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Intuitive Eating and its Relationship with Physical Activity Motivation

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INTUITIVE EATING AND ITS RELATIONSHIP WITH PHYSICAL ACTIVITY MOTIVATION

by

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ABSTRACT

Intuitive Eating and its Relationship with Physical Activity Motivation

by

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Research has shown that restrictive eating, or dieting, can be devastating to one's health. A new paradigm, intuitive eating, suggests that individuals eat based off of their physiological cues, and not for emotional or social ones. To date, restrictive eating has been extensively researched, but intuitive eating has not. The main purpose of this study was to examine the relationship between intuitive eating and its relationship between physical activity motivation and physical activity maintenance, using the self-determination theory.

Participants completed a survey to determine their intuitive eating level, their physical activity motivation, and their physical activity maintenance (n = 207). Linear regression analyses revealed that intuitive eaters were significantly more intrinsically motivated to engage in physical activity ($p > .01$). However, this did not mean that they maintained their physical activity more than non-intuitive eaters ($p = .317$). Further analysis explored the motivation levels in more detail, revealing a significant difference between intuitive and non-intuitive eaters between all levels of motivation but one, the

identified regulation motivation level (p = .537), the highest category of extrinsic motivation in the self-determination theory continuum.

(122 pages)

DEDICATION

I would like to dedicate this thesis to my professors, my friends, my siblings, my parents, and my husband. To Dr. Julie Gast: thank you for your energy and enthusiasm to finish. You helped keep the light at the end of the tunnel. To my friends: Thank you for showing interest in my research. It may not have always been as exciting for you as it was for me, but you humored me with your attention.

To my siblings: Thank you for your support and interest in my school. You have made it exciting to share. To my parents: Thank you for your example, faith, and support. You have taught me to work hard, you have taught me the value of education, and you have made it possible for me to reach my dreams. You are truly a blessing to me.

Lastly, to Jeff: Thank you for your patience and encouragement to keep going. You are a miracle in my life, and I love you. Lets grow old together, friend.

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CHAPTER I

INTRODUCTION

Intuitive eating, an alternative to restrictive eating or dieting, encourages individuals to consume calories only when physiologically hungry (Gast & Hawks, 1998). This paradigm also focuses on an individual's eating whatever is desired, theorizing that it is the body's natural way of telling it what it needs, avoiding food consumption for emotional, social, or environmental cues, being mindful of the body's satiety level, and supports the notion that acceptance of body size is just as important as the food we consume (Gast & Hawks, 2000).

This eating paradigm is relatively new to researchers and has thus not undergone the extensive research that some restrictive eating has. Studies conducted on intuitive eating have primarily focused on eating disorder symptomatology (Tylka & Wilcox, 2006), development of measurement scales (Hawks, Merrill, & Madanat, 2004; Tylka, 2006), exploration of an Acceptance Model of Intuitive Eating (Avalos & Tylka, 2006), western cultural influence in Asian countries on intuitive eating (Hawks, Merrill, Madanat, Miyagawa, et al., 2004), and adherence to an intuitive eating paradigm versus a calorie restricting program (Bacon et al., 2002).

In comparison, restrictive eating has undergone extensive research study. For example, weight-loss maintenance (Crawford, Jeffery, & French, 2000; French, Jeffery, & Murray, 1999; Jeffery, McGuire, & French, 2002; Lowe et al., 2006), physical complications associated with restrictive eating (French & Jeffery, 1994; Kenardy, Brown, & Vogt, 2001; Neumark-Sztainer et al., 2006), and negative behaviors associated

with restrictive eating (French & Jeffery; Kenardy et al; Neumark-Sztainer et al.) have all been studied. Research consistently shows that those who adopt restrictive eating as their main behavior for weight-loss typically gain the weight back over time (French, Jeffery, Sherwood, & Neumark-Sztainer, 1999; Williams, Germov, & Young, 2007). Findings also show that restrictive eating may be too psychologically overtaxing to maintain for extended periods of time (Kumanyika et al., 2000). It has been reported that individuals who try to restrict their eating may experience large weight fluctuations (Mann et al., 2007), depressive symptoms (Bacon et al., 2002), low self-esteem (Park & Beaudet, 2007; Rubinstein, 2006; Theim, 2007), and eating disorder symptoms (Keel, Baxter, Heatherton, & Joiner, 2007). Because of these risks, restrictive eating practices do not appear to be conducive to the maintenance of a long-term healthy lifestyle.

While restrictive eating is often the focus of weight loss programs, there has also been much emphasis on physical activity as a means of weight management as well. Several different variables have been studied in conjunction with motivation to engage in physical activities. Researchers have examined physical activity as a lifestyle (Hamer, Karageorghis, & Vlachopoulos, 2002), as well as physical activity maintenance (Wilson, Rodgers, Fraser, & Murray, 2004), and physical activity and eating style (Bacon et al., 2002). This research has led to many theories regarding motivation. One such theory, the Self-Determination Theory (SDT) (Deci & Ryan, 1985), has been used in several studies regarding motivation to engage in physical activity (Ingledew, Markland, & Sheppard, 2004; Thogersen-Ntoumani & Ntoumanis, 2005; Wilson & Rodgers, 2004).

The SDT postulates that motivation is experienced in varying degrees, which can be represented on a continuum (Ryan & Deci, 2000a). Three categories exist on the

continuum, and they are listed from the lowest amount of motivation to the highest. Amotivation, or the complete lack of motivation to engage in an activity, is on the left side of the continuum; extrinsic motivation, or motivation that exists due to external pressures to engage in an activity, is in the middle of the continuum; and intrinsic motivation, or motivation that exists when an individual participates in an activity out of enjoyment or pleasure, is on the farthest right. Within the extrinsic category of the SDT continuum, four additional categories of motivation exist: external, introjected, identified, and integrated. As an individual moves from the low end of the continuum to the high end, their level of self-determined motivation increases. Ryan and Deci (2000) further postulated that there are three needs that when met are conducive to higher levels of self-determination. When an individual feels that they are competent at a task, the task relates to their life and their goals, and the task supports personal autonomy, they will be more likely to be intrinsically motivated to engage in the activity at hand.

Research using the self-determination theory has shown that when participation in physical activities are intrinsically motivated, individuals are more likely to maintain their motivation to participate over extended periods of time (Frederick-Recascino & Schuster-Smith, 2003; Ingledew et al., 2003). Intrinsic motivation of physical activity mirrors the intuitive eating paradigm, with its emphasis on health adherence for satisfaction and enjoyment, rather than an emphasis on external factors such as body weight, or food avoidance (Bacon et al., 2002).

Purpose of the Study

To date, research has not been conducted to explore the connection between intuitive eating and physical activity. Research was needed to understand how eating style and physical activity interact. Both are critical for a healthy lifestyle, and understanding how and if they interact could be a benefit to health promotion. The purpose of this study was to apply the self-determination theory to examine the motivation for physical activity between restrictive eaters and intuitive eaters among female college students.

Significance for Health Education

Healthy eating and physical fitness are important components of healthy lifestyles (US Department of Health and Human Services [USDHHS], 2005). As health educators, it is important to know how to successfully engage people in both of these behaviors over a lifetime. Intuitive eating has been shown to hold promise for a healthy eating style, specifically for its encouragement of general appreciation of the body and what it does, less preoccupation with outer appearance and more emphasis on the function of the body, and more unconditional acceptance of the body, regardless of size or shape (Avalos & Tylka, 2006). It has also been shown to be an eating style that is maintainable in one study (Bacon, Stern, Van Loan, & Keim, 2005).

Research on physical activity has shown that individuals who focus on intrinsic motivation, such as body awareness, and enjoyment of exercise, are more likely to continue physical activities (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). In order

to increase the likelihood for physical activity adherence and intuitive eating practices, health educators need to know how and if these two variables are related for health behavior promotion. It is also important to know how these constructs work in relationship to female college students, seeing as this population is at an increased risk for disordered eating, and unhealthy behaviors related with eating disorder behaviors (Celio et al., 2006; Giles, Helme, & Krcmar, 2007; Klemchuk, Hutichinson, & Frank, 1990; Lowe et al., 2006; Tylka & Subich, 2002). By knowing if intuitive eating and intrinsic motivation interact, health educators can emphasize intuitive eating, while focusing in physical activity motivation for greater long-term maintenance of these healthy behaviors.

Research Questions

The following questions were asked:

1. Does an intuitive eating style among female college students predict an intrinsic regulation style of motivation to participate in physical activity?
2. Is there a significant correlation between eating style and physical activity maintenance?
3. Do intuitive eaters experience more identified regulation motivation and intrinsic regulation motivation to participate in physical activity, as compared to non-intuitive eaters?

Limitations of the Study

The following were limitations of the proposed study:

1. All responses were self-report, from a convenience sample, which may have affected the reliability of the responses and generalizability to others studies.
2. Participants responding to current physical activity participation were instructed to respond on their current level of physical activity. However, participants may have perceived higher levels of physical activity to be more desirable, thus responding inaccurately.
3. May not be generalizable to other non-random samples.

Delimitations of the Study

The delimitations of this study consisted of the following:

1. The sample was a convenience sample.
2. Participants were 18 years old and older.
3. Participants were garnered from a university campus.
4. Only English speakers were included in the sample.
5. Sample participants only included females.
6. Participants were assigned to a group, based off of eating style and not through a randomization procedure.
7. Individuals were placed within the intuitive eating group based on their responses to a self-report instrument and were not directly observed as to whether they actually practiced intuitive eating.

8. No pregnant women were included in the sample.
9. No university athletes were included in the sample.

Assumptions

In this study it was assumed that all participants responded to eating style questions in a way that represented the true way that they eat. It was also assumed that all participants answered questions regarding physical activity motivation in a way that represented their true feelings towards physical activity motivation. In addition, it was assumed that the instruments used for this study measured the behaviors and items they were intended to measure.

Definition of Terms

Amotivation – The lack of motivation due to feelings of incompetence, lack of control, and having no intention to act (Ryan & Deci, 2000b).

External Regulation – Motivation to participate in a behavior in order to avoid punishments or to garner rewards (Ryan & Deci, 2000a).

Extrinsic Motivation – Motivation to perform in order to obtain rewards or outcomes that are separate from the behavior itself (Ryan et al., 1997).

Identified Regulation – Valuing a behavior consciously or determining a behavior is personally important (Ryan & Deci, 2000a).

Integrated Regulation – Behavior is fully integrated into an individual, meaning that the individual has determined that the behavior is in complete congruence with their personal values, goals, and needs (Ryan & Deci, 2000a).

Intrinsic Motivation – Motivation to perform for the satisfaction gained from engaging in an activity itself (Ryan et al., 1997).

Introjected Regulation – Not fully accepting a behavior as one's own, but doing a behavior in order to avoid guilt, anxiety, or discomfort, or to give a boost to one's ego (Ryan & Deci, 2000a).

Intuitive Eating – Eating based on physiological and satiety caused rather than external and emotional cues (Tylka, 2006).

Maintenance – Maintaining physical activity for longer than 6 months.

Physical Activity – Engagement in an activity that elevates the heart rate for at least 30 minutes, 3 times a week (American Heart Association, [AHA] 2007).

Restrictive Eating – Restricting foods for the purpose of losing weight.

Self-Determination Theory – Theory used to study motivation in humans. Includes a scale of motivation, and postulates that intrinsic motivation is most likely met when an individual feels competent in a behavior, the behavior relates to them, and they are autonomous to engage in the behavior (Deci & Ryan, 1985; Ryan & Deci, 2000b).

Summary

This chapter discussed intuitive eating, restrictive eating, the self-determination theory, and exercise motivation. The need for a comparative study on intuitive eaters and physical activity motivation has been introduced. Limitations, delimitations, and assumptions were discussed, and definitions that are pertinent to this study were introduced. The following chapter will review literature on restrictive eating, intuitive eating, and the self-determination theory as applied to physical activity studies.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter will review the current literature on; (a) restrictive eating, (b) intuitive eating, and (c) exercise motivation and maintenance as applied in the Self-Determination Theory. The first section of the literature review will explore restrictive eating and the physical, mental, and exercise behaviors associated with a restrictive eating style. The second section will examine intuitive eating and the physical, mental, and exercise behaviors associated with intuitive eating. The final section will review the self-determination theory, specifically looking at the history of the theory, and then moving on to studies that have utilized this theory to understand motivation in physical activity.

Restrictive Eating

Restrictive eating is defined as an eating style where calories, fat content, or certain foods are purposely restricted with the intent to lose weight (Hawks, Madanat, Hawks, & Harris, 2005). There are an infinite number of restrictive eating styles, such as restrictive calorie diets, restrictive fat diets, or low carbohydrate diets. It would be impossible to document the research material of every one available. Consequently, this section will only examine the current literature on the physical and mental health of restrictive eaters, the positive and negative consequences of such an eating style, and the exercise behaviors associated with restrictive eating.

