no need to send reminder postcards via USPS because the necessary quota of completed surveys for statistical analyses was reached during the study period. Data was analyzed to answer the research questions and test the null hypotheses. In addition, construct validity for the questionnaire was established through the use of analytical procedures used "such as correlating scores with other scores; examin[ing] the correlation among questions on an instrument; or test[ing] a theory against the scores" (Creswell, 2005, p. 165).

Data Collection

Data was collected via the SurveyMonkey.com Web site and was available to download in Excel worksheet format at any point during the research. The questionnaire's settings online were set so that computer IP addresses were not stored in the database; therefore, it was not possible for the researcher to learn the identity of any participant, protecting anonymity. The data was reviewed for outliers and erroneously entered data, corrected, and imported into SPSS software (Version 16), for data analyses.

Data Analyses

Data analyses were performed with version 16 of the Statistical Package for Social Sciences (SPSS) software to answer the two research questions and test the two null hypotheses. The statistical test used to answer Research Questions 1 and 2 was multiple linear regression for prediction. Prior to this step, tests of principal components analysis with internal consistency reliability of questionnaire items on subscales of (a) attitude, (b) subjective norm, (c) perceived behavioral control, and (d) intention were performed to create composite scores for each subscale (variable). The composite scores for predictor variables were used in the linear regression. Other IVs used in the regression analysis were described in this chapter. A multiple linear regression prediction equation was generated to answer Research Question 1: "What is the best predictor of U.S. RDs' intentions to evaluate psychological factors related to food and weight concerns of weight management clients?" A second prediction equation was generated to answer the research question: "What is the best predictor of U.S. RDs' intentions to make psychological referrals related to food and weight concerns of weight management clients, as appropriate?" The regression equations were used to predict Intention scores from the IVs and to test the null hypotheses for the study. The two regression equations were validated with a subset of data reserved for this purpose.

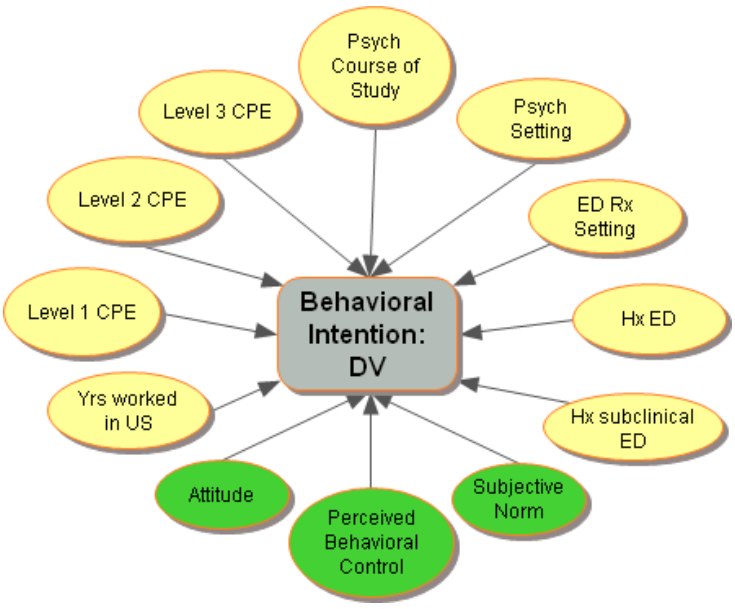

Figure 3. Study IVs used in relationship to the DVs for behavioral intention to evaluate psychological factors and to make referrals.[1]

[1]Level 1 CPE = 1-7 hr continuing professional education (CPE) related to eating disorders, Level 2 CPE = 8-15 hr, Level 3 = 16 or more hr.

Institutional Review Board Approval

Approval was granted to conduct the study by the University of Alabama at Birmingham Institutional Review Board (IRB) on June 26, 2007, and amended on February 5, 2008. The duration of the study was from August 2007 to June 2008.

Table 2

Study Timeline (2007-2008 Academic Year)

Study Activity	Month(s)
Proposal defense	August
IRB revisions	August
Convene content jury	September
Develop elicitation questionnaire	September
Administer elicitation questionnaire (n = 30)	October
Analyze data	November
Develop DBIQ	December
Expert panel review	January
Pilot study (n = 300)	February
Retest for reliability testing	March
IRB revisions	March
Full study DBIQ (n = 5,128)	April-May
Data analyses	May-June
Public defense	June

Summary

The present study used the TpB as the basis of a questionnaire (DBIQ) that was developed to measure behavioral intentions, attitudes, subjective norms, and perceived behavioral control of a random sample of U.S. RDs toward two practice behaviors: evaluating psychological factors related to food and weight concerns of weight management clients and making referrals.

Variables used in the study were as follows:

1. Composite score of intention to evaluate psychological factors related to food and weight concerns of weight management clients (interval level)

2. Composite score of intention to make referrals to psychological services related to food and weight concerns of weight management clients, as appropriate (interval level)

3. Attitude score, evaluation (composite score; interval level)

4. Subjective norm score, evaluation (composite score; interval level)

5. Perceived behavioral control score, evaluation (composite score; interval level)

6. Attitude score, refer (composite score; interval level)

7. Subjective norm score, refer (composite score; interval level)

8. Perceived behavioral control score, refer (composite score; interval level)

9. Number of years of dietetics practice in the United States (interval level)

10. Number of hours of professional development related to eating disorders (Level 1: 1-7 hrs, Level 2: 8-15 hrs, Level 3: 16+ hrs; categorical)

11. Course of study, as it relates to psychology or related field (includes a major, minor or graduate certificate in psychology or related field, does not include a major, minor or graduate certificate in psychology or related field; categorical)

12. Practice setting, as it relates to eating disorder treatment (primarily related to eating disorder treatment, not primarily related to eating disorder treatment; categorical, dichotomous)

13. Practice setting, as it relates to psychology practice (primarily related to psychology practice, not primarily related to psychology practice; categorical, dichotomous)

14. Personal history of bulimia or BED (personal history, no personal history; categorical, dichotomous)

15. Personal history of self-assessed subclinical history of bulimia or BED (personal history, no personal history; categorical, dichotomous)

The study used multiple linear regression analyses to develop a prediction equation to test the null hypothesis there is no difference between predicted intention to evaluate psychological factors related to food and weight concerns of weight management clients and actual intention to evaluate psychological factors related to food and weight concerns of weight management clients for the validation sample. A second prediction equation was generated to test the hypothesis there is no difference between predicted intention to refer weight management clients to counseling/therapy for issues related

to food or weight concerns and actual intention to refer weight management clients to counseling/therapy for issues related to food or weight concerns for the validation sample. The prediction equations were also used to answer Research Questions 1 and 2 to determine the best predictor of the practice behaviors under investigation.

CHAPTER 4

FINDINGS

The purpose of this chapter is to report findings for the three phases of the study designed (a) to develop a valid and reliable questionnaire (DBIQ) to measure dietitian beliefs and intentions toward evaluating psychological factors related to food and weight control of weight management clients and making referrals, (b) to pilot test the DBIQ, and (c) to administer the DBIQ to a final sample of registered dietitians. Data from the elicitation questionnaire, pilot study, and the online DBIQ were analyzed using SPSS (Version 16.0). Findings are reported for each of the three study phases.

In Phase 1, an elicitation questionnaire was constructed using guidelines by Francis et al. (2004), reviewed by the content jury, and sent in paper form via USPS mail to a random sample (n = 30) of members of the population not used in the final survey. Phase 1 of the study served to determine (a) the perceived positive outcomes for the performance of the behavior being studied, (b) the people thought to be the most approving or disapproving of the behavior under study and (c) the barriers or facilitating factors that would positively or negatively impact the study behavior. Results for Phase 1 are presented in narrative form, describing the manner in which the elicitation questionnaire informed the development of the DBIQ.

During Phase 2, the DBIQ was developed with the content jury and pilot tested with a random sample of 300 participants not used in the final survey. Construct items achieving 100% agreement that content items were relevant and clear were retained. Principal components analyses with internal consistency reliability analyses of components and test-retest reliability estimates were performed to evaluate the psychometrics of the instrument before using it with the full study sample. Results for

Phase 2 are presented in three parts: (a) findings of the content jury's rating of the DBIQ, (b) findings of the PCA with internal consistency reliability, and (3) findings of test-retest reliability analysis.

For Phase 3, the questionnaire was administered to the full study sample (n = 5,128) online (n = 4,168) and via USPS mail (n = 960) following principles of Dillman's methodology (initial survey with personalized cover letter and three personalized follow-up contacts) using SurveyMonkey.com Web site survey administration services. Results for Phase 3 are presented in three parts: (a) findings of the PCA with internal consistency reliability, (b) findings of test-retest reliability analysis, and (c) findings of the multiple linear regression analyses used to answer the research questions and test the null hypotheses.

Data Verification

All Phase 2 and Phase 3 data collected by the SurveyMonkey.com Web site was exported in Excel worksheet format and checked for outliers. It was determined that several participants entered the year of their birth instead of their age in years. For instance, if a participant indicated their age was 1975, it was converted by the researcher to 34 yrs. No other errors were noted. The decision rule for missing cases was to exclude cases list wise if the case was missing data for any variable included in the particular analysis.

Demographic Characteristics of the Population

Demographics for the study population of RDs registered with the CDR are presented in Table 3; demographics were obtained from the CDR via email communication with Pearlie Johnson, director of credentialing services (personal communication, June 7, 2007). The CDR reported the median age of the total RD population in 2004 to be 45 yrs; however, the organization spokesperson did not have a mean age to report when inquiry was made during this research. A total of 1238 RDs par-

ticipated in the three phases of the study. Demographics of the study sample are presented in this chapter by study phase.

Table 3

Demographics of the Study Population (n = 74,741 at Time of Record)

Variable	*f*	% of sample
Ethnicity		
American Indian or Alaskan Native	280	0.4
Asian	3839	5.1
Black or African American	2109	2.8
Hispanic or Latino	1940	2.6
Other	992	1.3
White	60,138	80.5
No response	5443	7.3
Gender		
Male	2,273	3.0
Female	68,542	91.7
No response	3,926	5.3

Findings of Analyses for Phase 1: Elicitation Questionnaire

The elicitation sample ranged from ages 25 to 55 yrs; mean age for Phase 1 dietitians was 38.6 ($n = 8$; $SD = 12.1$). The sample consisted of only white female responders, of which seven were currently practicing dietetics in the United States. Of these seven, five were practicing in patient care areas only, one was practicing in non-patient care areas, and the seventh was practicing in both areas, concurrently. One RD was practicing in an eating disorder practice setting. Years of practice ranged from 2 to 22 years.

The response sample was small ($n = 8$); however, the data provided by the responders informed the development of the DBIQ in three ways. First, despite a small sample of usable surveys ($n = 6$), the elicitation questionnaire results confirmed that diverse opinions are held by dietitians about the study topic. Second, it offered insight into particular areas of potential controversy that need to be

defined and addressed in a systematic way in future studies. Third, it provided information for considering next steps following the study by eliciting responses about particular beliefs RDs might hold in the categories of attitudes, subjective norms, and perceived behavioral control.

The diverse opinions held by RDs and potential areas of controversy related to evaluating psychological factors are exemplified by the following quotations by participants. Negative outcomes of dietitians evaluating psychological factors were stated as, "Consultation becomes too personal;" "getting involved into other psychological issues, trauma, triggers that I am not qualified to redirect;" and "more work for the dietitian (more time needed)." Positive outcomes of evaluating psychological factors were stated as, "provide more holistic approach to care;" "determine readiness to learn and modify dietary habits;" and "identify areas where [psychology-trained personnel] may be able to help with changes." Individuals listed as those who would approve of evaluating psychological factors were, "client, client's family, directors, coworkers, clinic physicians, supervisor, social worker, medical director, nursing, psychologist," among others. Those listed as those who would disapprove of evaluating psychological factors were, "client, family members, chief of staff, none, co-dependents, psychiatry, psychology, family members in denial, and doctors or RDs who think we are overstepping our scope of practice." Circumstances listed as enabling the dietitian to evaluate psychological factors were, "certification, licensure, experience, repeated consultation regarding weight management, training, privacy, valid tools for different cultural groups, nutrition consultation, cognitive behavioral therapy training, focus from dietetic director on importance by including questions on assessments, continuing education, books, evaluation guidelines/standards," among others. Circumstances listed as making it difficult or impossible for RDs to evaluate psychological factors were, "AMA [American Medical Association], schizo, danger present, inadequate training, no privacy, limited appointments available for obese patients, not enough time, not given opportunity for time for training, dietitians own history of an eat-

ing disorder, RD to patient ratios, unreliable clients and psychological services, and not enough education or unclear guidelines."

Potential areas of controversy about the practice standard of RDs evaluating psychological factors noted in this sample were physician approval, supervisory support, reimbursement issues, and scope of practice. Potential items for the questionnaire related to evaluating psychological factors were noted: (a) RD history of eating disorder, (b) RD practice experience, (c) RD course of study related to psychology, (d) benefit/harm of evaluating psychological factors, (e) RD confidence in ability to evaluate psychological factors, and (f) direct supervisor approval of evaluating psychological factors.

The diverse opinions held by RDs and potential areas of controversy related to making referrals to psychological services are exemplified by the following quotations by participants. Negative outcomes of dietitians referring weight management clients to psychological services are "patient noncompliant with appointments; patient not willing to admit psychological problems and refuses to go, leaving me unable to help [due to] lost rapport and still the psychological problems; patient cannot afford services; and lack of coordination from outside provider to facility MD and RD," among others. Positive outcomes of dietitians referring weight management clients to psychological services are "better able to help patient more thoroughly with problem; effective treatment; establishing a team setting; increased patient knowledge; and meet practice standard," among others. Individuals listed as those who would approve of referring clients to psychological services were "psychologists, dietitians, spouses, patients, children, bosses, psychiatrist, MD, health educators and social services staff," among others. Those listed as those who would disapprove of referring clients to psychological services were "none, psychiatrist and MD, if they disagree with [the] assessment, co-dependents, patient's family if they are in denial of the issue, and some bariatric surgeons," among others. Circumstances listed as enabling the dietitian to refer clients to psychological services were "team approach for weight man-

agement, available psychological program, every client gets psychological screening, counselors located in same office [as dietitians], insurance coverage, established check list to assess referral need, social worker input and evaluation, good client feedback, and better resources in the community," among others. Circumstances listed as making it difficult or impossible for dietitians to refer clients to psychological services were "no group to refer to routinely, do not know where to refer outside of the family practice, no financial support, patient denial, no system in place [to refer] males, and RD and psychological services do not see eye to eye," among others.

Potential areas of controversy about the practice standard of referring clients to psychological services noted were referring clients to psychological services who are in denial or who could not afford psychological services (due to adverse reactions by the clients), and not having adequate referral sources. Potential items for the questionnaire related to making psychological referrals were noted: (a) practice setting related to psychology; (b) ease in making referrals to psychology, and (c) benefit/harm in making referrals to psychology.

Findings of Analyses for Phase 2: Pilot Study

Description of the Sample

The number of usable questionnaires for Phase 2 analyses was 67 of the 70 responses. The range of ages for Phase 2 dietitians was 25 to 70 yrs, with a mean age of 41.7 yrs ($n = 65$; $SD = 11.7$). The range in years worked in the United States was 2 to 41 yrs; average number of years worked in the United States was 19.1 ($n = 61$; $SD = 10.6$). Ethnicity and gender demographics for Phase 2 dietitians are presented in Table 4.

Table 4

Phase 2 Demographics of the Study Participants (n = 67)

Variable	*f*	% of sample
Ethnicity		
American Indian or Alaskan Native	2	3.0
Asian	1	1.5
Black or African American	2	3.0
Hispanic or Latino	2	3.0
Other	2	3.0
White	57	85.0
No response	1	1.5
Gender		
Male	1	1.5
Female	65	97.0
No response	1	1.5

Findings of Content Juror Ratings

The procedure for instrument development described in Chapter 3 was followed in the development of the pilot version of the DBIQ. Three content jurors submitted completed rating forms, and their ratings are reported in Tables 5 and 6. While jurors rated all items to assist with instrument development, only the items related to the constructs of the questionnaire were used in determining content validity and reliability. Other items were considered demographic in nature and did not require interrater agreement or content validity to appear on the questionnaire, according to the statistical expert for the project. Any rating of clarity of "unclear without major revision" or "unclear" was addressed in accordance with the content jury's direction to achieve acceptability (the content jurors provided detailed comments of what they needed to rate the item as clear). Because there were three jurors rating the items, it was necessary to use a criterion for retaining items of 1.0 for the item content validity index (I-CVI). The scale-level content validity index (S-CVI) was determined both by unanimous agreement of judges' content ratings of relevancy and clarity (S-CVI/UA) and by averaging the percentage of items judged to be relevant for each juror and averaging the percentages across jurors

(S-CVI/Ave). For the purposes of the present study, no item was retained unless it achieved 100% consensus of the content jury that it was relevant to the constructs of the questionnaire and that it was clear, with revisions made per jurors' requests. Following this method, four construct items for each of the two practice behaviors (DVs) failed to be retained on the DBIQ (16d, 20d, 20e, 20f and 22d, 24d, 24e, and 24f). To increase the probability that there would be enough items to create a component on the perceived behavioral control items, two items related to actual behavioral control were added for each practice behavior.