Physical Health and Restrictive Eating

Weight Loss

Restrictive eating programs are popular in American culture, and in many cases, they have been shown to be effective for short-term weight-loss (Anderson, Konz, & Jenkins, 2000). This is not to say that individuals who have lost weight from restrictive eating have all gained weight back. Jeffery et al. (2000) did a review of the literature regarding long-term weight-loss maintenance. They stated that the data available on long-term weight-loss maintenance was imprecise, but evidence does exist that suggests weight-loss maintenance is possible in some cases. For example, a study by Kelm, Wing, McGuire, Seagle, and Hill (1997), also cited in Jeffery et al. (2000), gathered data on individuals who had maintained significant weight-loss (>30 lbs.) for more than a year. Participants were asked to register themselves on a National Weight Control Registry (NWCR), where researchers could access their information for analysis. Upon analysis, it was found that the individuals registered on the NWCR had actually maintained their weight-loss for an average of five years. Additionally, 89% of the sample stated that it was through both restrictive eating and physical activity that they were able to maintain their weight-loss. The study concluded that the NWCR was evidence that long-term weight-loss was maintainable. They also concluded that more research was needed to see how sustainable the weight-loss would continue to be.

Wing and Phelan (2005) continued to monitor the NWCR and have reported that approximately 20% of those who initiate a weight-loss program are able to maintain that loss. They also have found that individuals who eat breakfast, weigh themselves

frequently, engage in regular physical activity, restrict food, maintain a habit for when and how they eat, and are able to catch themselves before they regain the weight, are the individuals who are best able to maintain the weight-loss.

Weight-loss is possible through several different restrictive eating programs. In a study by Anderson et al. (2000), eight popular restrictive eating programs were computer analyzed for nutrition composition, food guide pyramid adherence, and snack options, with the intent to compare their potential long-term health effects. These restrictive eating plans included: Atkins, Protein Power, Sugar Busters, The Zone, the American Diabetic Association (ADA) Exchange Diet, Dr. Anderson's High-Fiber Fitness Plan, Pritikin, and Ornish plans.

A faux ~1600 kcal menu-plan was created for each restrictive eating program, and then analyzed and scored for nutrition composition, adherence to the food guide pyramid, weight-maintenance potential, and snack food allowance. While Anderson et al. (2000) created menus for the designated restrictive eating programs that would support weight loss, the nutrition analyses revealed different variations in their nutritional content. It was concluded that Atkins and Power Protein restrictive eating programs supported high protein and saturated fat consumption, which would raise serum cholesterol levels, and potentially increase the risk for heart disease. Sugar Busters and the Zone restrictive eating styles also focused on high protein, and low simple carbohydrate consumption, but some complex carbohydrates were deemed okay to consume. It was concluded that these restrictive eating styles would lower serum cholesterol levels, therefore lowering the risk for heart disease. The ADA Exchange Diet, Dr. Anderson's High-Fiber Fitness Plan, the Pritkin Diet, and the Ornish diet all focused on higher consumptions of fiber, complex

carbohydrates, fruits, and vegetables. Based off of the computer analyses, Anderson et al. (2000) concluded that these restrictive eating programs would have the greatest impact on decreasing the likelihood of heart disease by lowering serum cholesterol the most. All of these programs could potentially help an individual lose weight, as well as help with other health problems.

Alternatively, in another review of the literature by Miller (1999), restrictive eating programs were examined for their physiological effects on individuals. Fasting, high-protein, low-carbohydrate, liquid diets, very low calorie diets (VLCD), pre-packaged food plans, fat-free, and low-fat programs were examined for their effectiveness, and nearly all were successful in terms of short-term weight loss. However, it was reported that over half of the weight lost returned within a year, and then at five years all weight lost was reported as being regained. Few individuals were able to maintain the weight they lost, and the data on several of the programs were difficult to obtain because of the high drop-out rates for individuals on restrictive eating programs.

The literature on weight-loss potential shows that individuals can indeed lose weight and some may even maintain that, but there are other physiological indicators to consider. These indicators of health will be examined in the next section.

Physiological Indicators

Restrictive eating programs and their effectiveness for long-term and short-term weight-loss have been reviewed, but it is also imperative to examine the direct physiological changes associated with restrictive eating. The review of literature previously mentioned by Miller (1999) also looked at the physiological indicators for

individuals who had participated in restrictive eating programs. Problems associated with restrictive eating programs included: loss of lean body mass, depleted electrolytes, depleted glycogen stores, nausea, hyperuricemia, fatigue, edema, ventricular arrhythmia, gallbladder disease, and death. Miller concluded from the research collected for the literature review that restrictive programs were clearly a hazard to individuals seeking weight-loss assistance.

Other studies have reported additional physiological risks that women may face when practicing a restrictive eating plan. For example, a study by McLean and Barr (2003) has shown how restrictive eating impacts the menstrual cycles of women who practice restrictive eating with the purpose of losing weight. The researchers recruited a convenience sample of 596 women at a university in British Columbia. Participants filled out questionnaires to assess eating behaviors, perceived stress, self-esteem, menstrual cycle history, exercise, special eating styles (e.g., vegetarianism), and vitamin or mineral supplements. Based off of restrictive eating behavior scores, women were placed in one of three groups, which were labeled as low, medium, and high restrictive eating. These categories were then used to answer questions regarding restrictive eating, psychological and physiological interactions.

Data analyses showed that women with greater restrictive eating behaviors had higher BMIs, reported more hours of exercise, consumed more caffeinated beverages, and were more likely to be smokers (McLean & Barr, 2003). Vegetarians had significantly higher restrictive eating behaviors, and lower self-esteem. Women who reported more restrictive eating behaviors also reported having dealt with an eating

disorder at some point in the past. Weight fluctuations were also greatest for women who had high restrictive eating behaviors.

Interesting findings were noted for restrictive eaters and menstrual cycle irregularity. Women with high restrictive eating behaviors reported double the incidence of menstrual cycle irregularities than women with low to no restrictive eating behaviors (McLean & Barr, 2003). It is also interesting to note that women with irregular menstrual cycles did not differ in BMI or exercise scores. The prevalence of restrictive eating behaviors was the only variable that could account for the differences in irregular menstrual cycles in this study.

Weight cycling, also called yo-yo dieting, has been correlated with restrictive eating. A study by Lowe and Timko (2004) illustrated this, when they compared three groups: a restrained dieting group (RD) (n=18), a restrained nondieting (RND) group (n=22), and an unrestrained nondieting group (UND) (n=40). In this study questionnaires were filled out to assess participants' current level of eating restraint for weight control, levels of cognitive methods used to control eating, and past weight fluctuations. RDs were those who were currently restricting eating in order to lose weight, and these individuals were at or above the median on the restraint scale. RNDs were those who were not currently restricting eating in order to lose weight, but they still scored at or above the median on the restrained eating scale. UNDs were individuals who were not dieting and they scored below the median on the restrained eating scale.

Results from the study recorded a statistically significant difference between RDs and RNDs and UNDs and their current restrictive eating behaviors. Researchers also noted that these behaviors were supportive of weight cycling in the past, which was

found to be statistically significant when the RDs weight cycling histories were compared to the RNDs and UNDs. RDs had participated in significantly more restrictive eating patters for weight-loss than RDs and UNDs. This pattern led researchers to conclude that eating regulation issues were a result of restrictive eating, thus indicating that individuals who practice restrictive eating behaviors were more prone to eating regulation problems in general (Lowe & Timko, 2004).

Restrictive eating has been shown to be effective in terms of short term weight-loss (Bacon et al., 2002), but as has been shown, it can put individuals at a higher risk for weight cycling (Lowe & Timko, 2004). Other studies have indicated that long term weight loss can be achieved with restrictive eating (Wing & Phelan, 2005), but all studies located used samples not generalizable to the population of interest for this study.

It has been shown how restrictive eating can impact physical health, but there is another vein in the literature that shows how restrictive eating can impact mental health as well. The following section will examine the literature on the impacts on mental health correlated to restrictive eating.

Mental Health and Restrictive Eating

Mental health has been shown to be affected in many ways by restrictive eating (McFarlane, Polivy, & Herman, 1998). Eating disorders are of concern (Celio et al., 2006; McLean & Barr, 2003), as are self-esteem (Joshi, Herman, & Polivy, 2004; McLean & Barr, 2003; Trottier, Polivy, & Herman, 2005), body image (Mills, Polivy, Herman, & Tiggemann, 2002), inhibitions to follow the body's natural signals for hunger/fullness (McFarlane et al.), depression (Ackard, Croll, & Kearney-Cooke, 2002),

and the use of other health-compromising methods to lose weight (Celio et al.; Krahn, Kurth, Gomberg, & Drenowski, 2005; McLean & Barr). The following section will discuss the psychological outcomes association with restrictive eating.

Self-Esteem, Body Image, and Affect

Research has been conducted on the effects of restrictive eating on self-esteem, body image, and other types of affect of an individual. A study by McFarland, Polivy, and Herman (1998) looked at the emotional changes that took place when women (n = 103) were weighed and given false reports on their weight. Emotional changes were measured by responses made on a mood scale, self-image scale, self-esteem scale, restraint scale, body shape questionnaire, and cookie consumption (to measure emotional eating). It was predicted that unrestrained eaters would be less affected by a reported false higher weight. Researchers hypothesized that this would not affect cookie consumption, and participants would thus maintain their pre-test answers on all scales. Restrictive eaters were hypothesized to eat more cookies, and respond negatively on all scales if they were told that they weighed five pounds more than was true. If restrained eaters were given an accurate scale reading, it was predicted that no changes would be recorded on emotional scale responses or cookie consumption, and that if they were told they weighed five pounds less, they would consume less cookies, but respond positively on the scales used for emotional measurements.

The findings of the study showed that restrained eaters had lower self-esteem in general and a significant interaction was recorded between restrained eaters and false weight reporting. Restrained eaters had poorer self-image in general, and they reported

significantly more anxiety after being weighed, regardless if they were told that their weight was five pounds lighter than they thought. These changes were not significant for unrestrained eaters. Restrained eaters were significantly more concerned with their weight and shape as measured from the body shape questionnaire. The final interesting analyses revealed that cookie consumption was greatest for restrained eaters who were told they weighed five pounds more than they had previously thought. The other two groups did not differ in their cookie consumption from the time they were given their weight number to the end of the study.

The correlation between restrictive eating and mental health indicators have been examined in past research, but the desire to participate in restrictive eating is affected by more than internal cues. As Trottier et al. (2005) have shown in their research, external cues facilitated by the media can greatly influence the cognitions of restrictive eaters. Trottier et al. examined the correlation between restrictive eating, unrealistic weight-loss advertisements, unrealistic weight-loss expectations, and cookie consumption, after being exposed to unrealistic diet advertisements. A sample of 87 undergraduate college women were separated into four groups: a control group, realistic expectations group, moderately unrealistic expectations group, and highly unrealistic expectations group. Each group was exposed to different advertisements, varying in the degree of believability of the advertisement's claim.

Participants were told they were participating in two separate marketing studies. After being exposed to the advertisements, participants filled out questionnaires assessing their affect, self-esteem, and self-image. They then went into another room where they were instructed to taste-test as many cookies as they would like. At the conclusion of the

taste-test, participants filled out an eating restraint scale, and another self-esteem scale. When they left the room, participants were weighed and heights were measured so that BMI could be calculated.

Results from the Trottier et al. (2005) study revealed that BMI for restrained eaters were significantly higher than the non-restrained eaters. The data also showed a significant lower level of self-esteem in restrained eaters than non-restrained eaters. Restrained eaters reported feeling significantly more unattractive, unintelligent, and fat.

Similar findings were reported by Joshi et al. (2004). A sample of 92 undergraduate women were classified as restrained or unrestrained eaters after completing a restraint eating scale. Participants were separated into three conditions: a control condition where they were exposed to various products; a thin advertisement group that showed attractive, thin women for a short duration; and a thin advertisement group where participants were exposed for a long duration.

Joshi et al. (2004) reported that while restrained eaters had less self-esteem, were more concerned with appearance, and had poorer body image than unrestrained eaters, they experienced significant improvements after viewing the advertisements with thin women than their unrestrained counterparts, regardless of viewing duration.

Self-esteem was also examined as a construct affected by restrictive eating in a study conducted by McLean and Barr (2003). The researchers took a sample of 596 women and placed them in three separate groups, determined by their responses on an eating restraint instrument. High restrictive eaters, medium restrictive eaters, and low restrictive eaters were all given instruments to assess eating behaviors, physical and lifestyle characteristics, and perceived stress and self-esteem. They also found that more

vegetarians reported histories of eating disorders, and had significantly lower levels of self-esteem. High restrictive eaters had significantly more weight fluctuations, and they reported more menstrual cycle irregularities as compared to low and medium restrictive eaters. Lastly, high restrictive eaters reported significantly more perceived stress, and lower levels of self-esteem.

As has been shown, self-esteem is one psychological construct that has been used to measure mental health, but other constructs have been used as well when looking at the effects of restrictive eating on psychological health. Ackard et al. (2002) conducted a study to examine the relationship between the frequency of restrictive eating and its impact on disordered eating, body image, and other psychological problems, such as depression, body image, and affect.

College aged women (n = 345) were placed into three groups, depending on their reported frequency of restrictive eating patterns (Ackard et al., 2002). The categories included: never practiced restrictive eating, have practiced restrictive eating one to five times, or have practiced restrictive eating more than six times. Once the women were categorized, they were matched by BMI to other women in the other two categories, resulting in 115 matched pairs across groups. Eight variables were used to answer the objectives of the study. Instruments measured restrictive eating frequency, eating disorder symptoms, body image, BMI, depression, self-esteem, affect regulation, and exercise. Results showed that across variables, higher frequencies of restrictive eating resulted in significantly more negative responses on psychological variables. Specifically, higher frequencies of restrictive eating was positively and significantly associated with the following eating disorder behaviors: asceticism, bulimia,

interpersonal distrust, impulse regulation, ineffectiveness, interceptive awareness, maturity fears, perfectionism, social insecurity, body dissatisfaction, drive for thinness, lower reported ideal body sizes, depression, low self-esteem, affect regulation problems, emotional attachments to exercise, preoccupation with exercise, and exercise frequency and intensity. It was also interesting to note that individuals who reported more restrictive eating also saw themselves as larger than non-restrictive eaters. Researchers concluded that the data showed that higher incidences of restrictive eating were associated with more eating disorder symptoms, severe eating disorder symptoms, and greater emotional distress.

A study by Bacon et al. (2005) is an example of the mental and emotional changes a person can experience while restrictedly eating. A sample of obese women (n = 78) were randomly assigned into two treatments: intuitive eating and restrictive eating to test a new intuitive eating program. The intuitive eating group (n = 39) were educated about body acceptance, eating behavior, nutrition, activity, and social support. The restrictive eating group (n = 39) were trained on eating behaviors and attitudes, nutrition, social support, and exercise. These two groups were used to examine the physiological and psychological effects of an intuitive eating program versus a calorie-restricting program for the purpose of exploring the outcomes of an intuitive eating program.

At the study's onset, several baseline measurements were taken on depression, self-esteem, body image, energy expenditure, eating behaviors, anthropometric measures, and metabolic measures from participants in both groups. The study gathered this information again at 12 weeks (mid-treatment), 26 weeks (post-treatment), 52 weeks (post-aftercare), and 104 weeks (follow-up).

The women placed in the intuitive eating group received counseling on intuitive eating, and tests were administered to see if any psychological changes occurred to those participating in the study. Psychologically, the restrictive eating group did make significant improvements in their depression levels. They also made self-esteem improvements, however these improvements returned to baseline measurements at 52 weeks, and then continued to significantly worsen at 104 weeks.

These studies indicate that there are effects on self-esteem, body image, affect, and other psychological indicators when individuals use a restrictive eating style to control weight. These psychological outcomes have primarily been shown to have a negative effect on individuals using a restrictive eating style. Additional variables correlated with restrictive eating will be discussed in further detail in the next sections.

Food Behaviors

Eating is typically thought of as a physical act, but research has been conducted to show how restrictive eating can cause a confusing psychological relationship between food and the food consumer. A study conducted by Urbszat, Herman, and Polivy (2002) showed how rationale can be altered when restricted eaters were led to believe that they were going to participate in a restrictive eating study, but before doing so they had to taste test some cookies. A sample of college aged women (n = 46), who were deemed either restrictive eaters or non-restrictive eaters, were randomly assigned to a dieting condition or a non-dieting condition. All participants were led to believe that they were participating in a food deprivation and taste perception study. Those assigned to the dieting condition were told that they would begin a strictly regulated diet directly after

the taste testing. Before the taste tests, participants filled out a self-esteem, and an affect scale. Three plates of cookies were brought in for taste-testing and then were removed. The plates were then weighed by researchers to measure any weight differences from before the cookies were taken into the participants, to the time they were removed from the room. After the taste-testing portion of the study, participants were instructed to fill out a restraint scale, which measured dietary restraint, and were then debriefed on the nature of the study.

Results showed that restrained eaters who thought they were going to have to adhere to a strict restrictive diet for the next seven days consumed significantly more cookies than participants in the restrained non-dieter group, unrestrained dieter group, or the unrestrained non-dieter group. Self-esteem scores were not affected by cookie consumption or experimental condition, however, restrained eaters did report having lower self-esteem in general. This study is an example of how restrictive eaters are psychologically affected by their food.

Another example of how food restriction can affect food anxiety was observed in a study presented by Mills et al. (2002). Researchers gathered data from 98 college women in a deception experiment. Participants were exposed to magazine advertisements with attractive, very thin women, and attractive plus-size models, and were told to rate the advertisements for marketing purposes. A dietary restraint scale was used to classify participants as restrained or unrestrained eaters. After being exposed to the media images, participants were asked to participate in a cookie tasting experiment. All participants then completed an affect rating scale to assess anxiety, depression, hostility, and total negative affect.

Results showed that restrained eaters ate significantly more cookies than the non-restrained eaters after being exposed to the thin women media images. Restrained eaters also reported a thinner ideal body size, and seeing themselves as being thinner after exposure to the thin media images. This result was not found in the unrestrained eater group. Researchers (Mills et al., 2002) concluded that the disinhibited eating and the positive self-enhancement after viewing thin advertisements made restrictive eaters feel thinner, thus making them feel less concerned with food intake.

The study by Trottier et al. (2005) is another example of media images being used to explore the effect of unrealistic images on restrictive eaters eating behaviors. Participants were divided into a control group, realistic expectations group, moderately unrealistic expectations group, and highly unrealistic expectations group.

After being exposed to the advertisements that varied in their level of believability, participants filled out questionnaires assessing their affect, self-esteem, and self-image. They then went into another room where they were instructed to taste-test as many cookies as they would like. At the conclusion of the taste-test, participants filled out an eating restraint scale, and another self-esteem scale. When they left the room, participants were weighed and heights were measured so that BMI could be calculated.

Individuals scoring high on the restraint scale reported more interest in the unrealistic advertisements than the nonrestrained eaters, and restrained eaters also felt that the unrealistic programs being advertised would be more effective and important to them. During data analysis, both groups that were exposed to the unrealistic advertisements were combined, and data revealed that those who were exposed to the unrealistic advertisements, regardless of their restraint score, ate fewer cookies than those

who received the realistic advertisements or control group advertisements. This study represents how media and outer-forces can influence eating behaviors.

Another study by Fletcher, Pine, Woodbridge, and Nash (2006) showed how even the images of a desired food can arouse feelings of guilt, and anxiety in restrictive eaters. It was hypothesized that images of chocolate would increase cravings and feelings of guilt, with an even greater influence on restrictive eaters versus non-restrictive eaters. A convenience sample of 85 college aged women was assigned to two groups. One group was exposed to non-food images, while individuals in the other group were exposed to visual images of chocolate. Researchers divided the women into the groups so that restrictive eaters were found in both. Demographics were obtained, and another questionnaire assessed guilt and cravings after exposure to the images. Results showed that attitudes towards chocolate were higher for restrictive eaters than non-restrictive eaters, regardless of the group. Furthermore, restrictive eaters were significantly more affected by chocolate image exposure than non-restrictive eaters.

In the assessment of cravings, restrictive eaters in both conditions did not report a main effect for chocolate cravings after visual stimulus had occurred (Fletcher et al., 2006). The same was true for non-restrictive eaters. Researchers therefore concluded that cravings for chocolate did not change, regardless of eating style or visual image exposure. Guilt scores were obtained after viewing images from both groups. These scores revealed that restrictive eaters experienced more guilt in general towards chocolate, but the visual images of chocolate did not affect the level of guilt felt. There were no main effects found between visual image exposure and guilt. In conclusion, the researchers of this study determined that only restrictive eaters were affected by the

chocolate images based off of their responses, stating that they were more responsive to food related cues than non-restrictive eaters.

It has been shown that restrictive eating has an effect on individuals and their relationship with food behaviors. In addition to restrictive eating affecting food behaviors, it also has been shown to correlate with other degenerative behaviors. These will be explored in the next section.

Degenerative Behaviors

Restrictive eaters have been shown to have lower self-esteem (Trottier et al., 2005), greater depression symptoms (Ackard et al., 2001), and more body-image issues (Mills et al., 2007). A study by Krahn et al. (2005) illustrates how restrictive eating behaviors are strongly correlated with other degenerative health behaviors, specifically they examined alcohol consumption patterns in a sample of college-aged women (n = 1384). Questionnaires were distributed to assess restrictive eating and binging severity, smoking, depression, family history of alcohol use, and age of participants' onset drinking. Responses on the restrictive eating and binging severity scale were used to classify individuals into four categories: nondieters, casual dieters, intense dieters, and at-risk dieters. Categories were then examined to determine any significant relationships between restrictive eating, alcohol consumption, and relationships with other health covariates.

Results of the study showed that as restrictive eating patterns became more restrictive, meaning that participants scored in a way that would more closely identify them as having an eating disorder, the intensity and prevalence of alcohol use increased

(Krahn et al., 2005). Specifically, intense dieters and at-risk dieters reported significantly more alcohol use in the last 30 days than women in the nondieters and casual dieters categories. This relationship between the degree of restrictive eating and alcohol consumption had a greater correlation than the relationship between restrictive eating and depression, restrictive eating and family history of alcohol use, or restrictive eating and age of first alcohol encounter. While this study does not attempt to explain this positive correlation, it does report a significant relationship between restrictive eating and unhealthy alcohol consumption.

In another study by Celio et al. (2006), researchers examined the use of diet aids, such as over-the-counter pills, home remedies, diuretics, or laxatives, used by college aged women to lose weight. A sample of 484 undergraduate women were asked to fill out questionnaires on diet aids used, their level of fear of gaining weight, dieting frequency, as well as a depression scale, a stress coping scale. They were also weighed and their heights were taken to determine their BMIs.

The data collected by the researchers (Celio et al., 2006) revealed that women who were using diet aids were significantly more preoccupied with their weight. It was also interesting to note that women who used diet aids reported significantly higher rates of drug and alcohol use to cope with difficult situations. The most commonly used form of diet aids were over-the-counter pills, followed by laxatives. Researchers concluded that the use of diet aids as a means for weight control was alarmingly high, and these women were at increased risk for developing eating disorders.

While weight-loss may be achieved through restrictive eating, it has been shown here that mental health issues may arise from such practices. The evidence suggests that

the consequences of restrictive eating may present too high a risk to support that eating style. An alternative to restrictive eating is called intuitive eating. Research on intuitive eating is limited, but the following section will discuss what data have been gathered to this point.

Intuitive Eating

Intuitive eating is an eating style that promotes the intake of calories only when physiologically hungry (Avalos & Tylka, 2006; Gast & Hawks, 2000; Tylka, 2006; Tylka & Wilcox, 2006). It also promotes eating free of distractions, identifying hunger and satiety, and eating exactly what is desired regardless of nutrient or caloric content. The philosophy indicates that by eating this way, binges will decrease, the body will naturally crave healthy foods, an individual's weight will stabilize, and there will be low preoccupation of food (Polivy et al., 2005). Eating for any other reasons besides physiological, such as for social or emotional reasons, is not supported by the intuitive eating paradigm (Gast & Hawks, 1998).

The literature covering intuitive eating is not as extensive as the restrictive eating literature, because the intuitive eating concept is relatively new. The following section will review the literature that is currently available on intuitive eating.

Physical Health and Intuitive Eating

Only two studies were located in which the physical effects of an intuitive eating style was examined. The first is a study by Bacon et al. (2002), as mentioned in the previous section, used a population of obese female who were also chronic dieters, and

split them into two groups for a health intervention. The physiological outcomes of the intuitive eating participants displayed some interesting changes. Although there was not any weight loss attained by the intuitive eating group, significant improvements were made in cholesterol readings, triglyceride counts, and systolic blood pressure from the start of the study through to the follow-up period 24 months later. In comparison, the restrictive eating group did not have any significant changes in their total cholesterol from baseline to follow-up, however their LDL cholesterol readings went down significantly during post-aftercare, and returned to non-significant status at follow-up. The calorie restricting group also showed improvements in their systolic pressure readings, but again, this improvement was not maintained through to follow-up. The calorie restricting group significantly decreased their weight from the baseline reading, but they regained enough at follow-up, such that the weight loss was no longer significant.

Similar physiological indicators associated with intuitive eating were gathered in a pilot study by Hawks, et al. (2005). In this study, a sample of 205 college females filled out the Intuitive Eating Scale (IES) to assess where their eating style rated on an intuitive scale. The IES focused on four subscales defined by the characteristics of intuitive eating. These subscales included: intrinsic eating, or eating driven by internal cues that are recognized through hunger and nutritional needs; extrinsic eating, or the measure of how much eating is affected by social situations, emotions, or the environment; anti-dieting, or the avoidance of calorie restricting eating; and self-care, which measures an individual's emphasis on health and fitness.

Of the 205 original participants, 15 females who scored high on the Intuitive Eating Scale, and 17 who scored low in the Intuitive Eating Scale were used to gather further information. Specifically, the researchers wanted to examine several different health indicators, and how those indicators were affected by eating style. All 32 participants gave blood to be tested for fasting glucose levels, total cholesterol, high-density lipoproteins (HDLs), low-density lipoproteins (LDLs), triglycerides, iron, and total iron binding capacity. Their BMIs, percent body fat, cardiovascular risk based off of blood lipid profiles, and VO2 uptake were also assessed. The data from the health indicators were then paired with their Intuitive Eating Scale responses to test for correlations.