Table 5

Summary Judgments of Jurors for Content Validity of Retained Evaluation Items

		Content juror rating of item relevance						
Study area	DBIQ item	Juror 1	Juror 2	Juror 3	Interrater agreement	I-CVI[a]	Item retained	S-CVI/Ave[b]
Evaluation	16a	1	1	1	1.00	1.00	Yes	1.00
	16b	1	1	1	1.00	1.00	Yes	
	16c	1	2	1	1.00	1.00	Yes	
	17	1[c]	1	1	1.00	1.00	Yes	
	18a	1	2	1	1.00	1.00	Yes	
	18b	1	1	1	1.00	1.00	Yes	
	18c	1	1	1	1.00	1.00	Yes	
	18d	1	1	1	1.00	1.00	Yes	
	18e	1	2	1	1.00	1.00	Yes	
	19a	2	1	1	1.00	1.00	Yes	
	19b	2	1	1	1.00	1.00	Yes	
	19c	2	1	1	1.00	1.00	Yes	
	19d	2	1	1	1.00	1.00	Yes	
	19e	2	1	1	1.00	1.00	Yes	
	20a	-	1	1	1.00	1.00	Yes	
	20b	1	1	1	1.00	1.00	Yes	
	20c	1	1	1	1.00	1.00	Yes	

Note. Values are the individual judges scores on a 4-point scale (1 = *Relevant*, 2 = *Relevant with minor revision*, 3 = *Not relevant without major revision*, 4 = *Not relevant*).
[a]Content validity index-item refers to the proportion of jurors rating the item as 1 or 2. [b]Scale-level content validity index. [c]With correction recommended by Juror 1.

Table 6

Summary Judgments of Jurors for Content Validity of Retained Referral Items

Study area	DBIQ item	Content juror rating of item relevance: Juror 1	Juror 2	Juror 3	Interrater agreement	I-CVI[a]	Item retained	S-CVI/Ave[b]
Referral	22a	1	1	1	1.00	1.00	Yes	1.00
	22b	1	1	1	1.00	1.00	Yes	
	22c	1	1	1	1.00	1.00	Yes	
	23	1[c]	1	1	1.00	1.00	Yes	
	24a	1	2	1	1.00	1.00	Yes	
	24b	1	1	1	1.00	1.00	Yes	
	24c	1	1	1	1.00	1.00	Yes	
	24d	1	1	1	1.00	1.00	Yes	
	24e	1	1	1	1.00	1.00	Yes	
	25a	2	1	1	1.00	1.00	Yes	
	25b	2	1	1	1.00	1.00	Yes	
	25c	2	1	1	1.00	1.00	Yes	
	25d	2	1	1	1.00	1.00	Yes	
	25e	2	1	1	1.00	1.00	Yes	
	26a	1	1	1	1.00	1.00	Yes	
	26b	1	1	1	1.00	1.00	Yes	
	26c	-	1	1	1.00	1.00	Yes	

Note. Values are the individual judges scores on a 4-point scale (1 = *Relevant*, 2 = *Relevant with minor revision*, 3 = *Not relevant without major revision*, 4 = *Not relevant*).
[a]Content validity index-item refers to the proportion of jurors rating the item as 1 or 2. [b]Scale-level content validity index. [c]With correction recommended by Juror 1.

Findings of PCA and Internal Consistency Reliability

Of 300 surveys administered, the following numbers of surveys were returned: paper: n = 13, 16.6% with 1 contact; online: n = 70, 31.5% with 4 contacts; retest online: n = 22, 31.4% with 2 contacts. Because the return rate online was acceptable, a decision was made to conduct the study online to keep the project within the research budget; therefore, preliminary data analyses were conducted on the online version of the DBIQ only.

Assumptions of PCA were met for both pilot data and final DBIQ data. Components were rooted in theory, and valid meaning of component labels was applied. The model was properly speci-

fied. There was moderate to moderately high intercorrelation of variables but no high or perfect multicollinearity present. There was adequate sample size. The data was considered interval level because each subscale used as a variable possessed a minimum of three Likert-like scaled items found to have adequate internal consistency to perform as a variable. The data was found to be linear upon inspection of residual plots. The only outliers found were located in the data set and Cook's distance values were found to be within acceptable limits.

Analyses of pilot data provided the following statistics: Cronbach's alpha for all items α = .941 (n = 46 valid cases with data for all variables; missing data excluded listwise); split half reliability = .767 Spearman Brown coefficient straight split, and .893 Spearman Brown coefficient – even/odd. Principal component analyses (PCA) with Varimax rotation were performed on 19 items related to Evaluation and 19 items related to Referral from the DBIQ for a sample of 70 participants. Because of missing data, the analyses included only 46 cases in some instances. While this sample size was not sufficient to describe the data well, it was useful for decision-making about potential changes to the instrument prior to administration to the final sample (n = 5,128) and about mode of administration.

Items related to evaluation. For the Evaluation section of the questionnaire (n = 19 items), the Kaiser-Mayer Olkin test of adequacy of sampling was .783, justifying the use of PCA for Evaluation items. Varimax rotation was used to identify orthogonal components. Four components with Eigenvalues over 1.0 were detected and retained; these four components accounted for 77% of the variance in the model. Component 1 accounted for 43.7% of the variance, Component 2 for 15.7% of the variance, Component 3 for 9.8% of the variance, and Component 4 for 7.7% of the variance (Table 7)

Table 7

Phase 2 PCA Extraction: Variance Accounted for by Evaluation Components

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.302	43.694	43.694	8.302	43.694	43.694	4.821	25.373	25.373
2	2.983	15.702	59.396	2.983	15.702	59.396	4.367	22.983	48.356
3	1.847	9.719	69.116	1.847	9.719	69.116	3.288	17.304	65.660
4	1.446	7.612	76.728	1.446	7.612	76.728	2.103	11.067	76.728
5	.903	4.753	81.480						
6	.614	3.230	84.710						
7	.609	3.206	87.917						
8	.514	2.704	90.620						
9	.349	1.836	92.456						
10	.293	1.542	93.998						
11	.253	1.332	95.330						
12	.238	1.251	96.581						
13	.187	.984	97.565						
14	.143	.753	98.318						
15	.114	.600	98.918						
16	.087	.460	99.379						
17	.053	.277	99.656						
18	.040	.209	99.864						
19	.026	.136	100.000						

In the rotated component solution using .6 as a cut score, Component 1 primarily dealt with Behavioral Control, Component 2 dealt with Attitude, Component 3 dealt with Intention and Component 4 dealt with Subjective Norm (Table 8). There were no complex variables. Internal consistency analyses were conducted for all four components, since there are at least three items representing each component.

Table 8

Phase 2 Data PCA Extraction: Rotated Component Matrix for Evaluation Data

TpB Variable	Item	Component			
		1	2	3	4
Intention	ExpectEval			.839	
	WantEval			.861	
	IntendEval			.890	
Subjective Norm	MostThinkIShouldEval				
	SocialPressureEval				.754
	ExpectedofMeEval				.621
	ShouldEvaltobe Compentent				
	DirectSupervisor WantsEval				.782
Attitude	BeneficialEval		.735		
	AppropriateEval		.777		
	PleasantEval		.631		
	GoodEval		.914		
	UsefulEval		.866		
	RightEval		.938		
Perceived Behavioral Control	ConfidentEval	.895			
	EasytoEval	.891			
	NoStruggleEval	.889			
	PermittedbyPolicyEval	.673			
	NothingPreventsEval	.782			

The internal consistency of all Evaluation components was determined using Cronbach's alpha. The internal consistency of Component 1, Behavioral Control, was $\alpha = .934$ ($n = 54$; $n = 5$ items). The internal consistency of Component 2, Attitude, was $\alpha = .914$ ($n = 59$; $n = 6$ items); however, when the item labeled "Unpleasant/pleasant" was removed from the analysis, the alpha coefficient increased to .921 ($n = 60$; $n = 5$ items). This item was removed from analysis because it was considered by the principal investigator that "pleasant" was closer to an emotional response than an attitude and

did not well fit the scale. The internal consistency of Component 3, Intention, was $\alpha = .925$ ($n = 63$; $n = 3$ items). The internal consistency of Component 4, Subjective Norm, was $\alpha = .628$ ($n = 61$; $n = 3$ items).

Because the internal consistency estimates for three of the four components on the pilot study were high, and the estimate for the fourth was potentially acceptable given more cases in the analysis, it was thought that the full administration of the questionnaire to over five thousand participants would provide sufficient data to verify these relationships. Meaningful subscales of dietitian beliefs and intentions towards evaluating psychological factors related to food and weight concerns of weight management clients were created and summated scores used in data analyses.

Items related to referral. For the Referral section of the questionnaire ($n = 19$ items) the Kaiser-Mayer Olkin test statistic of adequacy of sampling was .793. This information justifies the use of PCA. Varimax rotation was used to identify orthogonal components. Four components with Eigenvalues over 1.0 were detected and retained; these four components accounted for 80.4% of the variance. Component 1 accounted for 38.5% of the variance, Component 2 for 23.8% of the variance, Component 3 for 11.0% of the variance, and Component 4 for 6.9% of the variance (Table 9).

Table 9

Phase 2 Data PCA Extraction: Variance Accounted for by Referral Components

Com-ponent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.316	38.503	38.503	7.316	38.503	38.503	5.333	28.070	28.070
2	4.534	23.864	62.367	4.534	23.864	62.367	4.717	24.828	52.898
3	2.107	11.088	73.455	2.107	11.088	73.455	2.924	15.391	68.289
4	1.311	6.901	80.356	1.311	6.901	80.356	2.293	12.067	80.356
5	.707	3.722	84.078						
6	.630	3.317	87.395						
7	.567	2.986	90.381						
8	.462	2.434	92.814						
9	.286	1.503	94.318						
10	.258	1.357	95.675						
11	.193	1.016	96.691						
12	.171	.900	97.591						
13	.142	.748	98.339						
14	.087	.460	98.799						
15	.082	.433	99.232						
16	.060	.317	99.550						
17	.043	.228	99.777						
18	.023	.120	99.897						
19	.020	.103	100.000						

In the rotated component solution using .6 as a cut score, Component 1 primarily dealt with Attitude, Component 2 dealt with Perceived Behavioral Control, Component 3 dealt with Intention and Component 4 dealt with Subjective Norm (Table 10). There were no complex variables. Internal consistency analyses were conducted on all four components, since there were at least three items remaining to represent each component.

Table 10

Phase 2 PCA Extraction: Rotated Component Matrix for Referral Data

		Component			
TpB Variable	Item	1	2	3	4
Intention	ExpectRefer			.643	
	WantRefer			.839	
	IntendRefer			.700	
Subjective Norm	MostThinkIShouldRefer				
	SocialPressureRefer				.785
	ExpectedofMeRefer				.692
	ShouldRefertobe Compentent			.710	
	DirectSupervisor WantsRefer				.708
Attitude	BeneficialRefer	.929			
	AppropriateRefer	.933			
	PleasantRefer	.734			
	GoodRefer	.967			
	UsefulRefer	.967			
	RightRefer	.952			
Perceived Behavioral Control	ConfidentRefer		.736		
	EasytoRefer		.898		
	NoStruggleRefer		.922		
	PermittedbyPolicyRefer		.805		
	NothingPreventsRefer		.821		

The internal consistency of all Referral components was determined using coefficient alphas. The internal consistency coefficient of Component 1, Attitude, was $\alpha = .960$ ($n = 55$; $n = 6$ items); however, when the item labeled "Unpleasant/Pleasant" was removed from the analysis, the alpha coefficient increased to .979 ($n = 55$; $n = 5$ items). The item labeled "Unpleasant/Pleasant" was removed after considering that pleasantness seemed to be more related to emotions than to attitudes. The internal consistency coefficient of Component 2, Behavioral Control, was $\alpha = .911$

(n = 53; n = 5 items). The internal consistency coefficient of Component 3, Intention, was α = .843 (n = 54; n = 4 items); however, when the item labeled "Should Refer to be Competent," the alpha coefficient increased to .854 (n = 55; n = 3 items). More importantly, though, the item was dropped because it did not fit with the theoretical construct of the component (TpB) described in the hypothesized model for confirmatory principal components analysis. The internal consistency coefficient of Component 4, Subjective Norm, was α = .703 (n = 51; n = 3 items).

Because the internal consistency estimates for the four components related to Referral on the pilot study were adequate, it was decided that the full administration of the questionnaire was warranted.

Findings of Test-Retest Reliability

Test-retest reliability analysis was used to determine if the questionnaire was stable over time; the amount of time between the test and retest was two weeks. To analyze the data, composite variables were created for each of the four components that emerged from the PCA for each practice behavior (evaluate and refer): (a) Intention, (b) Attitude, (c) Behavioral control, and (d) Subjective Norm. Paired samples t-tests were used to compare the two administrations of the pilot DBIQ. There were no statistically significant differences noted between any of the paired score samples (Table 11) indicating the questionnaire was stable over the two weeks between questionnaire administration.

Table 11

Test-Retest Reliability for Pilot Data: Paired Differences

Pair	Variable	*M*	*SD*	Std. Error Mean	95% Confidence Interval of the Difference		*t*	*df*	Sig. (2-tailed)
					Lower	Upper			
1	IntentEVAL – IntentEVAL-RETEST	-.95238	7.76837	1.69520	-4.48850	2.58374	-.562	20	.580
2	SubNormEVAL – SubNormEVAL-RETEST	-1.0000	6.16441	1.34519	-3.80601	1.80601	-.743	20	.466
3	AttEVAL – AttEVALRETEST	.58824	7.57511	1.83724	-3.30653	4.48300	.320	16	.753
4	IntentREFER – IntentREFER-RETEST	-.11765	6.86369	1.66469	-3.64663	3.41134	-.071	16	.945
5	AttREFER – AttREFERRETEST	.25000	9.13236	2.28309	-4.61629	5.11629	.110	15	.914
6	PBCREFER - PBCREFERRETEST	3.56250	12.50583	3.12646	-3.10139	10.22639	1.139	15	.272
7	SubNormREFER - SubNormREFER-RETEST	-.43750	6.28192	1.57048	-3.78490	2.90990	-.279	15	.784
8	PBCEVAL - PBCEVALRETEST	-.29412	10.73991	2.60481	-5.81607	5.22783	-.113	16	.912

Summary of Pilot Data Analyses

Although the number of cases used in analyses was too low to confirm results, findings of the DBIQ psychometric properties of content validity, interrater reliability, split-half reliability, principal component analyses with internal consistency reliability and test-retest reliability analyses supported the administration of the DBIQ to the full study sample with the omission of two items: "Overall, I think that evaluating psychological factors…is Unpleasant/Pleasant," and "Overall, I

think that referring weight management clients…is Unpleasant/Pleasant." The remaining 36 items related to intentions, attitudes, subjective norms, and perceived behavioral control were retained.

Responses to demographic items were reviewed and the following changes were made to the demographic items: Item 8: "Multidisciplinary team" was changed to "Team approach;" Item 8: "Weight management program with psychological component" was transformed into two choices: "weight management program with psychological component" and "weight management program without psychological component;" Item 9: "How many weight management clients do you work with per year?" was changed to "How many clients per year do you work with related to weight issues?," and Item 20: The following was changed to provide a definition for "Referral." The definition was listed as follows: "For this questionnaire, referral means any or all of the following: informal recommendation to your client to see a mental health professional, formal recommendation to your client's physician that your client needs to be seen by a mental health professional, and formal request made to psychological services to evaluate your client." These changes were made in collaboration with the study co-investigator through discussions to interpret preliminary findings.

Findings of Analyses for Phase 3: DBIQ Administration

Description of the Sample

The range of ages for Phase 3 dietitians was 23 to 77 yrs, with a mean age of 43.6 yrs (n = 1,068; SD = 11.8). The range in years worked in the United States was 1 to 60 yrs; average number of years worked in the United States was 17.9 (n = 1046; SD = 11.3). Tables 12 and 13 provide additional demographic information for the full study sample.

Table 12

Phase 3 Ethnicity and Gender Demographics for the Study Participants (n = 1,163)

Variable	*f*	% of sample
Ethnicity		
American Indian or Alaskan Native	6	0.5
Asian	34	2.9
Black or African American	36	3.1
Hispanic or Latino	27	2.3
Other	19	1.6
White	966	83.1
No response	75	6.4
Gender		
Male	39	3.4
Female	1049	90.2
No response	75	6.4

Table 13

Phase 3 Demographic Information Related to Study IVs (n = 1,163)

Variable	*f*	% of sample
Degree Status		
Bachelor's	517	44.5
Master's	575	49.4
Doctorate	52	4.5
No response	19	1.6
Course of study		
Does not include psychology	1038	89.3
Includes psychology	107	9.2
No response	18	1.5
Level of CPE related to eating disorders		
0 hr	376	32.3
Level 1: 1-7 hr	397	34.1
Level 2: 8-15 hr	111	9.5
Level 3: 16 or more hr	145	12.5
No response	134	11.5
Eating disorder practice setting status		
Eating disorder practice	154	13.2
Not eating disorder practice	640	55.0
No response	369	31.7
Psychology practice setting status		
Psychology practice	50	4.3
Not psychology practice	702	60.4
No response	411	35.3
History of eating disorder		
Clinical eating disorder	31	2.7
No clinical eating disorder	779	67.0
No response	353	30.4
History of self-assessed subclinical eating disorder		
Self-assessed subclinical eating disorder	205	17.6
No self-assessed subclinical eating disorder	601	51.7
No response	357	30.7

Findings of PCA and Internal Consistency Reliability

PCA with Varimax rotation was performed on 18 items related to Evaluation and 18 items related to Referral from the DBIQ for a sample of 1163 participants. Cronbach's alpha for all 36

construct items on the DBIQ was $\alpha = .944$ ($n = 668$; missing variables excluded listwise). The data was divided approximately in half to allow for a validation subset.

Items related to evaluation. Evaluation items ($n = 18$), when tested, yielded a Kaiser-Mayer Olkin measure of adequacy of sampling statistic of .919, justifying the use of PCA for Evaluation items. Varimax rotation was used to identify orthogonal components. Four components with Eigenvalues over 1.0 were detected using a cut-score of .6 and retained. These four components accounted for 77.7% of the variance. Component 1 accounted for 48.3% of the variance, Component 2 for 14.7% of the variance, Component 3 for 8.6% of the variance, and Component 4 for 6.1% of the variance (Table 14).