Results indicated that high intuitive eaters were healthier than the low intuitive eater sample. High intuitive eaters had significantly lower BMI mean scores, significantly less cardiovascular risk, significantly higher HDL counts, and significantly lower triglycerides. Fasting glucose and blood iron levels did not reveal any significant correlations with intuitive eating scores.

Within the subscales, the strongest relationships were found between the anti-dieting and the health indicators of the high intuitive eaters. These included a significant correlation of lower BMI, high HDLs, lower triglycerides, less cardiovascular risk, and total iron binding capacity. Significant relationships were also found on the extrinsic subscale for high intuitive eaters in correlation with lower BMIs, higher HDLs, and less cardiovascular risk. Researchers thus concluded that higher scoring intuitive eaters had overall better BMIs, less cardiovascular risks, and better blood lipid reports.

The final study that examined the physical differences between intuitive eaters and non-intuitive eaters was conducted by Banks (2008). The researcher questioned whether or not intuitive eaters' diets were healthier or more nutritious than non-intuitive eaters. To gather data a sample of 32 male and female participants were accessed and asked to complete questionnaires that would classify them as intuitive or non-intuitive eaters, based on their intuitive eating scores. Participants then kept a food log and a food frequency questionnaire.

Data analysis revealed that there was not a significant difference between intuitive and non-intuitive eaters in regards to their fruit, vegetable, calories from fat, calories from sugars, and sodium intake. The only significant difference found between intuitive and non-intuitive eaters was that intuitive eaters did not exceed their recommended calorie intake. Banks (2008) concluded that the outcome could have been because the sample was primarily taken from college aged students, who may have similar diets because of the lifestyle that is typical in this population.

These are the only three studies to date that have focused on the physiological outcomes associated with intuitive eating. The conclusion that can be made from these studies is that an intuitive eating style tends to promote healthy physiological indicators, such as BMI and cholesterol readings. Much of the research tends to focus more on the mental correlates of intuitive eating. The next section will review the literature available concerning mental health and intuitive eating.

Mental Health and Intuitive Eating

Research has shown that individuals who follow an intuitive eating style make improvements in self-esteem, decrease in restrained eating, and bulimic behaviors (Polivy & Herman, 1992). A sample of 18 women were recruited for this study that provided 10 two-hour sessions where participants learned about the effects of dieting, exercise, and participated in group discussion. Instruments were used to measure drive for thinness, bulimia, ineffectiveness, enteroceptive awareness, depression, restraint, self-esteem, and weight. Significant decreases were noted in participants drive for thinness, bulimia, ineffectiveness, entroceptive awareness, depression, and restraint. Significant increases were found in the self-esteem scale from pre-test to post-test.

Similar findings were documented in a more recent study by Bacon et al. (2002), mentioned above who used psychological instruments to examine the effects of eating intuitively. Their findings showed that when compared with a restrictive eating group, eating behavior improvements were made regarding hunger recognition (measure of the conscientiousness of hunger) and disinhibition to eat (measure of the loss of control felt after self-imposed rules are made). In the Bacon et al. study (2002) the cognitive restraint test, which measured cognitive control of eating, significantly decreased in the intuitive eating group. The EDI, a scale designed to measure displayed characteristics of eating disorder behaviors, was given to examine eating behaviors as well. Findings showed that both the intuitive eating group and restrictive eating group made improvements in depression scores, hunger recognition, and disinhibition towards food,

but the intuitive eating group was able to maintain these improvements through to the follow-up period, at 104 weeks, whereas the restrictive eating group did not.

One last interesting note was that of the attrition rate between the intuitive eating group and the restrictive eating group in the Bacon et al. study (2002). The intuitive eating group maintained 92% of their attendance through to the follow-up period (at 104 weeks), as compared to the restrictive eating group, which only maintained 42%.

Another study that has explored the mental health aspects of intuitive eating specifically examined food anxieties and pleasure associated with eating, along with diet composition, and the nutritional quality of intuitive eaters' diets (Smith & Hawks, 2006). A convenience sample of 343 male and female students from a large western university were instructed to fill out the Intuitive Eating Scale and additional instruments to determine nutritional analyses (CDC, 2005) and diet quality, pleasure and health-conscientiousness of food, and dietary behaviors (Rozin, Pischler, Imada, Sarubin, & Wrzesniewski, 1999). Study results showed that individuals who scored higher on the Intuitive Eating Scale had significantly lower BMIs, found a significant amount of pleasure from eating, and had significantly lower amounts of health-conscientiousness with food, meaning they were less preoccupied with food, and had a more diverse diet as compared to non-intuitive eaters. Differences between genders showed that males were typically more intuitive, and thus experienced more pleasure in eating and tended to diet less, whereas females reported being more health-conscientious in their food selections, and were more focused on weight goals. The results from this study also indicated that nutrition and food quality were not worse for intuitive eaters than non-intuitive eaters. In fact, the researchers argued that intuitive eaters food consumption patterns could be

considered healthier because of the diversity of foods in the intuitive eaters' diets (Smith & Hawks).

In the above study by Smith and Hawks (2006) it was found that intuitive eating was positively correlated to different mental health aspects associated with food. Research regarding eating and mental health often looks at the presence or lack of eating disorder symptomatology. For example, two studies conducted by Tylka and Wilcox (2006) examined this by looking at whether or not individuals practicing intuitive eating were simply void of eating disorder symptomatology, or if they were actually more healthy and distinct in their psychological well-being above and beyond those who do not meet the criteria for intuitive eaters.

In their study, Tylka and Wilcox (2006), sampled 340 women from a large midwestern university. Instruments were used to assess levels of positive affect, self-esteem, and proactive coping and dieting. It was hypothesized that intuitive eaters would report healthier positive affect, self-esteem, proactive coping, and less restrictive behaviors, above what would be expected from individuals with eating disorder symptoms. Participants filled out an intuitive eating scale, an eating disorder symptomatology scale, a positive affect scale, a self-esteem scale, and a proactive coping scale. The results showed significant positive correlations for intuitive eating and positive affect, self-esteem, and proactive coping, supporting the hypothesis that intuitive eating was more than the absence of eating disorder symptoms, but is a completely separate construct that does not overlap in any way with eating disorder symptomatology (Tylka & Wilcox).

A follow-up study was conducted to further examine the degree of differences between intuitive eating and the degree of absence in eating disorder symptomatology. In the first study, positive affect, self-esteem, and proactive coping were assessed. In the follow-up study, four new scales were used to examine optimism, unconditional self-regard, psychological hardiness, and social problem solving. It was predicted that these variables would be significantly associated with intuitive eating, after controlling for ED symptomatology. A new population (n = 397) of women were tested to see whether intuitive eating was significantly correlated with optimism, unconditional self-regard, psychological hardiness, and social problem solving, things that would not be present in an eating disorder mentality. Once again, data gathered supported the hypothesis that intuitive eating mentality is more than a lack of eating disorder symptoms, but an eating style that is significantly different from eating disordered thinking patterns, thus making it a construct of its own.

In another study by Avalos and Tylka (2006), mental processes were examined to predict intuitive eating behavior. The researchers began by creating an Acceptance Model of Intuitive Eating Scale and pre-testing it on a sample of college women (n = 181). After pre-testing the initial scale, they tested it again for validity and generalizability using a larger sample of college age women (n = 416). The constructs under investigation were: general unconditional acceptance, body acceptance by others, body function, and body appreciation, and intuitive eating. Avalos and Tylka hypothesized that when an individual perceived acceptance from a significant other, the individual would perceive body acceptance from others, or put more emphasis on her body function. Body function refers to less preoccupation with outer appearance and

more emphasis on the feel and function of the body. If body function was met, then it was predicted that body appreciation would ensue. Body appreciation is the idea that when an individual appreciates her body, she will honor it by engaging in healthy behaviors, such as intuitive eating. The final construct of the Acceptance Model of Intuitive eating was intuitive eating. Figure 1 is a depiction of the Acceptance Model of Intuitive Eating.

Avalos and Tylka tested their model by using five instruments; an instrument used to measure perceived unconditional acceptance from a most significant other, such as a mother or significant family member, an instrument used to measure perceived body acceptance by others, an instrument used to measure emphasis placed on body function, and instrument used to measure body appreciation, and an intuitive eating instrument. Results of the tests showed that the model was significant on many of the predictors of intuitive eating, except for the path going from general unconditional acceptance directly to body function. The final model showed that intuitive eating was predicted by body appreciation and body function. Body function and body appreciation were predicted by body acceptance by others, and body acceptance by others was predicted by general unconditional acceptance.

These studies have examined the relationship between mental health and intuitive eating. Research done on intuitive eating indicates that individuals practicing an intuitive eating style may live a happy and healthy lifestyle. The following section will examine the relationship between exercise and intuitive eating.

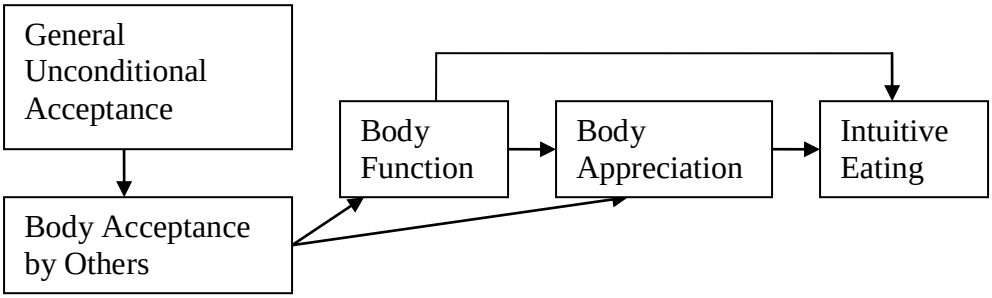

Figure 1. The acceptance model of intuitive eating scale by Avalos and Tylka (2006).

The constructs of the acceptance model of intuitive eating by Avalos and Tylka (2006) have shown how general unconditional acceptance, body acceptance by others, body function, and body appreciation can predict intuitive eating.

Exercise Behaviors and Intuitive Eating

To date there has not been any research regarding the relationship between physical activity behaviors and intuitive eating style exclusively. However, physical activity, including exercise, have been explored as a side note when examining intuitive eating in relationship to a broad range of health behaviors. An example of this is the study conducted by Bacon et al. (2005). Their findings suggested that women encouraged to participate in any type of physical activity, as defined by multiplying the average time of each activity by the average intensity in calorie expenditure, while participating in a longitudinal study on intuitive eating, increased their activity significantly from baseline to follow-up. These findings are similar in nature to elements found in intrinsic motivation to exercise. The following section will discuss concepts of exercise motivation, using the self-determination theory (SDT) (Deci & Ryan, 1985).

Self-Determination Theory (SDT)

Several theories have been explored to try and explain motivation, but the theory that will be discussed and used for the purposes of this study is the self-determination theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b). Before SDT, motivation theories typically split motivation into two defining categories: intrinsic and extrinsic. However, in 1985, Deci and Ryan developed a theory that envisioned extrinsic motivation and intrinsic motivation along a continuum, illustrating that individuals could actually be intrinsically or extrinsically motivated to different degrees. While the researchers established the SDT continuum, they also discussed three psychological needs that must be met in order for intrinsic motivation to exist. These needs are: competence, relatedness, and autonomy. Competence refers to the degree to which an individual feels they understand and have mastered a skill (Ryan & Deci, 2000b). Relatedness refers to the amount of interconnectedness people feel from doing an activity that they encouraged to do by those who are most important to them (Ryan & Deci, 2000b). Autonomy refers to the amount of self-determination a person experiences for engaging in a behavior (Ryan & Deci, 2000b). Deci and Ryan (1985) concluded that these needs may exist in different quantities, thus affecting the amount of motivation felt by an individual to engage in an activity. When these needs are nonexistent, they may inspire amotivation, or the complete absence of motivation to participate or engage in an activity (Ryan & Deci, 2000a).

Moving along the continuum, extrinsic motivation is broken down into its four smaller categories. Ryan and Deci (2000b) claimed that the different motivation categories represent the degree of integrated internalization of activities. The first category, external regulation, or the type of extrinsic motivation felt by an individual who engages in an activity, solely to either receive awards or avoid punishments, is the lowest type of external motivation. This would be like an individual participating in physical activity for the sole intent to lose weight.

Next, introjected regulation, or the partially internalized motivation, represents the partial internalized acceptance of a behavior. An example of this would be if an individual felt they "should" engage in physical activity, mostly to avoid any guilt or anxiety for not doing it.

The third category in extrinsic motivation is called identified regulation. It represents the individual starting to recognize the importance of a behavior. They also start to identify a behavior as their own. One last identifying characteristics of this category is when the individual starts to create goals to maintain a behavior. To illustrate this point, it could be that the individual participating in a physical activity now does so because they understand the good it does for their mental and physical health, and they value these things. They also start to make goals as a result of these realizations, for participation in the activity.

The final category in extrinsic motivation is called integrated regulation, and is closest to meeting the criteria of intrinsic motivation. When meeting the criteria for this category, an individual has integrated the behaviors and goals fully into their own lives. At this point they see their goals as something they inherently value. An example of this

would be when an individual does not necessarily participate in an activity simply for the enjoyment, but they participate because they are determined to do it and it has completely been integrated into their lifestyle. They have goals, they identify themselves as a regular participant, and they see the participation as an identity of who they are.

The highest degree of motivation on the SDT continuum is said to be intrinsic motivation. With intrinsic motivation, an individual will freely choose to participate in an activity for the pleasure and enjoyment of doing it. They engage in activities because they are interested in them, and they receive inherent satisfaction when they participate. This would be like a person choosing to participate in physical activity because they enjoy feeling that they are mastering it, they feel a self-determined freedom to participate, and they enjoy the social relatedness to others when participating. Figure 2 is an illustration of the SDT continuum.

The SDT has been applied to several different areas in social science, such as education, psychology, and business (Ryan & Deci, 2000a; Vallerand & Fortier, 1998). Applications of the SDT have also been used in sport psychology to study the relationship between physical activity and motivation (Milne, Wallman, Guifoyle, Gordon, & Courneya, 2008; Wilson, Rodgers, Blanchard, & Gessell, 2003; Wilson, et al., 2004). The following is a review of the current literature on SDT and physical activity. This is relevant to the current study because the SDT will be used to examine physical activity motivation.

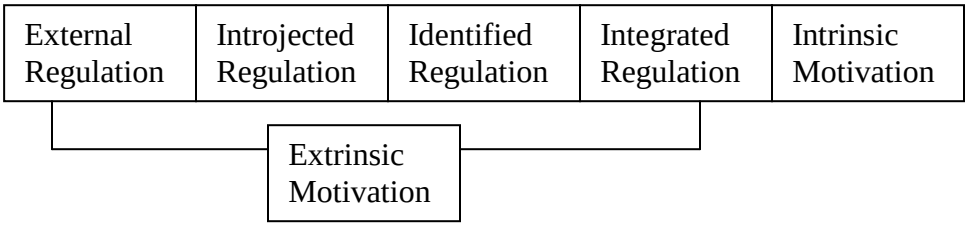

Figure 2. The SDT continuum, flowing from extrinsic motivation to intrinsic, as has been illustrated by Ryan and Deci (2000b). The figure depicts the breakdown of extrinsic motivation into its respective constructs.

Physical Activity Engagement and SDT

Deci and Ryan's (1985) self-determination theory has been used to explore motivational differences in physical activity engagement. This theory has been applied to physical activity because it helps researchers understand how other health behaviors influence physical activity and motivation. An example of this was a study conducted by Wilson et al. (2003) who used a longitudinal design to examine the relationship between psychological needs, exercise attitudes, physical fitness, and self-determined motivation. The researchers hypothesized that as individuals experience more competence, autonomy, and relatedness, they would experience an increase in self-determined motivation. The researchers also hypothesized that participants with motivation in the intrinsic and identified categories of the self-determination continuum would have more positive physical activity behaviors, physical fitness, and more positive attitudes towards physical activity. Additionally, researchers hypothesized that as the study progressed, participants would increase in their autonomy, relatedness, and competence, as well as

their self-determined motivation, primarily because they were adhering to a regular physical fitness program.

A sample of nine males and 44 females participated in the 12-week study that measured their feelings towards physical activity, their self-determination on the SDT continuum, their physical activity behaviors, their attitudes towards physical activity, and their general physical fitness at the beginning and end of the study (Wilson et al., 2003). Participants would meet three times a week to engage in a prescribed various physical activities for a prescribed amount of time and intensity.

Results of the study showed a significantly positive relationship between relatedness, competence, and self-determined motivation, meaning that as relatedness and competence for physical activity increased, so did the level of self-determined motivation (Wilson et al., 2003). A significant negative relationship between self-determined motivation and autonomy was found at the conclusion of the study, indicating that as study participants felt more controlled by their physical activity prescriptions, they felt their level of autonomy decrease. In additional to these findings, researchers also found a significantly positive relationship between self-determined motivation and the behaviors and attitudes related to physical activity, indicating that as the study went on behaviors and attitudes improved. Researchers found that the more frequent physical activity became, the more participants significantly became identified and intrinsic on the self-determination continuum. This same principle was found to be true regarding attitudes towards physical activity and overall physical fitness.

A similar study was conducted by Edmunds, Ntoumanis, and Duda (2006a) who looked at the relationship between perceived autonomy, relatedness, and competence, and

the type of motivation felt by individuals. Researchers extended the previously conducted research by examining how autonomy, relatedness, and competence, as well as the type of motivation, could predict exercise behavior. Edmunds et al. also predicted that when perceived autonomy was encouraged by a physical activity leader, study participants would report greater satisfaction of the three psychological needs, and higher self-determined motivation.

In this study, a sample of 173 male and 192 female participants were asked to fill out questionnaires on autonomy, relatedness, and competence felt in the physical activity domain (Edmunds et al., 2006a). They were also asked to complete a questionnaire to measure their self-determined motivation for physical activity, an instrument on physical activity behavior, and an instrument to measure their perceived autonomy support. Data analysis showed a significantly negative relationship between external motivation and autonomy, relatedness, and competence. Alternatively, significant positive correlations were seen between identified and intrinsic motivation, and autonomy, relatedness, and competence. Researchers found that a significant and positive relationship existed between autonomy, relatedness, and competence, and strenuous and total physical activity behavior. It was also found that participants who experienced more introjected motivation, identified motivation, and intrinsic motivation, also reported engaging in more strenuous and total time dedicated to physical activity behavior.

In addition to the correlations found, researchers found that competence was the only psychological need to predict physical activity behavior (Edmunds et al., 2006a). This finding suggested that the more competent individuals felt in their physical activity, the more likely they were to actually engage in it. It was also noted that identified

motivation was also a significant predictor of competence. Identified motivation was also a predictor of strenuous physical activity. A moderate, but significant, relationship was recorded between PAS and relatedness, and identified and intrinsic motivation. Researchers of the study concluded that SDT could be a useful tool in predicting physical activity behavior.

Another study used to predict physical activity behavior with the SDT, also looked at SDTs relationship with spontaneous implementation intentions (Brickell & Chatzisarantis, 2007). Spontaneous implementation intentions refer to the self-made plans that specify when, where, and how an individual will engage in an activity. Researchers hypothesized that physical activity motivation would be affected by spontaneous implementation intentions, and that this relationship would appear in physical activity participation.

Brickell and Chatzisarantis (2007) gathered data from a sample of 63 male and 99 female participants. Instruments were used to answer questions about spontaneous implementation intentions, self-determined motivation, and then at week two and week three, a physical activity behavior measure was given to assess how frequently participants engaged in physical activity.

Results of the study showed that spontaneous implementation intentions were significantly correlated with introjected, identified, and intrinsic motivation (Brickell & Chatzisarantis, 2007). This finding indicated that as individuals increased their self-determined motivation, they also improved their spontaneous implementation intentions. There was also a significant correlation between identified and intrinsic motivation and physical activity behavior, indicating that as individuals experienced higher levels of self-

determined motivation, they also engaged in more physical activity. Hierarchical regression analyses showed that identified motivation was the only significant predictor for physical activity behavior. When spontaneous implementation intentions were added to the analysis, it significantly increased the prediction of physical activity behavior. These findings showed that when physical activity was combined with identified motivation, it could predict individuals engaging in physical activity significantly more. Again, this research supports the finding that the type of motivation is as important to physical activity, as the physical activity is itself.

Physical activity motivation has been studied using the SDT, and the previous section has summarized the research that has been conducted. The following section will review the research on physical activity addiction using the SDT.

Physical Activity Dependency and SDT

While research has found a positive relationship between physical activity and the frequency of physical activity engagement, researchers have questioned whether this same relationship can be found in individuals who are considered to be overly dependent on physical activity. The following section will review research that has examined physical activity dependency using the SDT.

A study by Hamer et al. (2002) hypothesized that individuals who were more dependent on physical activity would be in the less self-determined categories of the SDT continuum. Specifically, researchers predicted that physical activity dependence would most strongly predict external and introjected regulation forms of self determination.

A sample of 147 males and 41 females were recruited from several fitness clubs. Instruments were administered to measure self-determination and running addiction (Hamer et al., 2002). Analyses of the data showed that introjected regulation was significantly the strongest predictor of physical activity dependence. External and intrinsic motivation did not significantly predict physical activity dependence. The conclusion of this study was that individuals who are more physical activity dependent may also experience motivation extrinsically. Researchers concluded that these findings showed when physical activity motivating is not experienced intrinsically, it can negatively affect the physical activity experience.

A similar finding was reported by Edmunds, Ntoumanis, and Duda (2006b), who also examined the relationship between physical activity dependence and the SDT. The researchers hypothesized that individuals who were more dependent on physical activity would feel less autonomous, which would then be reflected in their reported levels of lower self-determined motivation. Those who showed greater signs of dependence were deemed as symptomatic, while those who showed less to nonexistent signs of dependency on physical activity were deemed as asymptomatic. Researchers further hypothesized that individuals who reported less dependence, although they still were symptomatic for physical activity dependence, could be predicted by reported introjected motivation.

In this study, a sample of 161 males and 178 females were classified as symptomatic (n = 198) and asymptomatic (n = 141) (Edmunds et al., 2006b) in terms of their dependence on physical activity. Instruments were used to assess the levels of autonomy, relatedness, and competence; and the amount of self-determination felt

towards physical activity, physical activity behavior, and physical activity dependence. Data analysis revealed that symptomatic individuals felt significantly greater competence in physical activity. They also reported spending significantly more total time on physical activity engagement, as well as significantly more strenuous physical activity engagement. Individuals classified as symptomatic also scored significantly higher in all categories of motivation.

Regression analysis revealed that introjected motivation was a marginally positive predictor of engagement in strenuous physical activity (Edmunds et al., 2006b). The researchers also found that competence significantly predicted physical activity engagement, but it did not predict introjected motivation. When controlling for age, gender, relatedness, and autonomy, competence significantly predicted strenuous physical activity engagement and identified motivation. These findings suggest that when individuals feel competent in physical activity they will engage in it more, and do so at more strenuous levels. They will also experience greater self-determination, according to the results of this study, but they may also become more dependent on physical activity.

The previous section has reviewed the current literature on physical activity dependence and the SDT. It has been shown that physical activity motivation is experienced similarly in some ways and differently when individuals are dependent on it. The following section will review the literature on SDT and behavioral changes in physical activity.

Physical Activity Behavior Changes and SDT

The previous studies have shown how physical activity relates to the SDT, as well as the relationships between physical activity cognitions and behavioral outcomes. In another study by Thogersen-Ntoumani and Ntoumanis (2006), similar findings were recorded. These researchers examined the relationship between physical activity motivation using the SDT and physical activity behaviors, cognitions, and physical self-evaluations. They also wanted to explore how stages of change differed for individuals experiencing the different types of motivation.

Thogersen-Ntoumani and Ntoumanis (2006) approached fitness club members in Northern England and asked them to fill out questionnaires regarding physical activity. A total of 121 males and 246 females completed questionnaires on self-determined motivation, relapse from physical activity, stages of change, intentions to continue engaging in physical activity, self-efficacy to overcome barriers, physical self-worth, and social physique anxiety. Results showed positive significant relationships between intrinsic and identified motivation, and future intentions to exercise, self-efficacy to overcome barriers, and physical self-worth. Negative significant relationships were observed between intrinsic and identified motivation, and social physique anxiety. Introjected motivation was significantly and positively related to future intentions to engage in physical activity and self-efficacy to overcoming barriers.

Analysis of the stages of change and motivation differences showed that participants in the maintenance stage for physical activity had significantly higher intrinsic motivation, identified regulation, and introjected motivation (Thogersen-Ntoumani & Ntoumanis, 2006). Identified regulation increased significantly from

preparation to action, and then action to maintenance, and then again from preparation to maintenance, indicating that as individuals changed, they became more self-determined to engage in physical activity.

Further analysis of the data showed that high self-efficacy for overcoming barriers could significantly predict high introjected motivation, identified motivation, and intrinsic motivation (Thogersen-Ntoumani & Ntoumanis, 2006). This indicated that a more self-determined individual could overcome self-efficacy barriers better than a less self-determined individual. Intrinsic motivation also showed a positive significant correlation for physical self-worth, and a negative significant prediction for social physique anxiety. This meant that individuals with more intrinsic motivation could possibly feel better about themselves, and those with low intrinsic motivation could possibly have higher social anxiety regarding their physical appearance. Introjected motivation was positively and significantly predicted for social physique anxiety, so that as individuals experienced more social physique anxiety, they were also more introjected in their motivation on the SDT continuum. This study showed how SDT affected physical activity behaviors, cognitions, and physical self-evaluations.

Similar conclusions were made in another study by Wilson et al. (2004), who used the SDT to examine the relationship between physical activity motivation and the behavioral outcomes associated with that motivation. Specifically, researchers looked at physical activity behavior, behavioral intentions, and the effort and importance associated with physical activity when an individual felt more identified and intrinsic motivation.

A sample of 98 male and 178 female university students filled out instruments to measure self-determination, physical activity exertion and frequency, physical activity

intentions, and the effort and importance of physical activity (Wilson et al., 2004). Findings from the study indicated that significantly positive correlations existed between identified and intrinsic motivation and physical activity behavior, behavioral intentions, and the effort and importance that individuals place on physical activity. In addition, identified motivation had significantly more influence on physical activity behavioral outcomes than any other type of motivation, showing significant predictability for physical activity exertion and frequency, intentions, and effort and importance of physical activity. Researchers concluded that the more identified and intrinsically motivated physical activity is, the more beneficial it is to the exertion and frequency, intentions, and the effort and importance felt by the individual.