Table 14

Phase 3 Data PCA Extraction: Variance Accounted For by Evaluation Components

Com-ponent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.697	48.318	48.318	8.697	48.318	48.318	4.444	24.689	24.689
2	2.634	14.635	62.953	2.634	14.635	62.953	3.463	19.240	43.929
3	1.547	8.597	71.550	1.547	8.597	71.550	3.405	18.916	62.846
4	1.094	6.076	77.626	1.094	6.076	77.626	2.660	14.780	77.626
5	.789	4.386	82.012						
6	.522	2.900	84.912						
7	.430	2.387	87.299						
8	.357	1.984	89.282						
9	.307	1.705	90.987						
10	.297	1.651	92.638						
11	.263	1.459	94.097						
12	.228	1.269	95.366						
13	.218	1.210	96.576						
14	.188	1.043	97.619						
15	.128	.708	98.328						
16	.118	.657	98.985						
17	.109	.608	99.593						
18	.073	.407	100.000						

Data from Table 15 indicates that Component 1 primarily dealt with Attitude, Component 2 dealt with Behavioral Control, Component 3 dealt with Intention and Component 4 dealt with Subjective Norm. There were no complex variables. Internal consistency analyses were conducted for all four components, since there are at least three items retained per component.

Table 15

Phase 3 PCA Extraction: Rotated Component Matrix for Evaluation Items

TpB Variable	Item	Component 1	2	3	4
Attitude	goodEVAL	.914			
	usefulEVAL	.911			
	rightEVAL	.894			
	beneficialEVAL	.863			
	appropEVAL	.862			
Perceived Behavioral Control	donotstruggleEVAL		.755		
	confidentEVAL		.754		
	permittedtoEVAL		.748		
	easytoEVAL		.741		
	nothingpreventsEVAL		.721		
Intention	intendEVAL			.838	
	wantEVAL			.828	
	expectEVAL			.800	
Subjective Norm	shouldEVALtobegood				
	expectedtoEVAL				.795
	socialpressureEVAL				.782
	directsuperwantsEVAL				.768
	mostthinkIshouldEVAL				

Internal consistency reliability of all Evaluation components was determined using coefficient alphas, and the total scale alpha coefficient was .931 (n = 388; n = 18 items). The internal consistency coefficient for Component 1, Attitude, was α = .957 (n = 432; n = 5 items). The internal consistency coefficient for Component 2, Behavioral Control, was α = .887 (n = 413; n = 5 items). The internal consistency coefficient for Component 3, Intention, was α = .931 (n = 464; n = 3 items). The internal consistency coefficient for Component 4, Subjective Norm, was α = .754; (n = 425; n = 3 items). Using the validation sample, these findings were substantiated. The amount of variance accounted for by the first four components was 75.4%, and the Kaiser Meyer

Olkin measure of sampling adequacy statistic was .887. The items loaded on the same four components in the same manner in which they loaded in the initial analysis. The internal consistency reliability coefficient for the total evaluation scale, validation subset, was $\alpha = .918$ ($n = 390$; $n = 18$ items). The internal consistency reliability coefficient for Component 1, Attitude, was $\alpha = .951$ ($n = 435$; $n = 5$ items). The internal consistency coefficient for Component 2, Behavioral Control, was $\alpha = .871$ ($n = 414$; $n = 5$ items). The internal consistency coefficient for Component 3, Intention, was $\alpha = .936$ ($n = 457$; $n = 3$ items). The internal consistency coefficient for Component 4, Subjective Norm, was $\alpha = .739$ ($n = 429$; $n = 3$ items). Thus, the four components of Evaluation analyzed in this section were used as subscale scores and the related items summed and used as composite variables in the remaining data analyses.

Items related to referral. Referral items ($n = 18$), when tested, yielded a Kaiser-Mayer Olkin test of adequacy of sampling of .913. This information justifies the use of PCA and component analyses. Varimax rotation was used to identify orthogonal components. Four components with Eigenvalues over 1.0 were detected with a cut-score of .6 and retained. These four components accounted for 80.7% of the variance. Component 1 accounted for 49.3% of the variance, Component 2 for 15.3% of the variance, Component 3 for 10.1% of the variance, and Component 4 for 6.2% of the variance (Table 16).

Table 16

Phase 3 Data PCA Extraction: Variance Accounted For by Referral Components

Com-ponent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.862	49.231	49.231	8.862	49.231	49.231	4.621	25.672	25.672
2	2.758	15.321	64.552	2.758	15.321	64.552	4.126	22.921	48.593
3	1.817	10.095	74.647	1.817	10.095	74.647	3.366	18.699	67.292
4	1.104	6.136	80.783	1.104	6.136	80.783	2.428	13.491	80.783
5	.579	3.215	83.998						
6	.515	2.860	86.858						
7	.405	2.253	89.110						
8	.316	1.755	90.865						
9	.272	1.511	92.376						
10	.262	1.454	93.829						
11	.225	1.250	95.079						
12	.192	1.069	96.147						
13	.182	1.010	97.158						
14	.156	.869	98.026						
15	.122	.677	98.703						
16	.109	.604	99.307						
17	.081	.450	99.758						
18	.044	.242	100.000						

In the rotated component solution (Table 17), Component 1 primarily related to Attitude, Component 2 with Behavioral Control, Component 3 with Subjective Norms and Component 4 with Intention to Refer. There were no complex variables. Internal consistency analyses were warranted on all four components, since there were at least three items retained to represent each component.

Table 17

Phase 3 Data PCA Extraction: Rotated Component Matrix for Referral Items

TpB Variable	Item	Component 1	2	3	4
Attitude	appropriateREFER	.924			
	rightREFER	.924			
	goodREFER	.923			
	beneficialREFER	.908			
	usefulREFER	.899			
Perceived Behavioral	donotstruggleREFER		.853		
Control	easytoREFER		.840		
	nothingpreventsREFER		.822		
	confidentREFER		.791		
	permittedtoREFER		.771		
Social Norms	expectedofmeREFER			.822	
	socialpressureREFER			.807	
	directsuperwantsREFER			.791	
	shouldREFERtobegood			.697	
	mostthinkIshouldREFER			.679	
Intention	wantREFER				.860
	intendREFER				.778
	expectREFER				.741

Internal consistency reliability of all Referral components was determined using coefficient alphas, and the total scale $\alpha = .930$ ($n = 362$; $n = 18$ items). The internal consistency coefficient of Component 1, Attitude, was $\alpha = .975$ ($n = 392$; $n = 5$ items). The internal consistency of Component 2, Behavioral Control, was $\alpha = .919$ ($n = 376$; $n = 5$ items). The internal consistency of Component 3, Intention, was $\alpha = .919$ ($n = 407$; $n = 3$ items). The internal consistency of Component 4, Subjective Norm, was $\alpha = .881$ ($n = 387$; $n = 5$ items). The validation subset analysis confirmed these findings (Kaiser-Mayer Olkin test of sampling adequacy = .907); 79.9 of the total variance was accounted for in the first four components of the model. The internal consis-

tency coefficient of the total referral scale, validation subset, was α = .935 (*n* = 357; *n* = 18 items). The internal consistency coefficient of Component 1, Attitude, was α = .971 (*n* = 393; *n* = 5 items). The internal consistency of Component 2, Behavioral Control, was α = .915 (*n* = 379; *n* = 5 items). The internal consistency of Component 3, Intention, was α = .907 (*n* = 412; *n* = 3 items). The internal consistency of Component 4, Subjective Norm, was α = .882 (*n* = 385; *n* = 5 items). Thus, the four components of Referral analyzed in this section were used as subscale scores and the related items summed and used as composite variables in the remaining data analyses.

Findings of Test-Retest Reliability

Test-retest reliability analysis was used to determine if the questionnaire was stable over time; the amount of time between the test and retest was three weeks. To analyze the data, composite variables were created for each of the four components that emerged from the PCA for each practice behavior (evaluate and refer): (a) Intention, (b) Attitude, (c) Behavioral Control, and (d) Subjective Norm. Paired samples *t*-tests were used to compare the scores of these components on the two administrations of the DBIQ. There were no statistically significant differences at the *p* = .05 level noted between any of the paired samples (Table 18), demonstrating adequate test-retest reliability of the DBIQ.

Table 18

Test-Retest Reliability for DBIQ: Paired Differences

Pair	Variable	*M*	*SD*	Std. Error Mean	95% Confidence Interval of the Difference		*t*	*df*	Sig. (2-tailed)
					Lower	Upper			
1	IntentionEval - IntentionEval-RETEST	.01587	3.48495	.43906	-.86180	.89355	.036	62	.971
2	SubNormEval - SubNormEval-RETEST	-.06349	3.84319	.48420	-1.03139	.90440	-.131	62	.896
3	AttEval - AttE-valRETEST	-.88889	4.26959	.53792	-1.96417	.18639	-1.652	62	.103
4	PBCEval - PBCEval-RETEST	-.63492	5.35604	.67480	-1.98382	.71398	-.941	62	.350
5	IntentionRefer - IntentionRefer-RETEST	.44444	4.14565	.52230	-.59962	1.48851	.851	62	.398
6	SubNormRefer - SubNormRefer-RETEST	-.23810	5.78294	.72858	-1.69451	1.21832	-.327	62	.745
7	AttRefer – AttRefer-RETEST	.09524	4.23394	.53343	-.97107	1.16154	.179	62	.859
8	PBCRefer – PBCRefer-RETEST	.33333	5.15251	.64916	-.96431	1.63098	.513	62	.609

Adequate test-retest reliability for the DBIQ was confirmed through an alternate method of reliability estimate. Scale scores for the four Evaluation components (Intention, Attitude, Behavioral Control, and Subjective Norm) were compared between the DBIQ test ($n = 68$; $\alpha = .781$; $M = 79.9559$; $SD = 15.97333$) and retest ($n = 68$; $\alpha = .741$; $M = 81.2794$; $SD = 14.30462$); results indicated adequate correlation between the two test administrations ($n = 68$; Spearman-Brown coefficient for equal lengths = .880). Scale scores for the four Referral components (Intention,

Attitude, Behavioral Control, and Subjective Norm) were compared between the DBIQ test (n = 65; α = .740; M = 80.4154; SD = 16.58585) and retest (n = 65; α = .748; M = 79.2769; SD = 15.70082); results indicated adequate correlation between the two test administrations (n = 65; Spearman-Brown coefficient for equal lengths = .863).

Findings of Statistical Analysis for Null Hypothesis 1

Multiple linear regression analysis using simultaneous entry of all predictors was used to test Null Hypothesis 1: There is no difference between U.S. RDs' actual intention scores to evaluate psychological components related to food and weight concerns of weight management clients and predicted intention scores based on (a) attitude score, evaluation; (b) subjective norm score, evaluation; (c) perceived behavioral control score, evaluation; (d) number of years of practice in the U.S. (e) number of hours of professional development related to eating disorders, (f) course of study (includes a graduate certificate, minor or major in psychology or related field, does not include a graduate certificate, minor or major in psychology or related field), (g) practice setting primarily related to eating disorder treatment or not primarily related to eating disorder treatment, (h) practice setting related to psychology practice or not primarily related to psychology practice, (i) personal history of clinical eating disorder (BN or BED), and (j) personal history of self-assessed subclinical eating disorder (BN or BED). Correlations for all variables are presented in Appendix G.

The DV used for the prediction equation was Intention Evaluate (n = 484, M = 14.94, SD = 5.11), which was the summated score of the three intention items on the DBIQ. The histogram pictured in Figure 4 demonstrates the normal distribution of residuals on this variable.

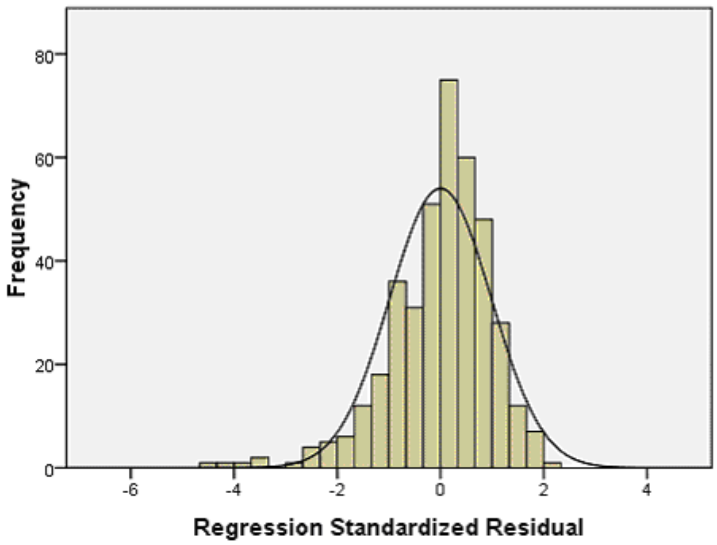

Figure 4. Distribution of residuals on the DV Intention Evaluate (n = 400, M = -7.3, SD = 0.985).

Statistically significant findings for Null Hypothesis 1. Based on results of the regression analysis, researchers failed to reject Null Hypothesis 1. There was no significant difference between actual Intention Evaluate scores and predicted Intention Evaluate scores, based on the predictor variables (M = .10, SD = 3.8, t = .183, df = 55, p = .855). A total of 455 returned surveys were complete for all variables used to create and validate the regression model. Of these, survey scores for 400 participants were randomly selected for use in developing the model and the remaining 55 were reserved for use in cross-validation of the model. The Durbin-Watson statistic for the model was 2.006. The linear combination of IVs accounted for 43.5% (R squared = .435) of the variance in the DV that is significantly different from zero (F = 24.9, p < .001). The standard error of estimation is 3.93. Regression statistics for the prediction are summarized in Table 19.

Table 19

Regression Statistics for Prediction Equation: DV Evaluate

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		b	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	.778	1.181		.659	.510		
	AttEVAL	.226	.037	.264	6.085	.000	.774	1.292
	PBCEVAL	.270	.034	.368	7.854	.000	.663	1.508
	SubNormEVAL	.199	.048	.173	4.149	.000	.836	1.197
	PsychCOS	1.705	.770	.086	2.215	.027	.967	1.034
	Level1	-.271	.460	-.026	-.590	.556	.737	1.356
	Level2	.140	.774	.008	.180	.857	.806	1.241
	Level3	.826	.670	.056	1.232	.219	.712	1.404
	EDRX	-.166	.617	-.011	-.269	.788	.829	1.206
	PsychPrac	.561	.902	.025	.622	.534	.911	1.098
	HxED	-.160	1.041	-.006	-.154	.878	.926	1.080
	HxSubED	.594	.462	.051	1.286	.199	.929	1.077
	RDyrsworkedUS	-.029	.019	-.062	-1.542	.124	.903	1.108

The prediction equation for Intention Evaluate was developed with all the IVs in the model and is stated as follows: Intention Evaluate = .778 + .226 * AttEVAL + .270 * PBCEVAL + .199 * SubNormEVAL + 1.705 * PsychCOS - .271 * Level1 + .140 * Level2 + .826 * Level3 - .166 * EDRX + .561 * PsychPrac - .160 * HxED + .594 * HxSubED - .029 * RDyrsworkedUS. The slopes for four of the IVs were found to be significantly different from 0 ($p < .05$); four IVs contributed significantly to predicting intention to evaluate: attitude evaluate ($p < .001$), perceived behavioral control evaluate ($p < .001$), subjective norm evaluate ($p < .001$) and psych course of study (psychCOS; $p = .027$).

Examination of residuals for non-normality, heterogeneity of variance, non-linearity and multicollinearity was made. Distribution was tested using 1-sample K-S nonparametric statistic on

residuals, which indicated a normal test distribution. Scatterplots were examined for heterogeneity of variance and non-linearity and no problems were identified. No problems were identified for multicollinearity (VIF values were all below 1.5 and correlational coefficients were all below .57). It was noted that five cases had standardized residuals in excess of 3.0; however, Cook's distances for these cases were less than 1 and the cases were not eliminated from analysis.

To test the validity of the prediction equation, the independent sample of cases reserved for cross-validation was used. The prediction equation was applied to the independent sample of cases and a transformed outcome variable Intention Evaluate Predicted was generated and tested with a paired *t*-test against the actual Intention Evaluate variable. Results of the t-test confirmed the validity of the prediction equation developed from the regression model. Table 20 contains a summary of the t-test results.

Table 20

Paired t-Test for Prediction Equation: Evaluate

Pair	*M*	*SD*	Std. Error Mean	95% Confidence Interval of the Difference		*t*	*df*	Sig. (2-tailed)
				Lower	Upper			
IntentionEVAL-PredictedInten-tionEval	.09143	3.73115	.49860	-.90778	1.09064	.183	55	.855

Findings of Statistical Analysis for Research Question 1

Multiple linear regression was used to answer the Research Question 1: What is the best predictor of U.S. RDs' intentions to evaluate psychological components related to food and weight

concerns of weight management clients? The prediction equation developed to test Null Hypothesis 1 was used to answer the Research Question 1.

Statistically significant findings for Research Question 1. The best predictor of U.S. RDs' intentions to evaluate psychological components related to food and weight concerns of weight management clients was Perceived Behavioral Control ($\beta = .368$, $p < .001$). Other statistically significant predictors, in order of magnitude, were: Attitude ($\beta = .264$, $p < .001$), Subjective Norm ($\beta = .173$, $p < .001$), and having taken a formal course of study (major, minor or graduate certificate) in psychology or a related field ($\beta = .086$, $p = .027$).

Findings of Statistical Analysis for Null Hypothesis 2

Multiple linear regression using simultaneous entry of all predictors was used to test Null Hypothesis 2: There is no difference between U.S. RDs' actual intention scores to refer weight management clients to psychological services, as appropriate, and predicted intention scores based on (a) attitude score, referral; (b) subjective norm score, referral; (c) perceived behavioral control score, referral; (d) number of years of practice in the U.S. (e) number of hours of professional development related to eating disorders, (f) course of study (includes a graduate certificate, minor or major in psychology or related field, does not include a graduate certificate, minor or major in psychology or related field), (g) practice setting primarily related to eating disorder treatment or not primarily related to eating disorder treatment, (h) practice setting related to psychology practice or not primarily related to psychology practice, (i) personal history of clinical eating disorder (BN or BED), and (j) personal history of self-assessed subclinical eating disorder (BN or BED).

The dependent variable for the prediction equation was Intention Refer ($n = 368$, $M = 14.33$, $SD = 4.84$), which was the summated score of the three intention items on the DBIQ. Cor-

relations for all variables are presented in Appendix G. The histogram for the DV Intention Refer is pictured in Figure 5 to demonstrate the normal distribution of residuals on this variable.

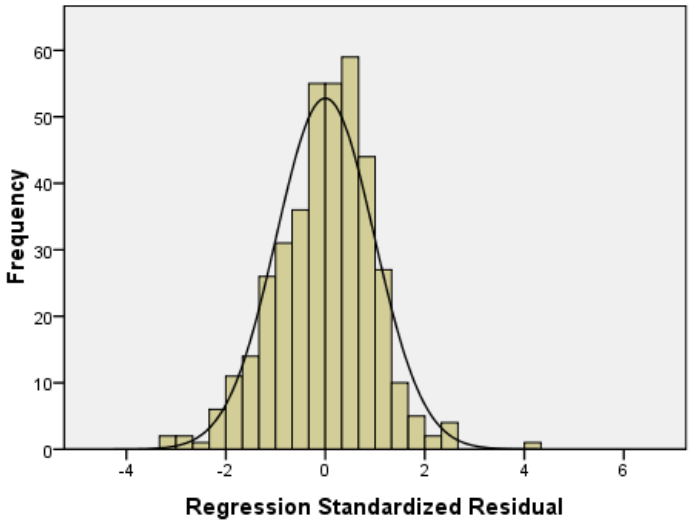

Figure 5. Distribution of residuals on the DV Intention Refer (n = 368, M = 14.33, SD = 4.84).

Statistically significant findings for Null Hypothesis 2. Based on results of the study, the researcher failed to reject Null Hypothesis 2. There was no significant difference between actual Intention Refer scores and predicted Intention Refer scores based on the IVs in the regression model (M = -.08, SD = 3.21, t = -.191, df = 52, p = .850). A total of 444 returned surveys were complete for all variables used to create and validate the regression model. Of these, survey scores for 391 participants were randomly selected for use in developing the model and the remaining 53 were reserved for use in cross-validation of the model. The Durbin-Watson statistic for the model was 2.149. The linear combination of IVs accounted for 47.1% (R squared = .471) of the variance in the DV that is significantly different from zero (F = 28.016, p < .001). The standard error of estimation is 3.64. Regression statistics for the prediction are summarized in Table 21.

Table 21

Regression Statistics for Prediction Equation: DV Refer

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		b	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	1.699	1.162		1.463	.144		
	AttREFER	.143	.038	.160	3.761	.000	.773	1.294
	PBCREFER	.195	.026	.337	7.363	.000	.667	1.499
	SubNorm REFER	.192	.030	.293	6.358	.000	.658	1.519
	RDyrswork-edUS	-.004	.018	-.008	-.205	.837	.889	1.125
	PsychCOS	.311	.701	.017	.444	.657	.972	1.029
	EDRX	.463	.563	.034	.822	.412	.810	1.235
	PsychPrac	1.652	.831	.079	1.988	.048	.884	1.131
	Level1	.284	.438	.029	.648	.517	.718	1.394
	Level2	.963	.706	.057	1.364	.173	.792	1.263
	Level3	1.095	.624	.080	1.756	.080	.678	1.476
	HxED	1.282	.975	.052	1.314	.190	.905	1.105
	HxSubED	.695	.436	.062	1.595	.112	.922	1.085

The prediction equation for Intention Refer was developed with all the predictor variables in the model and is stated as follows: Intention Refer = 1.699 + .143 * AttREFER + .195 * PBCREFER + .192 * SubNormREFER - .004 * RDyrsworkedUS + .311 * PsychCOS + .463 * EDRX + 1.652 * PsychPrac + .284 * Level1 + .963 * Level2 + 1.095 * Level3 + 1.282 * HxED + .695 * HxSubED. The slopes for four of the IVs were found to be significantly different from 0 ($p < .05$); four IVs contributed significantly to predicting intention to refer: attitude refer ($p < .001$), perceived behavioral control refer ($p < .001$), subjective norm refer ($p < .001$) and PsychPractice ($p = .048$).

Examination of residuals for non-normality, heterogeneity of variance, non-linearity and multicollinearity was made. Distribution was tested using 1-sample K-S nonparametric statistic on

residuals, which indicated a normal test distribution. Scatterplots were examined for heterogeneity of variance and non-linearity and no problems were identified. No problems were identified for multicollinearity (VIF values were all below 1.6 and correlational coefficients were all below .58). It was noted that three cases had standardized residuals in excess of 3.0; however, Cook's distances for these cases were less than 1 and the cases were not eliminated from analysis.

To test the validity of the prediction equation, the independent sample of cases reserved for cross-validation was used. The prediction equation was applied to the independent sample of cases and a transformed outcome variable Intention Refer Predicted was generated and tested with a paired *t*-test against the actual Intention Refer variable. Results of the t-test confirmed the validity of the prediction equation developed from the regression model. Table 22 contains a summary of the *t*-test results.

Table 22

Paired t-Test to Test Prediction Equation for Refer

Pair	*M*	*SD*	Std. Error Mean	95% Confidence Interval of the Difference		*t*	*df*	Sig. (2-tailed)
				Lower	Upper			
IntentionREFER – PredictedIntention-REFER	-.0839	3.20332	.44001	-.96685	.79904	-.191	52	.850

Findings of Statistical Analysis for Research Question 2

Multiple linear regression analysis was used to answer the Research Question 2: What is the best predictor of U.S. RDs' intentions to refer weight management clients to psychology, as

appropriate? The prediction equation developed to test Null Hypothesis 2 was used to answer the Research Question 2.

Statistically significant findings for Research Question 2. The best predictor of U.S. RDs' intentions to refer weight management clients was Perceived Behavioral Control ($\beta = .337$, $p < .001$). Other statistically significant predictors, in order of magnitude, were: Subjective Norm ($\beta = .293$, $p < .001$), Attitude ($\beta = .160$, $p < .001$), and working in a practice setting with psychology professionals ($\beta = .079$, $p = .048$).

Summary of DBIQ Analyses

Findings of the test-retest reliability analyses using paired t-tests of construct components and the Spearman-Brown coefficient confirmed the test-retest reliability of the DBIQ with the full study sample. Principal component analyses with internal consistency reliability analyses resulted in four components for each of the two DV: Intention Evaluate and Intention Refer. Composite scores were created for the components and these scores were used in multiple linear regression analyses to answer the research questions for the study and to test the null hypotheses. The researchers failed to reject both Null Hypothesis 1 and Null Hypothesis 2. There is no significant difference between predicted evaluation intention scores and actual evaluation intention scores or between predicted referral intention scores and actual referral intention scores. Research questions were answered. The best predictor for Intention Evaluate and for Intention Refer was Perceived Behavioral Control. All TpB component variables were significant predictors for both DVs. Additionally, having taken a course of study in psychology or a related field was a significant predictor for Intention Evaluate and working in a practice setting with psychology professionals was a significant predictor for Intention Refer.

CHAPTER 5

SUMMARY, DISCUSSION, IMPLICATIONS, CONCLUSIONS, AND RECOMMENDATION

Summary

RDs are among the largest professionally trained group of health care practitioners that provide nutritional assessment and plan and conduct nutrition intervention for the public, and, as such, must remain informed of scientific gains in the understanding of obesity etiology and treatment efficacy made through current research efforts. Research on psychological issues affecting eating behavior and body weight has specific relevancy to dietetics professionals.

The professional obesity literature was reviewed. Obesity is a multifaceted, heterogeneous chronic condition. Psychological issues, such as depression and stress, have been found to have a statistical correlation with obesity. Adverse childhood experiences that are putative contributors to these psychological issues, i.e., CSA, CPA, fear of physical abuse, and emotional abuse, have all been found to be statistically correlated with obesity in the literature (Aaron, & Hughes, 2007; Felitti, 1991; Felitti 1993; Gustafson & Sarwer, 2004; Noll et al., 2007; Springer et al., 2003; Thomas et al., 2008; Williamson et al., 2002), though causal pathways have not been established. In a study conducted by Williamson et al. (2002) with a cohort of 13,177 adult members of an HMO in California, researchers found that 66% of the sample identified they had experienced one or more of the following types of abuse: CSA, CPA, fear of physical abuse, or verbal abuse. Their findings were that

> physical abuse and verbal abuse were most strongly associated with body weight and obesity…Obesity risk increased with number and severity of each type of abuse. The popula-

> tion attributable fraction for "any mention" of abuse (67%) was 8% (3.4-12.3%) for BMI greater than or equal to 30 and 17.3% (-1.0-32.4%) for BMI greater than or equal to 40. (p. 1075)

The authors concluded that abuse in childhood is associated with adult obesity. While causal pathways have not been defined in these relationships, links of statistical association have been made between adverse childhood experiences and alexithymia (Hund & Espelage, 2005), anxiety disorders, PTSD, depression (Polusny & Follette, 1995; Stunkard et al., 2003; Markowitz et al., 2008); bulimia (Wonderlich et al., 2001; Wonderlich et al, 1996); binge eating disorder (Fassino et al., 2004; Wonderlich et al., 2001); and low self-esteem (Wonderlich et al., 2001), all of which have been linked to obesity. Additionally, having grown up with an alcoholic parent has shown to be significantly correlated with depression (Mathew et al., 1993), which is further statistically associated with obesity.

Causal relationships have not been defined for these associations, except for the relationship between depression and obesity (Markowitz et al., 2008), in part due to the nature of the criteria necessary to prove causation (i.e. "temporal precedence, covariation of the cause and effect, and no plausible alternative explanations;" Trochim, 2006); nevertheless, the objective of reviewing this literature was to provide a rationale for considering these factors and scenarios as items that dietitians and health educators may incorporate into screening tools with clients seeking assistance with weight management. For instance, a client history of child abuse or being an ACoA (adult child of an alcoholic) could be seen as a potential risk factor for depression; in combination with food and weight concerns, this may indicate a referral by the RD to psychological services. However, client history in the absence of symptomology would not necessarily indicate a referral, such as in the case of resilience factors (Carle & Chassin, 2004; Werner & Smith, 2004; Wilcox et al., 2004).

Dietetics practice standards state that dietitians should evaluate psychological factors related to food and weight concerns of weight management clients, and make appropriate referrals. Not all dietitians agree fully with the appropriateness of the dietetic standards as stated, as demonstrated in the present study. Evidence-based interventions for weight management have not been published by ADA as yet, leaving important decisions about nutritional assessment, diagnosis, intervention, and monitoring to the professional judgment and critical thinking of its members.

Since practice settings vary, and insurance carriers have varying policies, there has been no uniform code for dietetic services reimbursement by dietitians or clients. Whether a facility is covering the dietitian's time in the facility budget, whether an insurance company is reimbursing for that time, or whether a client is paying for the time out of pocket, the practice standards are the same. The manner in which a dietitian's workload is established varies from practice setting to practice setting; however, whenever a dietitian comes in contact with a client related to weight management, it is the responsibility of the dietitian work with that client according to the standards. It would seem that properly assessing client needs would be the first step in justifying better staffing patterns and identifying the need for services that might be reimbursable under various plans.

The purpose of the present study was to examine beliefs and intentions of U.S. RDs toward evaluating psychological factors related to food and weight concerns of weight management clients and beliefs and intentions toward making referrals, as appropriate, to determine the best predictor variable for each practice behavior. Methodology and findings of three dietetics practice studies with bearing on the present study in methodology and/or content were reviewed. A fourth study was reviewed for response rate to an online questionnaire. Limitations in the published dietetics practice studies were briefly discussed; these limitations focused mainly on sampling meth-

ods, measurement specificity, and lack of validation samples in published findings. Proposed steps of the present study designed to overcome these limitations were presented.

In Chapter 3, the methodology of the present study was delineated. A correlational, predictive research design was used with a simple random sample of the nation's 74,723 RDs, randomized to three phases of the research (elicitation phase, pilot phase and final phase). A valid and reliable survey instrument, "Dietitians Beliefs and Intentions Questionnaire (DBIQ)" was constructed to measure beliefs and behavioral intentions of RDs toward evaluating psychological factors related to food and weight concerns of weight management clients and toward referring weight management clients to psychological services, as appropriate. The questionnaire was developed using concepts from the Theory of Planned Behavior (TpB; Ajzen, 1988), which posits that intention to perform a behavior is the most proximal measure to the performance of the behavior. The questionnaire was pilot tested to determine psychometric properties to ensure validity and reliability before using it to gather data for the study. An a priori power analysis was performed to determine the number of participant responses needed in the statistical analyses.

Variables used in the study were:

1. Composite score of intention to evaluate psychological factors related to food and weight concerns of weight management clients (interval level)
2. Composite score of intention to make referrals to psychological services related to food and weight concerns of weight management clients, as appropriate (interval level)
3. Attitude score, evaluation (composite score; interval level)
4. Subjective norm score, evaluation (composite score; interval level)
5. Perceived behavioral control score, evaluation (composite score; interval level)
6. Attitude score, refer (composite score; interval level)
7. Subjective norm score, refer (composite score; interval level)

8. Perceived behavioral control score, refer (composite score; interval level)

9. Number of years of dietetics practice in the United States (interval level)

10. Number of hours of professional development related to eating disorders (Level 1: 1-7 hrs, Level 2: 8-15 hrs, Level 3: 16+ hrs; categorical)

11. Course of study, as it relates to psychology or related field (includes a major, minor or graduate certificate in psychology or related field, does not include a major, minor or graduate certificate in psychology or related field; categorical)

12. Practice setting, as it relates to eating disorder treatment (primarily related to eating disorder treatment, not primarily related to eating disorder treatment; categorical, dichotomous)

13. Practice setting, as it relates to psychology practice (primarily related to psychology practice, not primarily related to psychology practice; categorical, dichotomous)

14. Personal history of bulimia or BED (personal history, no personal history; categorical, dichotomous)

15. Personal history of self-assessed subclinical history of bulimia or BED (personal history, no personal history; categorical, dichotomous)

The study used multiple linear regression analyses to develop a prediction equation to test the null hypothesis there is no difference between predicted intention to evaluate psychological factors related to food and weight concerns of weight management clients and actual intention to evaluate psychological factors related to food and weight concerns of weight management clients for the validation sample. A second prediction equation was generated to test the null hypothesis there is no difference between predicted intention to refer weight management clients to psychological services for issues related to food or weight concerns and actual intention to refer weight management clients to psychological services for issues related to food or weight concerns for the

validation sample. The prediction equations were also used to answer Research Questions 1 and 2 to determine the best predictor of the two practice behaviors.

In Chapter 4, the researcher presented findings of the present study. Test-retest reliability analyses using paired *t*-tests of construct components and the Spearman-Brown coefficient confirmed the test-retest reliability of the DBIQ with the full study sample. Principal component analyses with internal consistency reliability analyses resulted in four components for each of the two DVs: Intention Evaluate and Intention Refer. The components, as expected, were related to: intention, attitude, perceived behavioral control, and subjective norm. Composite scores were created for the components and these scores were used in multiple linear regression analyses to answer the research questions for the study and to test the null hypotheses. The researcher failed to reject both Null Hypothesis 1 and Null Hypothesis 2. There was no significant difference between predicted evaluation intention scores and actual evaluation intention scores or between predicted referral intention scores and actual referral intention scores. Research questions were answered. The best predictor for Intention Evaluate and for Intention Refer was Perceived Behavioral Control. All TpB component variables were significant predictors for both DVs. Additionally, having taken a course of study in psychology or a related field was a significant predictor for Intention Evaluate and working in a practice setting with psychology professionals was a significant predictor for Intention Refer.

Discussion

The ADA practice standards indicate that evaluating psychological factors related to food and weight concerns of weight management clients and making appropriate referrals are vital to the nutrition care process; however, guidance for RDs concerning the details of these practices, including identifying the assessment measures/instruments that may be used by RDs, is limited. One

exception is that nutrition care process guidelines provide clarification that, while RDs are encouraged to make nutritional diagnoses, RDs are not permitted to make psychological diagnoses. It would be helpful to practicing dietitians if the standards were just as clear about what is permitted within the scope of practice. For example, while diagnosing depression would clearly be out of the scope of practice, screening and referral for depression would not, based on interpretation of information provided in the standards. Personal communication with a medical director at a large teaching hospital (William Fulcher, June 8, 2006) indicated that, due to the demands on physicians' time, it would seem to be helpful if dietitians were to conduct a valid screening for depression or other potential psychological condition associated with food and weight issues during their contact with clients, and to include the results of the screening on the dietitian's assessment of the client's condition and recommended treatment. The example of screening for depression is used here because there are multiple depression screening tools, such as the Beck Depression Inventory®—II (BDI®–II; Beck, Steer, & Brown, 2008) that can be used for depression. Other scales are referenced in the professional literature, as well, such as "The Depression Scale," that clearly indicate formal training in psychology is not necessary for administration (Goldberg, 2008). Another reason the example of screening for depression is used here is because researchers recently have established a causal link between depression and obesity (Markowitz et al., 2008).