Wilson and Rodgers (2004) have conducted other research on motivation and the intentions of women to continue engaging in physical activity. They were primarily interested in seeing how friends influenced physical activity motivation and behavioral intentions to keep engaging in physical activity. It was hypothesized that perceived autonomous support from friends would be correlated with intrinsic and identified motivation for physical activity in study participants. Researchers also hypothesized that intrinsic and identified motivation would be correlated with greater behavioral intention to keep adhering to physical activity.

A sample of 232 females from a large university were surveyed on physical activity motivation, perceived autonomy and friend support, and intent to continue engaging in the physical activity (Wilson & Rodgers, 2004). Analyses of the data showed that perceived autonomous support from friends was significantly positively associated with continued intent to engage in physical activity. There was a significant

association between autonomous support from friends and intrinsic and identified motivation. Alternatively, there was a significant decrease in motivation when friend support decreased. The same phenomenon was found regarding the intent to engage in physical activity; intent to continue engaging in physical activity was significantly higher when motivation was either intrinsic or identified on the SDT continuum.

This section has examined physical activity behaviors and motivation using the SDT. Behavioral change was experienced during physical activity and this was noted using the SDT. The following section will review the literature on physical activity and psychological effects using the SDT.

Physical Activity, Psychological Effects, and SDT

In addition to looking at the relationship between physical activity behaviors and motivation, researchers have also examined the psychological effect of motivation on physical activity. An example of this was found in a study conducted by Wilson and Rodgers (2002), who looked at intrinsic and identified motivation and its relationship with physical self-esteem. The researchers hypothesized that women who were more intrinsic and identified in their motivation, would have higher levels of physical self-esteem than individuals who were introjectedly motivated.

A sample of 114 college-aged women were used for this study (Wilson & Rodgers, 2002). Instruments were administered to collect data on physical activity motivation, and physical self-esteem, or the degree of positive feelings one has about their physical self. Data analyses revealed a statistically significant relationship between physical self-esteem and the type of motivation felt. As women increased in self-

determined motivation, their physical self-esteem significantly improved. As they decreased in self-determined motivation, their physical self-esteem significantly decreased. Researchers concluded that women reporting higher physical self-esteem valued and enjoyed physical activity more, than women who reported lower physical self-esteem.

It has been shown how psychological constructs are important in understanding the motivation to engage in physical activity (Wilson & Rodgers, 2002). This has also been examined by Kowal and Fortier (1999) in a study that looked at the effect of flow on physical activity motivation. Flow refers to the immersed sensation felt when people participate in an activity. It can also be considered as a loss of awareness, time, and surroundings, with only the complete focus given to the activity itself. Kowal and Fortier (1999) predicted that when motivation was more intrinsic or identified, a positive relationship would appear with flow. They also hypothesized that perceived autonomy, competence, and relatedness would be positively related to flow.

A sample of 203 swimmers, 105 males and 98 females, were instructed to fill out questionnaires on situational motivational determinants, situational motivation, and flow (Kowal & Fortier, 1999). The situational motivational determinant instrument was used to measure autonomy, competence, and relatedness, and the situational motivation instrument was used to gather information about the type of motivation felt by the participants. Study results showed that flow was significantly related to intrinsic motivation and identified motivation in a positive direction. Significant correlations were also found between flow and feelings of relatedness, competence, and autonomy. This

study supports the notion that motivation does affect the psychological outcomes for individuals engaging in physical activity.

It has been shown that the SDT has been used by several researchers to study the relationship between motivation and physical activity. Although motivation has been studied in depth, it has not yet been studied in correlation with intuitive eating. This relationship will be examined through this proposed study.

Summary

This chapter has reviewed the current literature to date on (a) restrictive eating, and the mental, and physical consequences of restrictive eating; (b) intuitive eating, and the mental, and physical consequences of intuitive eating; and (c) the self-determination theory, and the studies that have used the self-determination theory in physical activity settings. Although it has been documented that weight-loss can be attained through restrictive eating, the emotional and physical consequences of such practices can be detrimental to one's health. Intuitive eating is relatively new, but the literature to date reports healthy mental status, and positive physiological benefits. However, more research is needed to understand the relationship between intuitive eating and physical activity motivation. The self-determination theory has been used to explore physical activity motivation in conjunction with other health variables, but it has not been researched with the intuitive eating style. A study that explores any correlations between physical activity motivation and intuitive eating could be of benefit to health educators and seems to be a logical step in this area of research. The following chapter will discuss the methods that are going to be used to conduct this study. Specifically, it will detail the

research design, population and sample description, instrumentation, data collection procedures, and data analysis procedures.

CHAPTER III

METHODOLOGY

Introduction

The methods for conducting this study will be presented in this chapter. The following will be discussed in detail: (a) purpose of the study, (b) theoretical framework, (c) research design, (d) population and sample, (e) instrumentation, (f) reliability analysis of instrumentation, (g) data collection procedures, and (h) data analysis.

Purpose of the Study

To date, research had not been conducted to explore the connection between intuitive eating and physical activity motivation. Research was needed to understand how eating style and physical activity interact. Both are critical for a healthy lifestyle, and understanding how and if they interact could be a benefit to health promotion. The purpose of this study was to apply the self-determination theory to examine the motivation for physical activity between restrictive eaters and intuitive eaters among female college students.

Theoretical Framework

The Self-Determination Theory has been used in several contexts for studying physical activity motivation (Ryan et al., 1997; Vallerand & Fortier, 1998; Wilson & Rodgers, 2004). The SDT was used to study the relationship between intuitive eating and physical activity motivation.

Research Design

This study used a non-random, cross-sectional correlational research design. Quantitative analysis was used to determine: (a) the relationship between the degree of intuitive eating behavior and motivation to participate in physical activity, (b) how intuitive eaters differed from non-intuitive eaters on the self-determination continuum and (c) the relationship between past physical activity maintenance and intuitive eating.

Study Sample

The sample for this study consisted of female undergraduate students at Utah State University enrolled in introductory courses in English, sociology, and psychology. Previous research studies on intuitive eating were conducted using similar samples (Hawks et al., 2004; Tylka, 2006). No women participating in collegiate athletics were included in the study, due to physical activity training schedules and their potential to taint the data. Pregnant women were not included in the study, due to possible dietary changes and physical activity limitations from their condition. All participants over 18 were included in the study to keep the demographics to college-aged females. The student researcher acquired direction for a power analysis from the Office of Methodological and Data Sciences and Utah State University. A multiple regression power analysis was conducted to determine an adequate sample size for the proposed study. The multiple regression power analysis revealed that with an alpha of .05, an estimated power of 0.8, and a beta of 0.19, a sample size of 114 would provide adequate

power to detect a medium effect size, but the researcher will acquire data from at least 200 participants. The final sample consisted of 218 participants.

Instrumentation

Three instruments were used to collect data for this study. They included the Intuitive Eating Scale (IES; Hawks, Madanat, & Merrill, 2004; Appendix A) which was scored using the IES scoring instrument (Appendix B); the Behavioral Regulation in Exercise Questionnaire (BREQ; Mullan, Markalnd, & Ingledew, 1997; Appendix C), which also has a scoring instrument (Appendix D); and demographics (Appendix E).

Permission was obtained to use the IES from Dr. Steven Hawks (Appendix F). The IES (Hawks et al., 2004) is an instrument that was developed to measure the levels of intuitive eating behaviors and cognitions, present in individuals' eating styles. This instrument consists of 27 items answered on a 5-point Likert-type scale, with answers ranging from strongly agree (5) to strongly disagree (1). Item numbers 2, 3, 5, 7-9, 11, 14-24, and 26 are all reverse scored. The IES items are written to measure the following subscales: numbers 1, 4, 10, and 13 measure intrinsic eating; numbers 7, 16, 19, 20, 23, and 24 measure extrinsic eating; numbers 2, 3, 5, 8, 9, 11, 14, 15, 17, 18, 21, 22, and 26 measure anti-dieting; and numbers 6, 12, 25, and 27 measure self-care.

The IES (Hawks et al., 2004) consists of four different intuitive eating subscales: intrinsic eating, extrinsic eating, antidieting, and self-care. Face and content validity of the IES was tested by comparing it to previous intuitive eating scales, having reviews from professionals not involved in the instrument development, and having reviews made by students enrolled in an upper-division health class. Revisions and recommendations

were suggested by these individuals. The IES was then administered to a large sample of undergraduate students (n = 391), from a large western university. It was administered again four weeks later for test-retest reliability, showing a statistically significant correlation (r = .85) at retesting. Convergent validity was examined by administering the Cognitive Behavioral Dieting Scale (CBDS; Martz, Sturgis, & Gustafson, 1996), which is a 13-item scale that measures restrictive eating styles. Higher scores on the CBDS represent higher levels of restrictive eating behaviors. The CBDS was administered simultaneously as the IES, and then tested using a Pearson Product moment correlation between the total score on the CBDS and each total score from the IES subscales. Except for the self-care category, all of the subscales were significantly correlated to the CBDS in the direction hypothesized (r = -.836, p<.0001 for intrinsic eating; r = -.418, p<.0001 for extrinsic eating; r = -.484, p<.0001 for antidieting; r = -.023, p<.659 for self-care).

Individuals who scored high on the IES instrument indicated stronger adherence to an intuitive eating style. A high score was determined by the median of the IES responses. Those scoring above the median were considered intuitive, while those scoring below the median were considered non-intuitive (Hawks et al., 2004).

The Behavioral Regulation in Exercise Questionnaire (BREQ) was developed in 1997, by Mullan, Markland, and Ingledew, to test the SDT (Deci & Ryan, 1985) in an exercise setting. Consent to use this instrument was obtained from one of the test developers (Appendix G). This instrument consists of 15 self-report questions on a Likert-type scale of “not true for me” (0) to “very true for me” (4). Items are split up into the following subscales: item numbers 1, 5, 9, and 13 measure external regulation; item numbers 2, 6, and 10 measure introjected regulation; item numbers 3, 7, 11, and 14

measure identified regulation; and item numbers 4, 8, 12, 15 measure intrinsic regulation. Item numbers 16-19 were added by the student researcher to assess physical activity maintenance behaviors. Demographic information will also be collected on this instrument.

Mullan et al. (1997) tested the BREQ instrument for goodness of fit, internal consistency, reliability, and validity. The initial study was used to confirm that the items were tested for model testing of the self-determination continuum. Respondents (n = 298) were approached at a local gym in Northern England and asked to be a part of the study. Questionnaire results were analyzed with confirmatory factor analysis, testing individual item's accuracy for measuring the corresponding variable. Second, each subscale of the instrument was compared to another subscale to eliminate loaded items. Third, the BREQ was examined for model fit, by examining the internal consistency and discriminate validity of each subscale. Items that did not support the model were eliminated from the instrument. Upon completion, statistical analysis showed that there was an acceptable level of goodness of fit (goodness of fit index = 0.90, root means square error of approximation = 0.07, and non-normed fit index = 0.91). Internal consistencies of the four subcategories were tested using the Cronbach's alpha. Acceptable reliability was obtained for all four (external regulation = .789, introjected regulation = .763, identified regulation = .786, intrinsic regulation = .903).

Four questions were added to the BREQ to acquire demographic information. These addressed gender, race/ethnicity, age, class, height, and weight. Height and weight were used to calculate BMI. A question about collegiate athletic involvement was also included to control for physical activity participation. In addition, Cronbach's alpha was

analyzed for the proposed study for each of the two scales used in the study to determine reliability for the final sample used in this study.

Reliability Analysis of Instrumentation

Several Cronbach's alphas were run to determine the reliability of the scales being used for the current study. The IES consisted of four separate subscales measuring intrinsic eating, extrinsic eating, anti-dieting, and self-care. The BREQ consisted of four separate scales measuring external regulation, introjected regulation, identified regulation, and intrinsic regulation motivation. Table 1 is a compilation of all Cronbach's alphas run, as well as the results from preliminary and validation studies on the instruments used for this study (Hawks et al., 2004; Mullen et al., 1997).

Data Collection Procedures

Institutional Review Board

Permission to conduct this study was obtained through the Utah State University Institutional Review Board (IRB) prior to data collection (Appendix H). This ensured that all risks and benefits were addressed before the study began. All appropriate forms and documents were completed and submitted for approval.

Pilot Study

Once IRB approval was granted, a pilot study was conducted to determine if any adjustments needed to be made to the proposed study, before official data collection began. The student researcher attended Health and Wellness classes to access at least 15

students to participate in the pilot study. Study participants were briefed on the intents of the proposed study before receiving the instruments. A total of 27 students completed the survey.

Table 1

Cronbach's Alpha Coefficients for IES and BREQ from Current Data Set and Past Instrument Validation Studies.

Instrument	Alpha from current data set	Alpha from past validation studies
IES		
Intrinsic Eating	.414	.420
Extrinsic Eating	.754	.792
Anti-dieting	.869	.928
Self-Care	.670	.589
BREQ		
External Regulation	.811	.789
Introjected Regulation	.847	.763
Identified Regulation	.869	.786
Intrinsic Regulation	.915	.903
Physical Activity Maintenance	.843	N/A

The pilot participants were then given a letter of information, which explained the risks of participating in the proposed study and they understood that they could withdraw

from the study at any time (Appendix I). After receiving this, research participants received the IES (Hawks et al., 2004), the BREQ (Markland & Ingledew, 1997), the demographic questions, and the pilot study content questionnaire (Appendix J) to complete and hand in to the student researcher the next time class met. The pilot study content questionnaire was an additional instrument used to acquire feedback on question content, directions, and readability of the instruments. These instruments did not have any personal identifiers attached to them. Pilot study participants offered constructive suggestions for minor grammatical corrections to the survey. When pilot study participants completed and handed in the instruments after the next class meeting, they were thanked by the student researcher. The grammatical corrections they suggested were made to the instrument.

Data Collection Procedure

Data collection was conducted during psychology, English, and sociology undergraduate introductory courses at Utah State University. The student researcher attended classes where instructors deemed it appropriate to gather data. Information regarding the purpose of the study was presented to participants, after which they received a letter of information to read. Once the letter of information was handed out, student participants then received both the IES (Hawks et al., 2004), and the BREQ (Markland & Ingeldew, 1997) to complete. Student participants were instructed to complete the questionnaires at home and then return them to the student researcher at the next class meeting time. The student researcher was able to collect data for one class at another location and at a different time outside of class time, where students received lab

credit from their professor for completing the survey. One class did not take the survey home, as the professor agreed to give time during class to complete the survey. Students took approximately 10 to 15 minutes to complete the full survey. The student researcher handed out the surveys and collected them when students were finished.

Students were instructed to fill out their name and their instructor's name on a separate piece of paper to place in a drawing for all those who participated. The winners received one of three $20.00 gift certificates to the USU Bookstore. The student researcher gave the gift certificate to the instructor to give to the student who won the drawing.

Data Analysis

The BREQ, demographics, and IES data obtained from participants were coded and entered into SPSS version 17 by the student researcher. These data were used to complete descriptive and inferential statistical analyses. The BREQ and IES were analyzed using their corresponding scoring instructions (Appendix B and Appendix D). Demographic questions were not used in data analyses, but were important for information regarding sample description. BREQ (Markland & Ingeldew, 1997) and IES (Hawks et al., 2004) scores were analyzed using multiple linear regression equations. These equations answered research questions one, two, and three (see Table 2).

To answer questions one through three, study participants scoring above the median on the IES were categorized as intuitive eaters. Participants scoring below the median on the IES, which was a score of 87, were categorized as non-intuitive eaters. This criterion was used in a previous study by Hawks et al. (2004) who deemed that a

high scorer was determined by the median of the IES responses. In this study, those scoring above the median were considered intuitive, while those scoring below the median were considered non-intuitive.

To answer question one, individuals mean scores on the IES were used, as well as the mean scores for the intrinsic regulation subscale of the BREQ (Markland & Ingledew, 1997) and applied to the linear regression equation for analyses. This was done to answer if intuitive eating predicted intrinsic regulation motivation for physical activity.

To answer question two, individuals mean scores on the IES were used, as well as individual mean scores from questions 16-19 on the BREQ (Markland & Ingeldew, 1997) were then calculated, and applied to the linear regression equation for analyses.

To answer question three, individuals were classified as either intuitive or non-intuitive eaters. Mean scores were calculated for each of the four subscales on the BREQ (Markland & Ingeldew, 1997). An Independent samples t-test was conducted to determine any significant differences between intuitive and non-intuitive eaters in each of the subscales.

Summary

This chapter has defined the processes used to answer the research questions presented in the present study. Specifically, it has discussed the theoretical framework of the SDT (Deci & Ryan, 1985), the research design, the intended population and sample, the IES (Hawks et al., 2004), and the BREQ (Markland & Ingeldew, 1997) instruments, reliability analyses of instrumentation, data collection procedures, which were included in

obtaining IRB approval, conducting a pilot study, and then the actual data collection process, and data analyses procedures.

Table 2

Research Questions, Instruments Used to Answer the Research Questions, and the Statistical Analysis that will be Used to Answer the Research Questions.

Research Question	Instrument	Statistical Analysis
1. Does an intuitive eating style among female college students predict an intrinsic regulation style of motivation to participate in physical activity?	IES, BREQ (intrinsic regulation subscale)	Mean, standard deviation of X, standard deviation of Y, linear regressions F score
2. Does eating style predict physical activity maintenance?	IES, BREQ questions 16, 17, and 19	Mean, standard deviation of X, standard deviation of Y, linear regression F score
3. Do intuitive eaters experience more identified regulation motivation and intrinsic regulation motivation to participate in physical activity, as compared to non-intuitive eaters?	IES, BREQ	Median for IES for grouping variable determination, standard deviation of X, standard deviation of Y, Independent samples *t*-Test score

CHAPTER IV

RESULTS

Introduction

The current study was designed to examine the relationship between intuitive eating and physical activity motivation and maintenance. The previous chapter discussed the design and procedures used to gather data and analyze it. This chapter will discuss the resulting analyses from the data gathered, as well as answer the research questions presented in Chapters I and III.

Sample Description

A total of 207 females participated in the current study. Students were accessed during introductory English, psychology, and sociology classes. Data from participants who were pregnant or involved in collegiate sports were not included in the analyses. There were 231 participants who handed in the survey; however, only 207 were eligible due to pregnancy, collegiate sport participation, or incomplete surveys. The average age of the participants was 19.6, with an SD of 2.5. Students were instructed to include their height and weight for BMI analysis. Data showed that 66.7% of study participants were in normal BMI range, defined as between 18.5-24.9 (CDC, 2009), while anything below 18.5 is considered underweight, 25.0-29.9 is considered overweight, and 30 and above is considered obese (CDC, 2009). Race and ethnicity data were gathered and showed that 88.9% of the sample self-reported as being white, while the remaining 11.1% was of other races. The sample was primarily made up of freshmen (62.8%) which was

expected, since data collection took place in introductory general education courses. In total, 102 (49.3%) of the participants were considered intuitive, while 105 (50.7%) were considered non-intuitive. Table 3 presents the complete demographic data from the study sample.

Linear Regression analyses were conducted to describe the sample in terms of their BMI and eating style, and their BMI and physical activity maintenance. Of the sample, two did not report their age (1%), seven did not report their weight (3.4%), and two did not report their race (1%). However, these individuals completed all questions on the survey, therefore their answers were still included in the data analyses. Results showed that individuals who were intuitive had significantly lower BMIs than individuals who were not ($F(1, 198) = 6.006$, $p = .015$) A second linear regression analysis showed that BMIs were not significantly different for individuals who scored higher in maintaining their physical activity versus those who did not, $F(1, 198) = 3.827$, $p = .052$. Table 4 contains the results for BMI and eating style. Table 5 represents the results for BMI and physical activity maintenance.

Table 3

Demographic Characteristics of the Sample

Characteristics	Frequency	Percent
Age		
18	69	33.3
19	83	40.1
20	17	8.2
21	8	3.9
22	10	4.8
23	7	3.4
24	2	1.0
25	3	1.4
>26	6	2.9
Class		
Freshman	130	62.8
Sophomore	49	23.7
Junior	24	11.6
Senior	4	1.9
BMI		
Underweight	13	6.3
Normal	138	66.7

(table continues)

Characteristics	Frequency	Percent
Overweight	35	16.9
Obese	14	6.8
Race/Ethnicity		
Native American or Alaskan Native	3	1.4
White	184	88.9
Hispanic or Latino	8	3.9
Asian	7	3.4
Native Hawaiian or Pacific Islander	1	.5
Black or African American	2	1.0

Note. *Totals are not equal to 100 due to rounding.*

Table 4

Linear Regression Results for BMI and Eating Style. Individuals Scoring High on Intuitive Eating had Significantly Lower BMIs

BMI	*SS*	*df*	*MS*	*F*	*p*
Regression	143.736	1	143.736	6.006	.015
Residual	4738.290	198	23.931		
Total	4882.026	199			

Table 5

Linear Regression Results for BMI and Physical Activity Maintenance. There was No Significant Difference in BMIs for Individuals who Maintained or Did Not Maintain Their Physical Activity

Physical Activity	*SS*	*df*	*MS*	*F*	*p*
Regression	92.578	1	92.578	3.827	.052
Residual	4789.447	198	24.189		
Total	4882.026	199			

Results

Research Question One: Does an intuitive eating style among female college students predict an intrinsic regulation style of motivation to participate in physical activity?

Research question one was designed to examine the relationship between eating style and its predictive relationship on intrinsic motivation to engage in physical activity. In order to examine this relationship, a linear regression test was used. There was a statistically significant relationship between intuitive eating and intrinsic motivation to participate in physical activity, $F(1, 205) = 17.895$, $p < .01$; therefore the null hypothesis was rejected. The results indicated that as individuals scored higher on the intuitive eating scale, they also scored significantly higher on the intrinsic motivation scale. This means that an intuitive eating style was predictive of intrinsic motivation to engage in physical activity among participants in this study. Table 6 presents the results of the regression analysis for research question one.

Research Question Two: Is there a significant correlation between eating style and physical activity maintenance?

Research question two was created to examine the relationship between intuitive eating style and physical activity maintenance. A linear regression analysis was conducted to determine the relationship between eating style and physical activity maintenance. The null hypothesis was not rejected as there was not a significant relationship between eating style and physical activity maintenance, $F(1, 205) = 1.008$, $p = .317$. Results showed that individuals scoring high on the IES, meaning they were more intuitive eaters, did not maintain their physical activity any more or less than individuals who did not score high on the IES. Table 7 represents the results of research question two analysis.

Table 6

Linear Regression Analysis Results of Intuitive Eating Test Score for Predicting Intrinsic Motivation for Physical Activity

Intrinsic Motivation	*SS*	*Df*	*MS*	*F*	*p*
Regression	3898.154	1	3898.154	17.895	.000
Residual	44655.537	205	217.832		
Total	48553.691	206			

Table 7

Linear Regression Analysis Results of Eating Style for Predicting Physical Activity Maintenance

Activity Maintenance	*SS*	*df*	*MS*	*F*	*p*
Regression	237.525	1	237.525	1.008	.317
Residual	48316.66	205	235.689		
Total	48553.691	206			

Research Question Three: Do intuitive eaters experience more identified regulation motivation and intrinsic regulation motivation to participate in physical activity, as compared to non-intuitive eaters?

Research question three was designed to compare intuitive eaters to non-intuitive eaters to see if they experienced identified motivation and intrinsic motivation differently for physical activity. Participants were categorized as intuitive or non-intuitive based off of their total intuitive eating score. Those above the median intuitive eating score, which was 87, were classified as intuitive, while those below were classified as non-intuitive.

An independent samples *t* test was conducted to determine the difference between intuitive eaters and non-intuitive eaters and their intrinsic regulation motivation and introjected regulation motivation. Results showed a significant difference between intuitive and non-intuitive eaters in relation to their intrinsic motivation for physical activity, $t(205) = -3.374$, $p = .001$. The *t* test results showed that intuitive eaters experienced significantly higher levels of intrinsic motivation to engage in physical activity. The independent samples *t* test revealed a nonsignificant outcome between

intuitive and non-intuitive eaters in relation to their identified regulation motivation for physical activity ($t(205) = -.618$, $p = .537$). This outcome suggests that there is no difference between intuitive and non-intuitive eaters and the level of identified regulation motivation they experience for physical activity. Table 6 represents the results of research question three analysis.

Additional independent samples *t* tests were run to further examine the relationships between intuitive and non-intuitive eaters and their level motivation for physical activity, and results showed a significant difference between intuitive and non-intuitive eaters and their external regulation motivation, as well as their introjected regulation motivation. These results indicate that intuitive eaters were significantly lower in each subscale for physical activity when compared to non-intuitive eaters. Table 8 represents the results of research question three analysis.

Table 8

Independent samples t-Test for Intuitive Eaters Versus Non-Intuitive Eaters and Their Levels of Motivation for Physical Activity.

	t Test for equality of the means				
	t	*df*	Sig.	Mean Difference	Std. Error Difference
External regulation motivation	4.659	205	.000	1.978	.425
Introjected regulation motivation	7.713	205	.000	3.173	.411
Identified regulation motivation	-.618	205	.537	-.321	.520
Intrinsic regulation motivation	-3.374	205	.001	-1.767	.524

Summary

This chapter revealed the results of all the analyses completed to answer research questions one, two, and three. Specifically, question one showed a significant relationship between intuitive eating and intrinsic regulation motivation for physical activity. Question two showed a nonsignificant relationship between intuitive eating and physical activity maintenance. Question three showed a significant difference between intuitive eaters and non-intuitive eaters and their intrinsic motivation. However, this relationship was not significant for identified regulation motivation. Further analyses showed significant differences between intuitive eaters and non-intuitive eaters and their introjected regulation motivation and external regulation motivation.