Furthermore, adverse childhood experiences, such as CSA, CPA, fear of physical abuse, and verbal abuse have been statistically associated with obesity. Having been raised by an alcoholic parent has been statistically associated with depression, which has been further associated with obesity. Screening for a client history of adverse childhood experiences or for ACoA status might prove to be helpful in identifying clients with a higher risk of symptomology adversely affecting nutritional status, such as has been described in this dissertation, and warrants further investigation.

Once identified as a potential referral to psychological services, RDs face another challenge in making an appropriate referral based on the policies in place in the practice setting. In some instances, RDs would be permitted to recommend a referral to the physician but not order a referral for the client. In other instances, RDs would be permitted to talk with the client about needing to see a counselor/therapist at discharge and providing contact information. The issue is confounded by the lack of psychological resources in certain communities and the lack of funds to cover costs. Yet, the RD still is required by professional standards to make referrals, as appropriate. Findings of the present study provide evidence that the statistically significant predictors of a dietitian's intention to evaluate and refer clients to psychological services are (a) perceived behavioral control, (b) subjective norm, and (c) attitude toward evaluation and referral. Working in a practice setting with psychology professionals is also a predictor of intention to refer. This could be due to the networking relationships formed when working together, to a raised awareness of the issues through inservice training, or both. An important issue to consider is that clients with psychological factors that need to be evaluated for potential psychological referral often do not see the issues for themselves and may require assistance to make connections to psychological services. When an RD works with a client, it is through careful questioning and listening that the dietitian has the opportunity to combine everything learned about psychology, sociology, communication, food, nutrition, exercise, pharmacology, physiology, biology, health behavior, education, etc., to evaluate the client's needs, develop a plan of care (including referrals), and assist the client to enter into the recommended treatment plan.

The TpB predictors of dietitians' intention to evaluate psychological factors of food and weight concerns of weight management clients and to make referrals were (a) perceived behavioral control, (b) attitude, and (c) subjective norms. However, within these categories of beliefs are specific beliefs that, if known, would be useful in targeting dietetics curriculum and specific con-

tinuing professional education courses and trainings. The fact that (a) perceived behavioral control, (b) attitude, and (c) subjective norms were found to be significant predictors of intention to perform both practice behaviors indicates that further research to identify specific beliefs within each of these categories is warranted.

An overarching consideration in evaluating clients and making referrals is that there are overlapping responsibilities between dietitians and other professionals, which calls for an interdisciplinary approach. For instance, while dietitians are experts in nutritional requirements and ways to meet these requirements (what people eat), it remains a question if all dietitians are experts in health behavior and health behavior change (how people use food and how they change how they use food). Traditionally, dietitians have considered their role to convey nutrition information; however, well-conveyed information does not necessarily result in changed behavior. Student dietitians in some dietetics training programs are learning about motivational interviewing, which as been found to be effective in changing health behavior (Brug et al., 2007; Schwartz et al., 2007), and practicing dietitians are learning about motivational interviewing through continued professional education on various levels. This represents movement in the profession toward addressing issues of health behavior change and is an important step in teaching dietitians to dialogue with clients about issues surrounding health behavior. At the same time that many dietitians are learning about behavioral change techniques, the counseling profession is grappling with counselors who are working with clients on behavioral issues surrounding food, but do not have the expertise to address specific nutrient requirements to make nutritional recommendations (Stice, 2002). The conditions are favorable for dietitians and counselors to be trained together through interprofessional academic instruction and to work together on these issues.

Other non-physicians who are qualified to work with clients regarding health behavior are Certified Health Education Specialists (CHES), who are prepared through education and training to:

1. Assess individual and community needs for health education
2. Plan health education strategies, interventions, and programs.
3. Implement health education strategies, interventions, and programs.
4. Conduct evaluation and research related to health education.
5. Administer health education strategies, interventions, and programs.
6. Serve as a health education resource person.
7. Communicate and advocate for health and health education. (National Commission for Health Education Credentialing, Inc., 2006)

CHES are certified by the National Commission for Health Education Credentialing, Inc. (NCHEC), requiring continuing professional education to maintain status with the organization. CHES practitioners learn health behavior theory and are often hired by health care facilities and other entities. It would be difficult for dietitians to accept that specialists in health behavior might be a first point of contact, with a referral to a dietitian for help with specifications of the nutrition recommendations; however, this is already happening in some facilities where health educators are consulted to work with less complicated cases of obesity. Consider the following job tasks described in a sample health educator job description, posted on the NCHEC Web site: "coordinate and provide counseling services for specific disease management programs; provide class instruction as needed" (NCHEC, 2008, para 11).

As dietitians grapple with the need to understand and practice principles of health behavior change, a consideration needs to be made for individual philosophy and ability; however, the profession as a whole must stay apprised of the practice behaviors of its members inasmuch as they re-

late to dietetics practice standards. For example, results of the present study indicate that approximately 25% of participants responding strongly disagreed to the statement "my direct supervisor wants me to evaluate psychological factors related to food and weight concerns of weight management clients." This issue must be addressed systematically and corrections made at the top levels of dietetics management.

Implications for the Counseling and Dietetics Professions

Implications for Interprofessional Education and Collaboration

The researcher believes changes are inevitable in dietetic practice trends, especially in the area of interprofessional education. Interprofessional education refers to teaching students of more than one discipline together on related topics (Whelan et al., 2005). Counseling, health education and dietetic students could be taught together in a class that presents the connection between psychological and physiological issues in obesity. This format could include theory and models related to each discipline to understand behavior. For example, counseling, health education and dietetic majors may explore research perspectives, such as the 2007 study published in the *International Journal of Behavioral Nutrition and Physical Activity*, entitled, "The application of a social cognition model in explaining fruit intake in Austrian, Norwegian and Spanish schoolchildren using structural equation modelling" (Sandvik et al., 2007). The social cognitive theory is a broad theory that encompasses learned behavior, with constructs applicable to all three disciplines. Additionally, counseling and dietetic majors could participate in group sessions led by a counselor/therapist using the ABC model from rational emotive therapy (Mulhauser, 2008) to discuss their thoughts and feelings about evaluating psychological factors and making referrals, since these are areas where professional vulnerability may exist in the field. For instance, the activating event, A (discussing psychological factors with a client or practitioner's immediate interpretation of this event), may lead to beliefs

about the event, B (rational or irrational beliefs; evaluations about the beliefs), which may lead to consequences, C (emotions, other thoughts, behaviors). Rational-emotive therapy suggests that unhealthy consequences (C) to activating events (A) may be mitigated through exposing irrational beliefs (B) and modifying those beliefs. This theory may have particular applicability to promoting change with dietitians in the practice behaviors under investigation because it targets beliefs. RD beliefs have been demonstrated in the present study to have significant correlation with intention to perform the practice behaviors.

Collaborative interdisciplinary classes could help future counselor/therapists become more interested in helping clients address health issues of obesity and future dietitians become more interested in helping clients address the psychological issues that can be obstacles in the treatment of obesity. Both sets of professionals might become more interested in making referrals.

Another option would be for dietetic students to take a health behavior class to learn health behavior theory and psychology. In this case, dietetics students would be learning alongside students from an array of majors.

While interdisciplinary collaboration is occurring at the research level, with the merging of behavioral and biological/nutrition sciences in the research arena, the trends have not followed at the practice level between practicing psychologists and nutrition professionals to as great of an extent (Stice, 2002). Stice (2002), an assistant professor of psychology and eating disorders researcher at the University of Texas at Austin, published an insightful article describing this professional split, encouraging an integrated approach to obesity treatment. First, he described the split as unfortunate in that "obesity accounts for far more morbidity and mortality than all the eating disorders combined because it is much more prevalent and is associated with serious health problems (diabetes, coronary heart disease, cerebrovascular disease, colorectal cancer)" (para 2). Secondly, he described these conditions as probably overlapping in the fact that "the risk factors for obesity

and those for bulimia nervosa and binge-eating disorder…involve caloric overconsumption" (para 3). The remainder of the article is a call to identify obesity as a disorder in eating, and, as such, calls the disciplines together in treatment approaches. He writes:

> The neglect of obesity by the eating-disorders community may be the result of two factors. First, obesity is not considered a psychiatric disorder. This may be interpreted to suggest that obesity is not a disorder of eating. There is now incontrovertible experimental evidence indicating that body mass is a direct function of caloric intake relative to caloric expenditure (the energy equation). Research has also documented that obese individuals consume more calories and exercise less than their lean counterparts (dispelling the myth that obese individuals do not consume more calories). It seems reasonable to consider that a medical condition caused by excessive eating, relative to caloric needs, is a disorder of eating. (Stice, 2002, para 4)

An example from dietetics practice history of dietitians expanding their roles and responsibilities in the area of assessment and evaluation is in physical assessment. The expansion in the dietitian's role in physical assessment is evident in procedures such as placing nasogastric tubes, drawing blood via finger sticks to check for anemia, and taking blood pressure readings (Mackle, Touger-Decker, Maillet, & Holland, 2003). Training is available for dietitians in the area of physical assessment; yet as recently as twenty years ago, dietitians would not have been permitted to cross this barrier in the scope of dietetic practice. The same movement and expansion of practice boundaries is seen in the way dietitians are permitted to write orders for certain nutrition related products and procedures.

Likewise, dietitians can learn how to administer depression, stress, and emotional eating screens and appropriate assessments, such as the EADES (Ozier et al., 2006), and other validated testing instruments that are within the scope of dietetics. The purpose of administering psychologi-

cal screens within nutrition assessments when appropriate would be to make referrals to counseling/psychology to improve the level of patient care and address potential underlying issues related to eating and activity behaviors. Appropriate referrals to counseling/psychology can improve a client's sense of well-being and quality of life, in addition to supporting health behavior change. Perhaps academic courses and training could be developed to equip dietitians to better perform evaluations of psychological factors relating to food and weight concerns of clients.

Implications for Tailored Communication

With the continued protracted epidemic of obesity taking on pandemic proportions, dietitians need to look more deeply into individual circumstances and situations of patients and clients in order to establish tailored communication with clients. Assessments need to be more thorough and specific treatment plans need to address obstacles to obesity treatment occurring in each of the domains of health on the individual level. When formal multidisciplinary teams are not possible due to financial limitations, individual referrals need to be made to appropriate health care professionals that can offer assistance in areas where obstacles are detected. This recommendation is compatible with ADA's position that dietitians provide individualized nutrition care rather than standardized nutrition care.

The idea of tailored treatment plans for obesity is not new, although the idea has not received much attention. As early as 1990, Epstein observed that

> participants in obesity treatment programs usually are provided similar treatments, as if the problem of obesity were similar for all the participants. In the simplest sense this is true: all obese persons have become obese by consuming more calories than they expended. However, the causes for the positive energy balance are not likely to be the same across all participants. For example, some obese persons may eat to excess during stressful situa-

> tions. Others may have long periods of inactivity when they cannot easily reduce caloric intake sufficiently to compensate for the lowered expenditure. It seems likely that the reasons for getting obese, or for regaining lost weight, differ across individuals. These specific differences should be linked with the development of individually tailored treatment programs. (p. 70)

Implications for Dietitians in Health Education and Health Promotion

An important change for dietitians is that the ADA now recognizes the Certified Health Education Specialist (CHES) credentialing process as a professional development option for dietitians (Commission on Dietetic Registration, 2005). Dietitians may take advantage of this opportunity to study health education and health behavior, while meeting professional development requirements for dietetic registration. Advanced degrees in health education and health promotion provide dietitians deeper insight into the psychology of health behavior, while at the same time meeting important professional development goals. Additionally, findings of the present study indicate that dietitians who study psychology or related fields as a formal academic course of study have a significantly higher intention to evaluate psychological factors. Research may show that health behavior would be considered a related field for the purposes of dietetics practice.

An advantage to dietitians pursuing advanced degrees in health education and health promotion is that dietitians would likely increase perceived behavioral control (PBC) in working with obesity-related issues. Since PBC was found to be the best predictor for intention to evaluate psychological factors, it remains to be studied whether or not pursuing an academic course of study in psychology or a related field influences intention to evaluate indirectly through PBC in addition to the direct effect on Intention Evaluate. Path analysis will provide further information to answer this and other questions. Studying health education and promotion may be found to increase self-

efficacy in working with other obesity-related issues other than nutrition. For instance, it is considered within the scope of practice to discuss physical activity and exercise with patients/clients; however, dietitians often do not feel qualified to give health advice on this side of the energy equation. Other advantages to dietitians learning health education and promotion principles are learning tailored health communication techniques, needs assessment, and planning, implementing, and evaluating community-based health (nutrition) interventions.

Related to the role of health educator, is the role of health coach. In 2006, the ADA published an article describing the field of health coaching, suggesting that the professional qualifications for dietitians lend themselves to health coaching (Lipscomb, 2006). In this article, Lipscomb discusses the CHES credentials for use in health coaching, and encourages dietitians to use their credentials to establish themselves also as health coaches.

Implications for Dietetics Practice Standards

It is noted that psychological terminology is not uniform as related to dietetics. For instance, some practice standards documents refer to psycho-social assessment whereas others refer to psychological assessment. Neither term is defined. Even through the practice standards state that registered dietitians are to use validated instruments to assess mental status, it remains unclear in the interpretation of the standard where the responsibility lies in assessing the patient/client. Does the dietitian utilize results from the assessment performed by other practitioners, or does the dietitian administer certain instruments that are within the scope of dietetics? While there are validated instruments to screen for (but not diagnose) eating disorders and depression, among other psychological status indicators, there is no mention of these by name in ADA standards or position statements. In considering the future of reimbursement for dietitian services, it is suggested that these issues be considered as potential vehicles to improve the rate of reimbursement, as clients are

identified and referred for adjunct therapy that might be shown to increase the effectiveness of the RD's involvement through referral. This is recommended for future study.

Implications for Acceptance of Nontraditional Treatment Approaches into Mainstream Dietetic Practice

In 2002, the ADA published *Eating Disorders: A Clinical Guide to Counseling and Treatment* that discusses in great depth the roles and interaction of biological, psychological and social issues in the etiology and treatment of eating disorders through the process of nutrition therapy (Woolsey, 2002). (Throughout this discussion, the phrase "treating eating disorders through nutrition therapy" refers to the RDs work on a treatment team in conjunction with psychology professionals.) While this and other information provided in the publication seemingly is essential to dietetic practice, the author refers to her writing as a "nontraditional project" (p. viii). The author of the present study believes that mainstream dietetic practice needs to open to the experiences of clients to understand the unique barriers and roadblocks to successful weight management faced by the segment of the obese population with adverse childhood experiences, histories of ACoA, and eating disorders.

Other barriers must be faced, including other psychological issues addressed in this research, to provide proper and effective treatment and referrals. Future trends in dietetics will require a blending of traditional and nontraditional practices to produce more balanced practitioners who are equally adept at both the art and science of dietetic practice in the 21st century, as well as an acceptance by those who establish the standards for insurance reimbursement of the complexity of both the art and the science of helping obese clients.

Conclusions

The professional obesity literature lends credence to the idea of assessing a weight management client's psychological status prior to and during the implementation of a weight manage-

ment treatment plan. The ADA states in the standards of practice for nutrition care and in the position statement on weight management that psychological assessment and appropriate referrals are to be included in the nutrition assessment process. Further, Standard 4.1.5 of the standards of practice in nutrition care, which falls under Standard 4.1 (Monitors Progress), states the dietitian is to gather information that indicates reasons that explain lack of progress (Kieselhorst et al., 2005). If there are psychological issues that explain lack of progress, the registered dietitian should be able to recognize the issues sufficiently to make a referral to psychological services.

It is reasonable to believe, based on progress in other areas of nutrition assessment, that dietitians can develop skills in the area of psychological assessment and referral, especially when there are validated instruments available that do not require a degree in counseling/psychology for administration. When conditions such as stress, depression or eating disorders are detected through screening that can partially explain lack of progress, it is the dietitian's responsibility to refer these clients to appropriate services and to work collaboratively with other professionals to address the needs of the client. Results of the present study indicate that dietitian's behavioral, normative, and control beliefs, along with formal academic preparation in psychology or a related field, are statistically significant predictors for intention to evaluate psychological factors related to food and weight concerns of weight management clients. Furthermore, dietitian's behavioral, normative, and control beliefs, along with working in a practice setting with psychology professionals, are statistically significant predictors for intention to refer clients to psychological services. More extensive analyses of the study data, i.e. path analyses, are indicated to investigate these statistical relationships in more detail, especially antecedent and direct effects on the dependent variables.

Recommendations

Recommendations for Improving the Dissertation Study

Recommendations for improving the dissertation study would be to request a larger sample from the CDR at the beginning of the research to avoid duplicate names resulting from taking two samples with slight overlap (202 names out of 5660 names were duplicates). Additionally, it is recommended that paper versions of the DBIQ not be used even in the pilot stage, since the psychometrics of the paper version cannot be proven to be the same as the online version without sufficient numbers to test that assumption. Lastly, it is recommended that more complex statistical analyses be conducted to answer other research questions developed on this topic. For example, while multiple linear regression was used to predict the variance in two separate interval dependent variables (evaluate and refer) based on linear combinations of independent variables, it can also be used to establish that certain independent variables significantly explain or account for a proportion of variance in a dependent (Garson, 2008). Furthermore, interaction effects can be explored using cross-products, among other tests. Hierarchical regression can be used to determine "how most variance in the dependent can be explained by one or a set of new independent variables, over and above that explained by an earlier set" (para 1).

Recommendations for Dietetic Practice

As stated previously, it has been found that dietitians' attitudes, subjective norms and perceived behavioral control are significant predictors of intention to evaluate psychological factors and to refer clients to psychological services. In addition, formal academic course of study in psychology or a related field and a practice setting that includes psychology professionals are significant predictors of intention to evaluate and intention to refer, respectively. The level of perceived behavioral control in performing the practice behaviors under investigation, what a dietitian thinks

about the practice behaviors, and what a dietitian thinks others think the dietitian should do in regards to these practice behaviors are important to the profession and inform dietetics training program and continuing professional education curriculum. Dietitians should be taught that these practice behaviors are "good, helpful, useful, beneficial, and right," and tutored in the necessary skills to perform the behaviors. This could be done through inservice and continuing professional education at the local, state, and national levels; however, it should also be taught at the level of formal academic training. The goal would be for dietitians to be confident and able to perform the practice behaviors of interest "so that RD's are able to mediate effective and sustainable behavior change in clients and patients" (personal communication with Amy Ozier, May 28, 2008). In addition, health care organizations need to work out the logistics that allow dietitians to practice these behaviors. Finally, attention of direct supervisors needs to be given to dietitians in such a way as dietitians perceive that supervisors want them to practice these behaviors. As mentioned previously, it is important to note that 211 of 862 total responses to the item "my direct supervisor wants me to evaluate psychological factors…" was strongly disagree (a score of 1 on a 7-point Likert-like scale), which represents 24% of responses. While responses to a single item within a factor cannot be used to draw conclusions, it is important that so many dietitians believe their supervisors do not agree with a practice behavior that is a clear standard in the profession. This finding carries with it the recommendation that dietetics supervisors could benefit from further training on practice standards to support dietetic staff in complying with professional standards.

Recommendations for Future Research

Based on the study data, recommendations are to further investigate the gaps between dietetics training and practice, and to further analyze the dataset to see how levels of continuing professional education and other IVs used in the study might explain intention to evaluate and refer

clients in the multiple regression model. Further investigation may lead to increased awareness of these issues and provide guidance in how to perform psychological assessment within the scope of dietetic practice. Researchers who administer the DBIQ to other RD samples might confirm the findings or report new findings. In addition, modifications to the DBIQ and retesting of psychometric properties to ensure reliability and validity of a modified instrument might offer new insights into the contribution of other variables to the model, perhaps improving the model fit. For example, variables such as empathy and RD attitude toward obesity might be explored, as well as RD BMI (Barr et al., 2004; Empathy, 2007; Oberrieder, Walker, Monroe, & Adeyanju, 1995; Schwartz, Vartanian, Nosek, & Brownell, 2006).

Studies investigating effective screening items for psychological factors are recommended. Studies that incorporate depression screens are particularly recommended, given the recent findings of a causal link between depression and obesity (Markowitz et al., 2008). Other suggested screening items for investigation would be items related to client history of adverse childhood experiences or ACoA status, in addition to items related to current psychosocial issues such as stress, PTSD, anxiety, alexithymia, self-esteem, barrier weight, eating disorderes, current abuse, etc.

Long-term benefits of continued research on this topic might be a realignment of staffing patterns, with dietitians working on services that tend to see more complex cases of obesity permitted more time per patient to allow for more comprehensive treatment. Perhaps one reason treatment for obesity is often not included in insurance reimbursement schedules is due to the ineffective system in place of treating all obesity the same with minimal, if any, success. Investing time into creating a system that has the potential to demonstrate improved results through more comprehensive assessment and referral patterns also has the potential to effect change in how obesity treatment is viewed and reimbursed. Nonetheless, these practices must be substantiated with re-

search to become included in the evidence-based interventions used as a frame of reference by practitioners and third-party payers, alike.

The idea of substantiating a realistic obesity treatment paradigm through research wields a double-edged dilemma. Survey research conducted with a national sample of registered dietitians indicates most dietitians surveyed said they reviewed the professional research literature less than once per month or never (Byham-Gray et al., 2005). RDs completing doctoral programs scored the highest among all other groups. Others who scored significantly higher than their counterparts were (a) those with advanced-level board certifications, (b) those who had completed a research course, (c) those who read research more recently than two weeks previously, and those involved with two or more practice groups. The changes necessary to move the practice of dietetics into the future in obesity treatment and weight management will come from the evidence discovered in the very research studies not being used among the majority dietitians at the current time (Byham-Gray et al., 2005). This will put an additional burden on professional dietetics groups to educate their members on the "best practices" for the profession.

Dissemination of Findings

Findings of this research will be submitted for publication to professional dietetics journals and other publications. Additionally, the principal investigator and other members of the research team will disseminate the findings at professional conferences, such as the ADA national convention, the AAHPERD national convention, and state and local conferences. The research team also will disseminate the findings within counseling/therapist groups and publications and continue the dialogue between the dietetics and counseling professions that has begun through this research.

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APPENDIX A

IRB DOCUMENTS

OMB No. 0990-0263
Approved for use through 11/30/2008

Protection of Human Subjects
Assurance Identification/IRB Certification/Declaration of Exemption
(Common Rule)

Policy: Research activities involving human subjects may not be conducted or supported by the Departments and Agencies adopting the Common Rule (56FR28003, June 18, 1991) unless the activities are exempt from or approved in accordance with the Common Rule. See section 101(b) of the Common Rule for exemptions. Institutions submitting applications or proposals for support must submit certification of appropriate Institutional Review Board (IRB) review and approval to the Department or Agency in accordance with the Common Rule.

Institutions must have an assurance of compliance that applies to the research to be conducted and should submit certification of IRB review and approval with each application or proposal unless otherwise advised by the Department or Agency.

1. Request Type	2. Type of Mechanism	3. Name of Federal Department or Agency and, if known, Application or Proposal Identification No.
[ ] ORIGINAL [ ] CONTINUATION [ ] EXEMPTION	[ ] GRANT [ ] CONTRACT [ ] FELLOWSHIP [ ] COOPERATIVE AGREEMENT [ ] OTHER:_____	

4. Title of Application or Activity	5. Name of Principal Investigator, Program Director, Fellow, or Other
Beliefs and Intentions of U.S. Registered Dietitians Toward Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients and Making Referrals	BURNETT, DONNA O.

6. Assurance Status of this Project *(Respond to one of the following)*

[X] This Assurance, on file with Department of Health and Human Services, covers this activity:
Assurance Identification No. FWA00005960, the expiration date 2/14/09 IRB Registration No. IRB00000726

[ ] This Assurance, on file with *(agency/dept)*_____, covers this activity.
Assurance No._____, the expiration date_____ IRB Registration/Identification No._____*(if applicable)*

[ ] No assurance has been filed for this institution. This institution declares that it will provide an Assurance and Certification of IRB review and approval upon request.

[ ] Exemption Status: Human subjects are involved, but this activity qualifies for exemption under Section 101(b), paragraph_____.

7. Certification of IRB Review (Respond to one of the following IF you have an Assurance on file)

[X] This activity has been reviewed and approved by the IRB in accordance with the Common Rule and any other governing regulations.
by: [ ] Full IRB Review on (date of IRB meeting) _____ or [X] Expedited Review on (date) 06/26/07
[ ] If less than one year approval, provide expiration date _____

[ ] This activity contains multiple projects, some of which have not been reviewed. The IRB has granted approval on condition that all projects covered by the Common Rule will be reviewed and approved before they are initiated and that appropriate further certification will be submitted.

8. Comments	Title X070626001
Protocol subject to Annual continuing review.	Beliefs and Intentions of U.S. Registered Dietitians Toward Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients and Making Referrals

IRB Approval Issued: 06/26/07

9. The official signing below certifies that the information provided above is correct and that, as required, future reviews will be performed until study closure and certification will be provided.	10. Name and Address of Institution
11. Phone No. *(with area code)* (205) 934-3789 12. Fax No. *(with area code)* (205) 934-1301 13. Email: smoore@uab.edu	University of Alabama at Birmingham 701 20th Street South Birmingham, AL 35294

14. Name of Official	15. Title
Marilyn Doss, M.A.	Vice Chair, IRB

16. Signature	17. Date
Marilyn Doss	6-26-07

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Public reporting burden for this collection of information is estimated to average less than an hour per response. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: OS Reports Clearance Officer, Room 503 200 Independence Avenue, SW., Washington, DC 20201. *Do not return the completed form to this address.*

Project Revision/Amendment Form

(PLEASE TYPE: In MS Word, highlight the shaded, underlined box and replace with your text; double-click checkboxes to check/uncheck.)

- Federal regulations require IRB approval before implementing proposed changes.
- Change means any change, in content or form, to the protocol, consent form, or any supportive materials (such as the Investigator's Brochure, questionnaires, surveys, advertisements, etc.).
- Complete this form and attach the changed research documents.

Today's Date: *2-5-08*

1. Contact Information

Principal Investigator's Name: *Donna O. Burnett* BlazerID: *dmangham* E-mail: *dburnett@uab.edu*
Contact Person's Name: *Donna O. Burnett* BlazerID: *dmangham* E-mail: *dburnett@uab.edu*
Telephone: *205-996-7981* Fax: *205-996-7977*
Campus Address: *169 912 Bldg Zip 1200*

2. Protocol Identification

Protocol Title: *Beliefs and intentions of U.S. registered dietitians toward evaluating psychological factors related to food and weight concerns of weight management clients and making referrals*
IRB Protocol Number: *X070626001*

Current Status of Project (check only one):

- ☒ Currently in Progress (Number of participants entered: *9*)
- ☐ Study has not yet begun (No participants entered)
- ☐ Closed to participant enrollment (remains active)—
  Number of participants on therapy/intervention:_____
  Number of participants in long-term follow-up only:_____
- ☐ Closed to participant enrollment (data analysis only)—
  Total number of participants enrolled:_____

This submission changes the status of this study in the following manner (check all that apply):

- ☐ Protocol Revision
- ☒ Protocol Amendment
- ☐ Study Closed to participant entry
- ☐ Study Closure
- ☐ Other, (specify) _____
- ☐ Revised Consent Form
- ☐ Addendum (new) consent form
- ☐ Enrollment temporarily suspended by sponsor
- ☐ Change in protocol personnel

3. Reason for change

Briefly describe, and explain the reason for, the change. If normal, healthy controls are included, describe in detail how this change will affect those participants.
Include a copy of the protocol and any other documents affected by this change (e.g., consent form, questionnaire) with all the changes highlighted.

A) The change in protocol results from the fact that this project did not receive the requested NIH funding. By changing the protocol to include a Web-based component in a mixed-mode survey retaining a paper wave for non-respondents (and providing paper copies to those without working email addresses), the cost to conduct the research will be significantly reduced, while preserving the response rate needed to complete the analysis (Dillman, 2000).

B) The survey instrument is attached to this documentation and will be used for Phases II and III of the study. It is being submitted now after compiling the data from Phase I that was used to develop the instrument. After pilot testing in Phase II, a revised version of the instrument will be submitted if it is changed as a result of the pilot testing.

C) The researcher will use Surveymonkey (www.surveymonkey.com) to generate the survey and collect responses. There is an option within Surveymonkey whereby the researcher can refuse to store IP addresses from respondents' computers. For this research, IP addresses will NOT be stored by researchers.

4. Does this change revise or add a genetic or storage of samples component? ☐Yes ☒No

If yes, please see the Guidebook to assist you in revising or preparing your submission, or call the IRB office at 934-3789.

5. Does the change affect subject participation (e.g. procedures, risks, costs, etc.)? ☒Yes ☐No

6. Does the change affect the consent document(s)? ☒Yes ☐No

If yes, briefly discuss the changes. *In Phase I of the original protocol, by completing and returning the paper questionnaire, subjects consented to participate by completing and returning the questionnaire; documentation was not provided for reasons explained in the approved protocol. The change comes in Phases II and III, which are not yet underway. With the online survey, participants who voluntarily participate to complete and submit the survey will be required to check "yes" to a consent statement before participating in the survey. This statement can be found on the enclosed paper copy of the online survey. No change is requested for the consent process to voluntarily complete and return the paper surveys via postal mail.*

Include the revised consent document with the changes highlighted.

Will any participants need to be reconsented as a result of the changes? ☐Yes ☒No

If yes, when will participants be reconsented?_____

Signature of Principal Investigator Donna O. Burnett Date 2/5/08

DOLA 6/27/07

APPROVED
Marilyn Doss 2/6/08
MARILYN DOSS, M.A.
Vice Chair – IRB

APPENDIX B

JOURNALS WITH PUBLISHED TPB STUDIES

Table 23

Partial Listing of Journals Containing Published TpB Studies

Journals with published TpB Studies
American Journal of Health Promotion
Academy of Management Journal
Accident Analysis and Prevention
Activities, Adaptation & Aging
Adapted Physical Activity Quarterly
Addiction Research and Theory
Addictive Behaviors
Advances in Consumer Research
AIDS Care
AIDS Education & Prevention
Alcohol & Alcoholism
American Journal of Community Psychology
American Journal of Health Behavior
American Journal of Health Promotion
American Journal of Infection Control
American Journal of Preventive Medicine
Annals of Behavioral Medicine
Appetite
Assessment & Evaluation in Higher Education
Avante
Basic & Applied Social Psychology
Behavioral Medicine
British Journal of Addiction
British Journal of Health Psychology
British Journal of Social Psychology
Canadian Journal of Behavioural Science
Canadian Journal of Public Health
Cancer Nursing
Clinical Effectiveness in Nursing
Criminal Behavior and Mental Health
Criminal Justice & Behavior
Current Psychology: Developmental, Learning, Personality, Social
Decision Support Systems
Diabetic Medicine
Educational Studies
Elementary School Journal
Entrepreneurship Theory and Practice

Table 23, *continued*

Journals with published TpB Studies
Ergonomics
Ethnicity and Disease
European Journal of Social Psychology
European Review of Social Psychology
Food Quality and Preference
Health Communication
Health Education & Behavior
Health Education Quarterly
Health Education Research
Health Psychology, Psychological Bulletin
Hispanic Journal of Behavioral Sciences
Human Dimensions of Wildlife
Human Relation
Infection Control and Hospital Epidemiology
Integrative Cancer Therapy
International Journal of Behavioral Medicine
International Journal of Human-Computer Studies
International Journal of Public Policy
International Journal of Sport Psychology
Irish Journal of Psychology
Journal of Adolescent Health
Journal of Advanced Nursing
Journal of Alternative and Complementary Medicine
Journal of Applied Biobehavioral Research
Journal of Applied Social Psychology
Journal of Applied Sport Psychology
Journal of Behavioral Medicine
Journal of Business Ethics
Journal of Cardiopulmonary Rehabilitation
Journal of Child and Substance Abuse
Journal of Cleaner Production
Journal of Clinical Psychology
Journal of Clinical Psychology in Medical Settings
Journal of *Community & Applied Social Psychology*
Journal of Community and Applied Social Psychology
Journal of Community Health
Journal of Consulting and Clinical Psychology
Journal of Consumer Psychology

Table 23, *continued*

Journals with published TpB Studies
Journal of Cross-Cultural Psychology
Journal of Drug Education
Journal of Economic Psychology
Journal of Educational Psychology
Journal of Experimental Social Psychology
Journal of Health Care for the Poor & Underserved
Journal of Health Psychology
Journal of Human Lactation
Journal of Human Nutrition and Dietetics
Journal of Information Science
Journal of Leisure Research
Journal of Management Development
Journal of Midwifery and Women's Health
Journal of Neuroscience Nursing
Journal of Nursing Education
Journal of Nursing Scholarship
Journal of Nutrition Education
Journal of Nutrition Education and Behavior
Journal of Occupational & Organizational Psychology
Journal of Occupational and Environmental Medicine
Journal of Occupational Medicine
Journal of Personality
Journal of Physical Activity and Health
Journal of Psychosomatic Research
Journal of Reproductive & Infant Psychology
Journal of Research in Personality
Journal of Research in Science Teaching
Journal of Rural Studies
Journal of Safety Research
Journal of School Health
Journal of Sex Research
Journal of Social Issues
Journal of Sport & Exercise Psychology
Journal of Sports Science
Journal of Studies on Alcohol
Journal of Teaching in Physical Education
Journal of Vocational Behavior
Leisure Sciences

Table 23, *continued*

Journals with published TpB Studies
Maternity and Child Health Journal
Military Medicine
Multidisciplinary Association for Psychedelic Studies
Negotiation Journal
Nursing & Health Sciences
Nursing Research
Nutrition Research
Oncology Nursing Forum
Organizational Behavior and Human Decision Processes
Patient Education and Counseling
Pediatric Exercise Science
Perceptual & Motor Skills
Perceptual and Motor Skills
Personality & Social Psychology Bulletin
Personality and Individual Differences
Personnel Psychology
Preventive Medicine
Psychiatric Services
Psychologist
Psychology & Health
Psychology & Marketing
Psychology, Health & Medicine
Psychology of Sport and Exercise
Psychology, Health & Medicine
Psycho-Oncology
Public Health Nursing
Public Health Reports
Quality & Quantity
Rationality and Society
Rehabilitation Psychology
Research in Nursing & Health
Research Quarterly for Exercise & Sport
Scandinavian Journal of Psychology
Scandinavian Journal of Public Health
Science Communication
Self & Identity
Sexual & Relationship Therapy
Small Group Research

Table 23, *continued*

Journals with published TpB Studies
Social Behavior & Personality
Social Psychology Quarterly
Social Science & Medicine
Social Science and Medicine
Society & Natural Resources
Substance Use & Misuse
Teaching of Psychology
Technovation
The Canadian Journal of Human Sexuality
The Sport Psychologist
Theory & Psychology
Therapeutic Recreation Journal
Violence and Victims
Womens Health Issues

APPENDIX C

ELICITATION QUESTIONNAIRE

ON UNIVERSITY OF ALABAMA AT BIRMINGHAM LETTER HEAD

October 22, 2007

Dear :

The past few years have brought greater focus on the Nutrition Care Process in dietetic practice. At the same time, scientists continue to work in other areas to provide current research data in areas such as eating disorders, including binge eating disorder (BED). For example, a 2007 study found a prevalence rate of 6.6% for BED in a community sample of 910 randomly selected participants living in metropolitan St. Louis, MO. Results from the study found that men had the same likelihood of screening positive for BED (BED+) as did women. The researchers found a strong association between BED and obesity; furthermore BED was found to be distinct from typical obesity based on psychological characteristics.

As a registered dietitian, you represent the largest group of professionals with a primary focus of working with the public to provide education and guidance in the areas of food- and weight-related issues. Critical to your job function is the formulation and recommendation of appropriate treatment plans based on information gathered in the nutrition assessment stage of the Nutrition Care Process. This includes plans for referral to psychological services, as appropriate. Due to the complex nature of food- and weight-related treatment issues, it is imperative that cases with psychological components be referred to mental health professionals.

You have been randomly selected to complete this survey that looks at issues related to evaluating and referring weight management clients. For your time, you will receive a $15 Starbucks Card if you return the survey by November 1, 2007. Your responses will help to design a survey instrument that other U.S. registered dietitians will complete to investigate how we, as a profession, are identifying and referring clients with psychological issues related to their food- and weight- related concerns. Only summary results will be used, to protect confidentiality. The identification number on the survey will be used only to keep track of the surveys as they are returned. In this way, follow-up reminders will not be sent to those who respond in a timely manner. The Institutional Review Board (IRB) of the University of Alabama at Birmingham has reviewed and approved this study, and by completing and returning the survey you agree to participate. If you have any questions, please feel free to contact Dr. Retta Evans at 205-934-8227. If you would like to be informed of study results you may provide an email address. Thank you very much for your participation in the survey!

Best wishes,

Donna O. Burnett, MS, RD
Department of Human Studies
University of Alabama at Birmingham

Beliefs and Intentions of U.S. Registered Dietitians Towards Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients and Making Referrals

Directions for completing the study:

A. Complete the survey form **ON THE REVERSE SIDE OF THIS PAGE**. It should take about 15 to 20 minutes to complete the survey. Read the instructions carefully for each item and indicate your response. The items refer to two tasks performed by registered dietitians: 1) evaluating clients and 2) making referrals.

Task 1: "Evaluating psychological factors related to food and weight concerns of weight management clients"	Task 2: "Referring weight management clients to psychological services for issues related to food and weight concerns, as appropriate"

B. If you need additional space to complete your answers, continue on the additional paper provided, only.

C. Return the survey in the enclosed self-addressed, stamped envelope to:
Donna O. Burnett, MS, RD c/o Retta Evans, Ph.D.
Department of Human Studies
University of Alabama at Birmingham
EB 259 1530 3rd Ave. So.
Birmingham, AL 35294-1250

D. Name and Address (to receive a $15 Starbucks Card, ***if you are returning the completed form by 11/01/07***):

_____

Name (please print) Street Address City, State ZIP

_____

Email address

Important Information about You:

1. ID Number:_____ 2. Date: _____

3. Age:_____ 4. Gender: Female □ Male □

5. Ethnicity: Mark One

American Indian or Alaskan Native	Hispanic or Latino	Black or African American	Asian or Native Hawaiian Pacific Islander	White	Other	Prefer not to Disclose
□	□	□	□	□	□	□

6. Currently practicing dietetics in the U.S.?: Yes □ No □

7. Category (choose one): a. Non-patient care, only □ b. Non-patient care and patient care □ c. Patient care, only □

8. Total years of practice (full and/or part time):_____

9. Practice setting ***primarily*** related to eating disorder treatment? Yes □ No □

Your ideas are very important, and we appreciate the time you are taking to participate in this exciting research!

TURN THE PAGE OVER AND COMPLETE THE SURVEY.

Beliefs and Intentions of U.S. Registered Dietitians Towards Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients and Making Referrals

Directions for completing the survey are on the reverse side of this form.

Survey Items	**Task 1: "Evaluating psychological factors related to food and weight concerns of weight management clients"**	**Task 2: "Referring weight management clients to psychological services for issues related to food and weight concerns, as appropriate"**
1a.List positive outcomes of any type you would expect related to performing Task 1 or Task 2 and rate how important that outcome is to you as a dietitian on a scale of 1 to 10 (10 = most; 1 = least important).	Example: Justify referral to psychological services - 8	Example: Meet practice standards – 10
1b.List negative outcomes of any type you would expect related to performing Task 1 or Task 2 and rate how important that outcome is to you as a dietitian on a scale of 1 to 10 (10 = most; 1 = least important).	Example: Unpleasant experience for dietitian - 5	Example: Patient cannot afford psychological services – 10
1c. List any other outcomes of any type you would expect related to performing Task 1 or Task 2.		
2a. List any individuals or groups who would approve of you performing the task described in the column heading, including your supervisor.	Example: Director of Dietetics	Example: Counselors
2b. List any individuals or groups who would disapprove of you performing the task described in the column heading, including your supervisor.		
2c. List any other individuals or groups who come to mind when thinking about		

performing the task described in the column heading.		
3a. List the factors or circumstances that would enable you to perform the task described in the column heading.	Example: Adequate training	Example: Referral system established in facility
3b. List the factors or circumstances that would make it difficult or impossible for you to perform the task described in the column heading.	Example: Not enough time given current case load.	Example: Don't know where to refer
3c. List any other factors or circumstances that come to mind when thinking about performing the task described in the column heading.		

Beliefs and Intentions of U.S. Registered Dietitians Towards Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients and Making Referrals

ID Number: _____

Additional Comments (if applicable):

APPENDIX D

JUROR'S REVIEW FORM

Juror's Review Form*

Dietitian Beliefs and Intentions Toward Evaluation of Psychological Factors Related to Food and Weight Concerns of Weight Management Clients Questionnaire (DBIQ)

Directions to Jurors

Thank-you for reviewing the DBIQ draft instrument. We developed this instrument with funding provided in part by an award from the School of Education at UAB. The UAB Institutional Review Board approved the study protocol. Your opinion is important to evaluate the relevance and clarity of the **survey content** before administration to a sample of U.S. registered dietitians.

The TpB and Wording of Survey Items

Item content and sentence structure were determined according to guidelines provided by "Constructing Questionnaires Based on the Theory of Planned Behavior: A Manual for Health Services Researchers" (Francis et al., 2004) and according to information gathered from the professional literature. The items are designed to measure the general influence of the following TpB variables: (a) attitudes, (b) perceived behavioral control (self efficacy and ability), and (c) subjective norms, as well as demographic variables, as they relate to (d) intentions to evaluate psychological factors related to food and weight concerns of weight management clients and making referrals. The survey is NOT designed to identify specific beliefs about the TpB variables.

Your task

1) Copy the link to the online survey, below, and paste into your Web browser:
http://www.surveymonkey.com/s.aspx?sm=KeZ4IsUE35VTqmtk1e5rDA_3d_3d

2) Mark one response each for "Relevancy" and "Clarity" on this form as you preview each survey item. Indicate whether each item is:

   4-Relevant; 3-Relevant with minor revision; 2-Not relevant without major revision; or *1-Not relevant*

   4-Clear; 3-Clear with minor revision; 2-Not clear without major revision; or 1-Not clear.

3) Contact Donna Burnett at 205/996-7981 if you have questions about these instructions.

4) Return your completed responses to Donna Burnett via Email at dburnett@uab.edu, or Fax 205/996-7977 by **4 February 2008**.

*Adapted from Geiger, B.F. & Fulmore, J.S. (2007). "Juror's Review Form *AL Curriculum Coordinator's Survey About Cancer Education*," available from the authors, UAB Center for Educational Accountability, Room EB 233, 1530 3rd Ave. So., Birmingham, AL 35294-1250, Tel. 205/975-5388.

Instructions and Consent to Participate:

Record comments here about the instruction section:

1. The first set of questions relates to demographics:

What is the highest academic degree you have earned?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Have you completed an academic course of study with a declared major or minor degree in counseling, psychology, or social work?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Which response(s) best describes the counseling, psychology, or social work academic course of study you completed?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Which setting best describes your practice?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Is your practice setting primarily related to eating disorder treatment?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

How many years of full-time or part-time work experience have you gained in the United States as a registered dietitian?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

How many hours of continuing professional education related to disordered eating have you completed?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

What is your gender?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

With which ethnic group do you most identify?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

What is your age?

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

2. The next set of items asks about "Evaluating Psychological Factors Related to Food and Weight Concerns of Weight Management Clients."

I expect to evaluate psychological factors related to food and weight concerns.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I want to evaluate psychological factors related to food and weight concerns.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I intend to evaluate psychological factors related to food and weight concerns.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I plan to evaluate psychological factors related to food and weight concerns.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Out of the next 10 patients you see for an initial weight management consult, for how many would you expect to evaluate psychological factors related to food and weight concerns?

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Most people who are important to me think that I should evaluate psychological factors.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

I feel under social pressure to evaluate psychological factors.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

It is expected of me that I evaluate psychological factors.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

If I want to be thought of as a competent dietitian, I should evaluate psychological factors.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Others who are important to me want me to evaluate psychological factors.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Overall, I think that evaluating psychological factors RELATED TO FOOD AND WEIGHT CONCERNS OF WEIGHT MANAGEMENT CLIENTS is:

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Harmful/Beneficial

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Unpleasant/Pleasant

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Bad/Good

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Worthless/Useful

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Wrong/Right

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

I am confident in my ability to evaluate psychological factors…

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

It is easy for me to evaluate psychological factors…

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

I usually do not struggle to evaluate psychological factors…

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Whether I evaluate psychological factors...is entirely up to me.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

The decision to evaluate psychological factors...is within my control.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

The choice I make to evaluate psychological factors...is completely my own.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I use the following types of information to evaluate psychological factors related to food and weight concerns of weight management clients:

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Information obtained from significant other(s)

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Information obtained directly from the client

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Verbal information obtained from qualified professionals

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Written documentation by qualified professionals

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Information from validated assessment instruments administered by qualified professionals other than dietitians (i.e. Beck Depression Inventory)

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Information from validated assessment instruments administered by dietetics professionals

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Information from other assessment instrument (not validated)

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

Please list the name of any validated assessment tool you administer to your clients to provide evaluation information about psychological factors related to food and weight concerns:

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

3. The next set of items asks about "Referring Weight Management Clients to Psychological Services for Issues Related to Food and Weight Concerns, as Appropriate."

I expect to refer weight management clients to psychological services, as appropriate.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I want to refer weight management clients to psychological services, as appropriate.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I intend to refer weight management clients to psychological services, as appropriate.

☐ Relevant	☐ Relevant with minor revision	☐ Not relevant without major revision	☐ Not relevant
☐ Clear	☐ Clear with minor revision	☐ Not clear without major revision	☐ Not clear

I plan to refer weight management clients to psychological services, as appropriate.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Out of the next 10 patients for which referral to psychological services is indicated for food or weight concerns identified in the Nutrition Care Process, how many would you expect to refer?

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Most people who are important to me think that I should refer weight management clients.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

I feel under social pressure to refer weight management clients.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

It is expected of me that I refer weight management clients.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

If I want to be thought of as a competent dietitian, I should refer weight management clients.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Others who are important to me want me to refer weight management clients.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Overall, I think that referring weight management clients to psychological services for issues related to food and weight concerns, as appropriate, is:

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

I am confident in my ability to refer weight management clients to psychological services, as appropriate.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

It is easy for me to refer weight management clients to psychological services, as appropriate.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

I usually do not struggle to refer weight management clients to psychological services, as appropriate.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Whether I refer weight management clients to psychological services, as appropriate, is entirely up to me.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

The decision to refer weight management clients to psychological services, as appropriate, is within my control.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

The choice I make to refer weight management clients to psychological services, as appropriate, is completely my own.

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

4. The next two items relate to somewhat sensitive information about the participant.

Indicate your height AND weight:

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant

☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Have you ever been diagnosed and/or treated for binge eating disorder (BED) or bulimia nervosa (BN)?

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Have you ever had a subclinical case of BED or BN, in your opinion?

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

5. The last set of items asks about continuing professional education interests.

If continuing professional education opportunities were available for learning more about evaluating psychological factors related to food and weight concerns of weight management clients and making referrals, rate your level of interest in the topic:

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

List your preferred methods for continuing professional education:

☐Relevant	☐Relevant with minor revision	☐Not relevant without major revision	☐Not relevant
☐Clear	☐Clear with minor revision	☐Not clear without major revision	☐Not clear

Record other comments about the survey here:

Juror, please include **your full name**:

Many thanks for your time and expertise!

*Research note: The attitude statement options from the evaluation section were repeated for the referral section in an attempt to minimize the length of the juror's form.

APPENDIX E

FINAL DBIQ

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

INSTRUCTIONS AND CONSENT TO PARTICIPATE

You have been selected to take this survey about evaluating and referring weight management clients. By completing and submitting the survey, you will be able to share how YOU feel and think about these issues. This information may help to plan CPE programs to help dietitians do their jobs better.

Please carefully read and respond to each survey item. It should take about 15 minutes to take the survey. All responses will be kept confidential. By completing and submitting the online survey you consent to participate in the study. Your participation is voluntary and you can stop participating at any time. Your computer's IP address will not be reported to the researchers.

It is important to respond to all survey items that appear on your screen. Thank you very much for your time and effort!

* **1. Mark your agreement to participate in the survey in order to proceed:**

◯ *Yes, I agree to participate and wish to proceed to the survey.*

2. What is your gender?

◯ *Female*

◯ *Male*

3. With which ethnic group do you most identify?

◯ *American Indian or Alaskan Native*

◯ *Hispanic or Latino*

◯ *Black or African American*

◯ *Asian or Native Hawaiian or Pacific Islander*

◯ *White*

◯ *Other*

4. What is your age?

Years:

Months:

5. What is the highest academic degree you have earned?

◯ *Bachelor's degree*

◯ *Master's degree*

◯ *Doctorate*

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

6. Have you completed an academic course of study with a declared major or minor degree in counseling, psychology or a related field?

- ◯ *No*
- ◯ *Yes*

7. Which response(s) best describes the counseling, psychology or related course of study you completed?

- ◯ *Minor degree program*
- ◯ *Major degree program*
- ◯ *Graduate or professional certificate*

8. How many hours have you completed of continuing professional education (CPE) related to disordered eating?

- ◯ *None, I have not completed continuing professional education related to disordered eating.*
- ◯ *1-7 hours*
- ◯ *8-15 hours*
- ◯ *16 or more hours*

*** 9. Have you ever worked as a registered dietitian?**

- ◯ *No*
- ◯ *Yes*

10. Have you retired?

- ◯ *No*
- ◯ *Yes*

*** 11. How many years have you worked as a dietitian in the United States or on a U.S. military base?**

Round up to complete year. If "0" then enter "0" and continue with the survey: _____

12. Which of the following statements is true for you?

- ◯ *I have always worked in non-patient care settings.*
- ◯ *I have worked in both non-patient and patient care settings.*
- ◯ *I have always worked in patient care settings.*

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

13. Which of the following describe your current or previous work with weight management clients?

	No	Yes
Inpatient	○	○
Outpatient	○	○
Residential	○	○
Long-term care	○	○
Individual consultation	○	○
Team approach	○	○
Weight management program WITH a psychological component	○	○
Weight management program WITHOUT a psychological component	○	○
Eating disorder treatment setting	○	○
Psychologist/LPC/MCSW practice	○	○

14. How many clients per year do you work with related to weight issues?

Enter the average number of clients you work with regarding weight issues per year: _____

15. How did you answer the previous question?

○ *I entered "1" or more*

○ *I entered "0"*

SECTION 1: EVALUATING PSYCHOLOGICAL FACTORS

16. Indicate your agreement to each statement about your intention to evaluate psychological factors related to food and weight concerns of your clients:

	1 Strongly disagree	*2*	*3*	*4*	*5*	*6*	*7 Strongly agree*
a. I expect to evaluate psychological factors.	○	○	○	○	◉	○	○
b. I want to evaluate psychological factors.	○	○	○	○	○	○	○
c. I intend to evaluate psychological factors.	○	○	○	○	○	○	○

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

17. For how many of the next 10 clients seen for an INITIAL weight management consult do you expect to evaluate psychological factors related to food and weight concerns?

- ◯ *0 (I see clients related to weight issues but I don't expect to evaluate psychological factors)*
- ◯ *1*
- ◯ *2*
- ◯ *3*
- ◯ *4*
- ◯ *5*
- ◯ *6*
- ◯ *7*
- ◯ *8*
- ◯ *9*
- ◯ *10*

18. Indicate your agreement with the following statements about evaluating psychological factors related to food and weight concerns of your clients:

	1 Strongly disagree	*2*	*3*	*4*	*5*	*6*	*7 Strongly agree*
a. Most professionals who are important to me think that I should evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯
b. I feel under social pressure to evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯
c. It is expected of me that I evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯
d. I should evaluate psychological factors if I want to be thought of as a competent dietitian.	◯	◯	◯	◯	◯	◯	◯
e. My direct supervisor wants me to evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

19. Overall, I think that evaluating psychological factors related to food and weight concerns of weight management clients is...

Please rate from 1 to 7:

	1	2	3	4	5	6	7
Harmful=1 to Beneficial=7	◯	◯	◯	◯	◯	◯	◯
Inappropriate=1 to Appropriate=7	◯	◯	◯	◯	◯	◯	◯
Bad=1 to Good=7	◯	◯	◯	◯	◯	◯	◯
Worthless=1 to Useful=7	◯	◯	◯	◯	◯	◯	◯
Wrong=1 to Right=7	◯	◯	◯	◯	◯	◯	◯

20. Indicate your agreement to each statement about your ability to evaluate psychological factors related to food and weight concerns of your clients:

	1 Strongly disagree	2	3	4	5	6	7 Strongly agree
a. I am confident in my ability to evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯
b. It is easy for me to evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯
c. I usually do not struggle to evaluate psychological factors.	◯	◯	◯	◯	◯	◯	◯
d. I am permitted by policy to evaluate psychological factors where I work.	◯	◯	◯	◯	◯	◯	◯
e. Nothing prevents me from evaluating psychological factors where I work.	◯	◯	◯	◯	◯	◯	◯

21. Mark each type of information you use to evaluate psychological factors related to food and weight concerns of your clients:

	No	Yes
Information obtained from significant other(s)	◯	◯
Information obtained directly from the client	◯	◯
Verbal information obtained from qualified professionals	◯	◯
Written documentation by qualified professionals	◯	◯
Information from psychological assessment instruments	◯	◯
*Information from assessment instruments administered by dietetics professionals**	◯	◯

**Names of assessment instruments used:*

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

SECTION 2: REFERRING WEIGHT MANAGEMENT CLIENTS

For this questionnaire, "REFERRAL" means any or all of the following:

- INFORMAL recommendation to your client to see a mental health professional
- FORMAL recommendation to your client's physician that your client needs to be seen by a mental health professional
- FORMAL request made to psychological services to evaluate your client

22. Indicate your agreement to each statement about your intention to refer weight management clients to psychological services:

	1 Strongly disagree	*2*	*3*	*4*	*5*	*6*	*7 Strongly agree*
a. I expect to refer weight management clients.	◯	◯	◯	◯	◯	◯	◯
b. I want to refer weight management clients.	◯	◯	◯	◯	◯	◯	◯
c. I intend to refer weight management clients.	◯	◯	◯	◯	◯	◯	◯

23. How many of the next 10 weight management clients FOR WHOM REFERRAL TO PSYCHOLOGICAL SERVICES IS INDICATED do you expect to refer?

- ◯ *0 (I see clients for weight issues but I don't expect to refer any to psychological services)*
- ◯ *1*
- ◯ *2*
- ◯ *3*
- ◯ *4*
- ◯ *5*
- ◯ *6*
- ◯ *7*
- ◯ *8*
- ◯ *9*
- ◯ *10*

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

24. Indicate your agreement with the following statements about referring weight management clients to psychological services for issues related to food and weight concerns, as appropriate:

	1 Strongly disagree	*2*	*3*	*4*	*5*	*6*	*7 Strongly agree*
a. Most professionals who are important to me think that I should refer weight management clients.	○	○	○	○	○	○	○
b. I feel under social pressure to refer weight management clients.	○	○	○	○	○	○	○
c. It is expected of me that I refer weight management clients.	○	○	○	○	○	○	○
d. I should refer weight management clients to be thought of as a competent dietitian.	○	○	○	○	○	○	○
e. My direct supervisor wants me to refer weight management clients.	○	○	○	○	○	○	○

25. Overall, I think that referring weight management clients to psychological services for issues related to food and weight concerns, as appropriate, is...

Please rate from 1 to 7:

	1	*2*	*3*	*4*	*5*	*6*	*7*
Harmful=1 to Beneficial=7	○	○	○	○	○	○	○
Inappropriate=1 to Appropriate=7	○	○	○	○	○	○	○
Bad=1 to Good=7	○	○	○	○	○	○	○
Worthless=1 to Useful=7	○	○	○	○	○	○	○
Wrong=1 to Right=7	○	○	○	○	○	○	○

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

26. Indicate your agreement with the following statements about your ability to refer weight management clients to psychological services for issues related to food and weight concerns, as appropriate:

	1 Strongly disagree	*2*	*3*	*4*	*5*	*6*	*7 Strongly agree*
a. I am confident in my ability to refer weight management clients to psychological services.	◯	◯	◯	◯	◯	◯	◯
b. It is easy for me to refer weight management clients to psychological services.	◯	◯	◯	◯	◯	◯	◯
c. I usually do not struggle to refer weight management clients to psychological services.	◯	◯	◯	◯	◯	◯	◯
d. I am permitted by policy to refer weight management clients to psychological services where I work.	◯	◯	◯	◯	◯	◯	◯
e. Nothing prevents me from referring weight management clients to psychological services where I work.	◯	◯	◯	◯	◯	◯	◯

27. Have you ever been diagnosed and/or treated for binge eating disorder (BED) or bulimia nervosa (BN)?

◯ *No*

◯ *Yes*

28. Have you ever personally experienced a subclinical case of BED or BN, in your opinion?

◯ *No*

◯ *Yes*

29. Rate your interest in completing continuing professional education (CPE) for evaluating psychological factors and making referrals:

◯ *1 Strong disinterest* ◯ *2* ◯ *3* ◯ *4* ◯ *5* ◯ *6* ◯ *7 Strong interest*

The Dietitian Beliefs and Intentions Questionnaire (DBIQ)

30. Rate your interest in the following methods for obtaining CPE for evaluating psychological factors and making referrals:

	1 Strong disinterest	*2*	*3*	*4*	*5*	*6*	*7 Strong interest*
Self-study	○	○	○	○	○	○	○
Experiential skill development	○	○	○	○	○	○	○
Local dietetics meetings	○	○	○	○	○	○	○
Conference presentations	○	○	○	○	○	○	○
Interactive workshops	○	○	○	○	○	○	○
Seminars/lectures	○	○	○	○	○	○	○

Thank you for participating in this survey! Submit your answers now.

APPENDIX F

WEB PAGE DBIQ ACCESS FOR PARTICIPANTS WITHOUT WORKING EMAILS

University of Alabama at Birmingham - Birmingham, AL – USA

Department of Human Studies - 1530 3rd Ave. S., EB 259 - Birmingham, AL 35294-1250
dburnett@uab.edu - rrevans@uab.edu
www.uab.edu

Dietitian Beliefs and Intentions Questionnaire (DBIQ)

Link to Enter Survey:
http://www.surveymonkey.com/s.aspx?sm=wQnnCc_2bl6AuS3eUDEluu6w_3d_3d

Dear Fellow Dietitian:

Due to the complex nature of food- and weight-related treatment issues, it is imperative that cases with psychological components be referred to mental health professionals.

By completing this survey you will provide important information that will inform the dietetics profession about how YOU feel and think about the practice standards of evaluating psychological factors related to food and weight concerns of weight management clients and making referrals. This may lead to identifying and addressing issues that surround these standards.

Your estimated time to complete the survey is 15 minutes. All responses are confidential and results will be shared only as a group. Your IP address will not be reported to the researchers. If you would like to be informed of survey results you may email dburnett@uab.edu.

Many thanks for participating in the survey!

Best wishes,

Donna

Donna O. Burnett, MS, RD

P.S. The Institutional Review Board (IRB) of the University of Alabama at Birmingham has reviewed and approved this study. If you have any questions, contact Donna Burnett at 205-996-7981 (dburnett@uab.edu) or Dr. Retta Evans at 205-996-2701 (rrevans@uab.edu).

APPENDIX G

CORRELATION TABLES FOR ALL VARIABLES USED IN REGRESSION

Table 24

Correlations of all Variables Considered for Analysis for DBIQ: DV Evaluate (*n* = 446)

Variable	Correlation/ Significance	AgeYrs	PsychCOS	EDRX	PsychPrac	Intention EVAL	AttEVAL	RDyrs-workedUS
AgeYrs	Pearson Correlation	1.000	-.031	.058	.006	-.101*	-.097*	.853**
	Sig. (2-tailed)		.508	.221	.907	.033	.040	.000
PsychCOS	Pearson Correlation	-.031	1.000	-.079	-.001	.135**	.059	-.051
	Sig. (2-tailed)	.508		.097	.976	.004	.211	.285
EDRX	Pearson Correlation	.058	-.079	1.000	.264**	.121*	.089	.063
	Sig. (2-tailed)	.221	.097		.000	.010	.061	.185
PsychPrac	Pearson Correlation	.006	-.001	.264**	1.000	.070	.056	.038
	Sig. (2-tailed)	.907	.976	.000		.138	.241	.428
IntentionEVAL	Pearson Correlation	-.101*	.135**	.121*	.070	1.000	.446**	-.097*
	Sig. (2-tailed)	.033	.004	.010	.138		.000	.040
AttEVAL	Pearson Correlation	-.097*	.059	.089	.056	.446**	1.000	-.108*
	Sig. (2-tailed)	.040	.211	.061	.241	.000		.022
PBCEVAL	Pearson Correlation	.026	.106*	.234**	.087	.592**	.414**	.009
	Sig. (2-tailed)	.577	.025	.000	.067	.000	.000	.853
SubNormEVAL	Pearson Correlation	-.010	-.009	.065	.014	.362**	.168**	-.008
	Sig. (2-tailed)	.840	.846	.172	.764	.000	.000	.864
Level1	Pearson Correlation	.027	.030	-.100*	-.006	-.050	-.040	.048
	Sig. (2-tailed)	.563	.529	.034	.900	.293	.395	.313
Level2	Pearson Correlation	.125**	-.002	.000	-.043	.042	.097*	.138**
	Sig. (2-tailed)	.008	.970	.988	.363	.376	.041	.003
Level3	Pearson Correlation	.108*	-.050	.298**	.196**	.122**	.005	.050
	Sig. (2-tailed)	.022	.296	.000	.000	.010	.920	.293
HxED	Pearson Correlation	-.030	-.060	.101*	.095*	.056	.075	.009
	Sig. (2-tailed)	.522	.207	.032	.045	.237	.116	.847
HxSubED	Pearson Correlation	-.004	-.005	.039	-.019	.132**	.067	-.028
	Sig. (2-tailed)	.939	.918	.416	.688	.005	.160	.555
RDyrsworkedUS	Pearson Correlation	.853**	-.051	.063	.038	-.097*	-.108*	1.000
	Sig. (2-tailed)	.000	.285	.185	.428	.040	.022	

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 24, *continued*

Variable	Correlation/ Significance	PBCEVAL	SubNorm EVAL	Level1	Level2	Level3	HxED	HxSubED
AgeYrs	Pearson Correlation	.026	-.010	.027	.125**	.108*	-.030	-.004
	Sig. (2-tailed)	.577	.840	.563	.008	.022	.522	.939
PsychCOS	Pearson Correlation	.106*	-.009	.030	-.002	-.050	-.060	-.005
	Sig. (2-tailed)	.025	.846	.529	.970	.296	.207	.918
EDRX	Pearson Correlation	.234**	.065	-.100*	.000	.298**	.101*	.03
	Sig. (2-tailed)	.000	.172	.034	.988	.000	.032	.416
PsychPrac	Pearson Correlation	.087	.014	-.006	-.043	.196**	.095*	-.019
	Sig. (2-tailed)	.067	.764	.900	.363	.000	.045	.688
IntentionEVAL	Pearson Correlation	.592**	.362**	-.050	.042	.122**	.056	.132**
	Sig. (2-tailed)	.000	.000	.293	.376	.010	.237	.005
AttEVAL	Pearson Correlation	.414**	.168**	-.040	.097*	.005	.075	.067
	Sig. (2-tailed)	.000	.000	.395	.041	.920	.116	.160
PBCEVAL	Pearson Correlation	1.000	.379**	-.049	.040	.156**	.080	.103*
	Sig. (2-tailed)		.000	.304	.399	.001	.092	.030
SubNormEVAL	Pearson Correlation	.379**	1.000	-.010	.010	.075	-.054	.039
	Sig. (2-tailed)	.000		.825	.839	.115	.256	.408
Level1	Pearson Correlation	-.049	-.010	1.000	-.272**	-.362**	-.065	.007
	Sig. (2-tailed)	.304	.825		.000	.000	.170	.885
Level2	Pearson Correlation	.040	.010	-.272**	1.000	-.128**	-.023	.012
	Sig. (2-tailed)	.399	.839	.000		.007	.626	.796
Level3	Pearson Correlation	.156**	.075	-.362**	-.128**	1.000	.077	.069
	Sig. (2-tailed)	.001	.115	.000	.007		.106	.145
HxED	Pearson Correlation	.080	-.054	-.065	-.023	.077	1.000	.239**
	Sig. (2-tailed)	.092	.256	.170	.626	.106		.000
HxSubED	Pearson Correlation	.103*	.039	.007	.012	.069	.239**	1.000
	Sig. (2-tailed)	.030	.408	.885	.796	.145	.000	
RDyrsworkedUS	Pearson Correlation	.009	-.008	.048	.138**	.050	.009	-.028
	Sig. (2-tailed)	.853	.864	.313	.003	.293	.847	.555

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 25

Correlations of all Variables Considered for Analysis for DBIQ: DV Refer (*n* = 435)

Variable	Correlation/ Significance	AgeYrs	PsychCOS	EDRX	PsychPrac	Level1	Level2	Level3
AgeYrs	Pearson Correlation	1.000	-.041	.062	.038	.015	.158**	.114*
	Sig. (2-tailed)		.397	.195	.431	.750	.001	.017
PsychCOS	Pearson Correlation	-.041	1.000	-.085	-.003	.018	.013	-.031
	Sig. (2-tailed)	.397		.077	.946	.713	.789	.521
EDRX	Pearson Correlation	.062	-.085	1.000	.308**	-.093	-.004	.281**
	Sig. (2-tailed)	.195	.077		.000	.054	.938	.000
PsychPrac	Pearson Correlation	.038	-.003	.308**	1.000	-.002	-.052	.218**
	Sig. (2-tailed)	.431	.946	.000		.962	.275	.000
Level1	Pearson Correlation	.015	.018	-.093	-.002	1.000	-.290**	-.366**
	Sig. (2-tailed)	.750	.713	.054	.962		.000	.000
Level2	Pearson Correlation	.158**	.013	-.004	-.052	-.290**	1.000	-.142**
	Sig. (2-tailed)	.001	.789	.938	.275	.000		.003
Level3	Pearson Correlation	.114*	-.031	.281**	.218**	-.366**	-.142**	1.000
	Sig. (2-tailed)	.017	.521	.000	.000	.000	.003	
HxED	Pearson Correlation	-.018	-.063	.180**	.136**	-.026	.003	.066
	Sig. (2-tailed)	.710	.188	.000	.005	.595	.952	.167
HxSubED	Pearson Correlation	-.036	-.005	.074	.003	.040	-.011	.052
	Sig. (2-tailed)	.449	.920	.124	.954	.401	.820	.283
RDyrsworkedUS	Pearson Correlation	.854**	-.080	.074	.069	.026	.150**	.060
	Sig. (2-tailed)	.000	.097	.122	.150	.595	.002	.211
IntentionREFER	Pearson Correlation	-.038	-.011	.191**	.108*	-.031	.088	.219**
	Sig. (2-tailed)	.427	.812	.000	.024	.517	.067	.000
AttREFER	Pearson Correlation	-.077	-.055	.089	-.017	-.029	.048	.094
	Sig. (2-tailed)	.108	.249	.064	.726	.540	.322	.050
PBCREFER	Pearson Correlation	.034	.024	.223**	.046	.012	.090	.167**
	Sig. (2-tailed)	.483	.625	.000	.333	.809	.059	.000
SubNormREFER	Pearson Correlation	-.074	-.045	.103*	-.021	-.001	-.014	.175**
	Sig. (2-tailed)	.124	.353	.032	.664	.981	.766	.000

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 25, *continued*

Variable	Correlation/ Significance	HxED	HxSub ED	RDyrs-work-edUS	Intention-REFER	Att REFER	PBC REFER	SubNorm-REFER
AgeYrs	Pearson Correlation	-.018	-.036	.854**	-.038	-.077	.034	-.074
	Sig. (2-tailed)	.710	.449	.000	.427	.108	.483	.124
PsychCOS	Pearson Correlation	-.063	-.005	-.080	-.011	-.055	.024	-.045
	Sig. (2-tailed)	.188	.920	.097	.812	.249	.625	.353
EDRX	Pearson Correlation	.180**	.074	.074	.191**	.089	.223**	.103*
	Sig. (2-tailed)	.000	.124	.122	.000	.064	.000	.032
PsychPrac	Pearson Correlation	.136**	.003	.069	.108*	-.017	.046	-.021
	Sig. (2-tailed)	.005	.954	.150	.024	.726	.333	.664
Level1	Pearson Correlation	-.026	.040	.026	-.031	-.029	.012	-.001
	Sig. (2-tailed)	.595	.401	.595	.517	.540	.809	.981
Level2	Pearson Correlation	.003	-.011	.150**	.088	.048	.090	-.014
	Sig. (2-tailed)	.952	.820	.002	.067	.322	.059	.766
Level3	Pearson Correlation	.066	.052	.060	.219**	.094	.167**	.175**
	Sig. (2-tailed)	.167	.283	.211	.000	.050	.000	.000
HxED	Pearson Correlation	1.000	.254**	.009	.130**	.022	.117*	.064
	Sig. (2-tailed)		.000	.845	.007	.650	.015	.181
HxSubED	Pearson Correlation	.254**	1.000	-.051	.109*	.071	.069	.019
	Sig. (2-tailed)	.000		.288	.023	.137	.148	.690
RDyrswork-edUS	Pearson Correlation	.009	-.051	1.000	-.040	-.086	.032	-.095*
	Sig. (2-tailed)	.845	.288		.400	.073	.501	.048
IntentionRE-FER	Pearson Correlation	.130**	.109*	-.040	1.000	.416**	.574**	.541**
	Sig. (2-tailed)	.007	.023	.400		.000	.000	.000
AttREFER	Pearson Correlation	.022	.071	-.086	.416**	1.000	.402**	.411**
	Sig. (2-tailed)	.650	.137	.073	.000		.000	.000
PBCREFER	Pearson Correlation	.117*	.069	.032	.574**	.402**	1.000	.524**
	Sig. (2-tailed)	.015	.148	.501	.000	.000		.000
SubNormRE-FER	Pearson Correlation	.064	.019	-.095*	.541**	.411**	.524**	1.000
	Sig. (2-tailed)	.181	.690	.048	.000	.000	.000	

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)