CHAPTER V

DISCUSSION

Introduction

The current study was intended to examine the way that intuitive and non-intuitive eaters experience motivation to engage in physical activity. It also examined the relationship that eating style had on physical activity maintenance. While there has been some investigation on intuitive eating and its relationship with other health determinants (Bacon et al., 2002; Banks, 2008; Hawks et al., 2005; Polivy, Colemann, & Hermann, 2005; Tylka & Wilcox, 2006), research does not exist that examines the relationship between intuitive eating and physical activity, or physical maintenance. Table 6 presents each research question, results of the analyses, and a comparison of these results with previous literature. This chapter will discuss the results presented in Chapter IV and the implications these may have for health educators. Suggestions will also be presented for future researchers.

Discussion

Research Question One

Research question one was designed to examine the relationship between intuitive eating and intrinsic regulation motivation to engage in physical activity. A previous study by Bacon et al. (2005) found that as participants in an intuitive eating program maintained their intuitive eating lifestyle, they also increased significantly in their regular physical activity. In another study by Brickell and Chatzisarantis (2007), researchers

found that as individuals experienced higher levels of self-determined motivation, they also engaged in more physical activity. Another study by Wilson et al. (2004), found a similar outcome, which showed that when individuals were more intrinsic, they also increased in the effort and the importance they placed on their physical activity. Again, in the Bacon et al. (2005) study it was noted that from beginning to end of the study, individuals who learned the intuitive eating style increased significantly their time spent on moderate, hard, and very hard physical activity.

In another study by Wilson and Rodgers (2002), researchers found that women reporting higher physical self-esteem valued and enjoyed physical activity more than women who reported lower physical self-esteem. In the Bacon et al. (2005) study, researchers also found an improvement in individuals' self-esteem for those participating in the intuitive eating program.

While these studies do not directly examine the relationship between intuitive eating and intrinsic regulation motivation to engage in physical activity, it could be suggested that intrinsic regulation motivation may have changed as the individuals who were learning the intuitive eating became less restrictive in their eating style. Perhaps individuals who practice intuitive eating are inherently more appreciative of their body and the pleasure that they get from being physical active. Another possible explanation could be that perhaps individuals who eat non-intuitively focus more on completing their physical activity, rather than enjoying it for the experience, therefore hindering their intrinsic motivation. They feel that they *have* to do it, rather than the feelings of pleasure they get from doing it.

In addition to these possible explanations, the study by Avalos and Tylka (2006) that tested a prediction model for intuitive eating, specifically found a link between body function and intuitive eating. They defined body function as less preoccupation with outer appearance and more emphasis on the feel and function of the body. They tested the theory that if body function was met, then body appreciation would ensue. Body appreciation is the idea that when an individual appreciates her body, she will honor it by engaging in healthy behaviors, such as intuitive eating or engaging in physical activity.

The final prediction model of the Avalos and Tylka (2006) study showed that intuitive eating was predicted by body appreciation and body function, among other things. This could help explain why individuals who eat intuitively experience greater intuitive motivation for physical activity. Avalos and Tylka also found that individuals who eat intuitively are less preoccupied with outer appearance, they place more emphasis on the feel and function of their body, and they appreciate their body more, so they honor it by engaging it in healthy behaviors, such as physical activity. The sample for this population could possibly be less preoccupied with outer appearance, and they may place more emphasis on the feel and function of their body when engaging in physical activity, however this did not mean that they engaged in more physical activity than non-intuitive eaters. This will be explored further in the next section.

Research Question Two

Research question two was designed to examine the relationship between intuitive eating and physical activity maintenance. Results showed that there was no significant difference between intuitive and non-intuitive eaters and their physical activity

maintenance. Previous studies on physical activity maintenance have shown that there are individuals who eat in a restrictive way, who are able to maintain their physical activity for long periods of time (Wing & Phelan, 2005). However, in the study by Wing and Phelan, this behavior was only successfully maintained by 20% of the original sample, and was not compared to an intuitive eating group. Another study by McLean and Barr (2003) reported that women with greater restrictive eating behaviors reported more hours engaging in physical activity as compared to those who were not as restrictive. Ackard et al. (2002) also reported that women with greater restrictive eating behaviors reported significantly greater physical activity frequency and intensity, as compared to those who did not restrict their eating behaviors. The previously mentioned studies do not support the findings of the current study, which found that there was no significant difference between intuitive and non-intuitive, or restrictive eaters, and their physical activity maintenance.

There was one study that directly examined the differences between intuitive and non-intuitive groups (Bacon et al., 2005). The study by Bacon et al. found that intuitive eaters significantly increased their physical activity, and maintained that behavior through to follow-up, as compared to non-intuitive eaters. The results of the current study did not find that there was any difference in the maintenance of physical activity when comparing intuitive to non-intuitive eaters. One possible explanation could be because the individuals recruited from the Bacon et al. study were obese women, specifically assigned to an intuitive eating condition. In this condition they learned about physical activity, and ways to help them transform and identify barriers to becoming physically active. Participants of the current study did not receive any type of education

on physical activity maintenance and were of a variety of weights and the majority of the sample was of normal BMI.

In another study by Brickell and Chatzisarantis (2007), researchers found that as individuals experienced higher levels of self-determined motivation for their physical activity, they also engaged in more physical activity. Similar results were found in the study by Thogersen-Ntoumani and Ntoumanis (2006), and Wilson et al. (2004). In the current study, results showed that higher levels of intuitive eating meant higher levels of intrinsic motivation to engage in physical activity. However, this difference did not equate to intuitive eaters maintaining their physical activity significantly more than non-intuitive eaters in the present study.

When examined further, the study by Wilson et al. (2004) found that positive correlations existed between identified regulation motivation and intrinsic motivation and physical activity maintenance. In addition, identified regulation motivation had significantly more influence on physical activity behavioral outcomes than any other type of motivation. This is similar to the study by Brickell and Chatzisarantis (2007), who found that identified motivation was the only significant predictor for physical activity behavior. In the current study there was no difference between intuitive and nonintuitive eaters and the level of identified regulation motivation they experienced.

Another possible explanation for this outcome could be that perhaps enough of the entire sample was already maintaining their physical activity, regardless of eating style, that no significant difference was detected. A research study done by Thogeresen-Ntoumani and Ntoumanis (2006) using the Stages of Change Theory (Prochaska & DiClementi, 1982), found that individuals in the maintenance stage for physical activity

had significantly higher intrinsic, identified, and introjected regulation motivation. Therefore, if the sample used for this study was already in the maintenance stage, there may not have been any difference between eating style and physical activity maintenance. It could be that if data were collected using a stages of change model, it may illuminate what stage the sample was in and could possibly help gain insight in to these particular results for this research question.

The current sample may have also been different to other populations in several different ways. First of all, the sample was composed of college aged women, most being 19 years old and freshman, who may feel more pressure to engage in regular physical activity to maintain a slimmer appearance for dating or social reasons. Second, the college campus that they attend heavily advertises a "Be Well" campaign that addresses physical activity guidelines and ways to engage in healthy behaviors. Lastly, the campus provides exercise facilities and physical activity classes, which could help relieve time, monetary, and motivation barriers to engaging in regular physical activity.

Research Question Three

Research question three was designed to examine the differences between intuitive and non-intuitive eaters, while looking in greater detail to the different levels of motivation to engage in physical activity. Previous research has shown that as individuals increase in their levels of self-determination motivation, they also increase in their physical activity engagement (Brickell & Chatzisarantis, 2007). Other research has also shown that as individuals become more intuitive in their eating, they also increase their physical activity engagement (Bacon et al., 2005). Research question three asked

specifically about identified and intrinsic regulation motivation, the two highest forms of motivation on the self-determination motivation continuum.

A significant difference was found only between intuitive and non-intuitive eaters when looking at intrinsic regulation motivation. There was no significant difference between the two groups when looking at identified regulation motivation. To further understand these findings, and to aid in explaining them, analyses on all levels of the self-determination motivation continuum for physical activity were conducted.

Outcomes from these analyses showed that individuals reporting lower levels of intuitive eating experienced lower self-determination motivation for physical activity, individuals reporting higher levels of intuitive eating experienced higher self-determination motivation for physical activity, but at a certain point there was no difference between the two groups. Where no difference was detected, was at the identified regulation motivation point on the continuum.

Deci and Ryan (1985) defined intrinsic regulation motivation when an individual will freely choose to participate in an activity simply because they enjoy it, they are interested in it, and they receive inherent satisfaction from doing it. Identified regulation motivation is when an individual will start to identify a behavior as their own, and they will start to recognize the importance of the behavior. They create goals to maintain the behavior, and they value the behavior.

Previous research has found that identified motivation has significantly more influence on physical activity behavior than any other type of motivation (Wilson et al., 2004). These researchers also stated that this was not surprising, when one considers that physical activity is not always intrinsically motivating. In the times it is not, an

individual may rely on their identified motivation to engage in the behavior, regardless if they are intuitive or not. So while the current study found a significant difference between intuitive and non-intuitive eaters and their level of intrinsic motivation for physical activity, perhaps intuitive eaters rely on identified motivation to engage in physical activity, just as much as non-intuitive eaters. This could explain the significant differences between intuitive and non-intuitive eaters in the lower levels of motivation, as well as the phenomenon happening in the upper end of the continuum.

Support for this comes from the study by Avalos and Tylka (2006), as mentioned previously, who found that body function and body appreciation were predictors of intuitive eating. Body function and body appreciation refer to an individual who is in greater harmony with their bodies needs. Individuals who were classified as non-intuitive could possibly feel motivated to engage in physical activity because they do not want to deal with the guilt, anxiety, or social stigmatism for not being physically active. These are all adjectives that describe the pressures that would motivate an individual for physical activity on the lower end of the self-determination continuum.

College-aged women are constantly bombarded with messages through media and social avenues that restrictive eating and physical activity are required to look an ideal way (Ackard et al., 2002; Keel et al., 2007). These messages could possibly be diminishing their internal cues for intuitive eating, which could then affect their ability to focus on their body's functions. It could also make it difficult to fully appreciate their body. This would mean that women could be focusing more on the lower end of the self-determination continuum to engage in their physical activity. However, perhaps when

these barriers are overcome, individuals are able to be both intuitive, thus having greater intrinsic motivation.

Table 9 is a representation of all research questions asked, data analyses results, supporting literature, and opposing literature found. More detailed information on the data analyses can be found in Chapter IV. This section has discussed the outcomes for the current study. The next section will examine the implications this study may have on health educators.

Table 9

Research Questions, Data Analyses Results, and Other Similar Research to the Present Study

Research question	Data analysis results	Supporting literature	Opposing literature
1. Does an intuitive eating style among female college students predict an intrinsic regulation style of motivation to participate in physical activity?	Intuitive eating does significantly predict an intrinsic regulation style of motivation to participate in physical activity.	Bacon et al. (2005) Brickell & Chatzisarantis (2007) Wilson et al. (2004) Wilson & Rodgers (2002)	
2. Is there a correlation between eating style and physical activity maintenance?	There is not a statistically significant correlation between eating style and physical activity maintenance.		Wing & Phelan (2005) McLean and Barr (2003) Ackard et al. (2002) Bacon et al. (2005) Brickell & Chatzisarantis (2007) Thogersen-Ntoumani & Ntoumanis (2006) Wilson et al. (2004)

(table continues)

Research question	Data analysis results	Supporting literature	Opposing literature
3. Do intuitive eaters experience more identified regulation motivation and intrinsic regulation motivation to participate in physical activity, as compared to non-intuitive eaters?	Intuitive eaters do experience significantly more intrinsic regulation to participate in physical activity, as compared to nonintuive eaters. There was not a significant difference between the two groups and the identified regulation motivation. All lower levels of motivation showed a significant difference between the two groups.	Brickell & Chatzisarantis (2007) Bacon et al. (2005) Thogersen-Ntoumani & Ntoumanis (2006)	

Implications for Health Education

The results of this study revealed information that may be of use for health education professionals in the future. This study was designed to examine the relationship between intuitive eating and physical activity motivation, and physical activity maintenance. It was shown that intuitive eaters experience greater levels of intrinsic regulation motivation to engage in physical activity. They do not, however, maintain their physical activity more than non-intuitive eaters. Intuitive eaters are not significantly different than non-intuitive eaters in their identified regulation motivation, but they experience significantly less introjected regulation motivation, and external regulation motivation than non-intuitive eaters for physical activity.

The previous chapters of this study have examined past research that has been conducted on restrictive eating, intuitive eating, and physical activity motivation using the SDT. Research has profoundly shown how restrictive eating can negatively impact

individuals psychologically, physically, and emotionally (Ackard et al., 2002; Celio et al., 2006; Joshi et al., 2004; Krahn et al., 2005; McFarlane et al., 1998; McLean & Barr, 2003; Mills et al., 2002; Trottier et al., 2005). It has also shown how individuals who practice an intuitive style of eating tend to be healthier psychologically, physically, and emotionally (Avalos & Tylka, 2006; Gast & Hawks, 2000; Tylka, 2006; Tylka & Wilcox, 2006). Preliminary research on intuitive eating seems promising, and it is possible that individuals may experience positive outcomes from practicing an intuitive eating style. Health educators could possibly help individuals looking for a healthier lifestyle by teaching intuitive eating methods.

Teaching intuitive eating methods include instruction on several habits that would encourage an individual to eat for physiological reasons. Firstly, it is important to reject the dieting mentality that claims that by eating a certain way, weight goals can be met; second, honoring hunger cues, or refamiliarizing ones self with the body's physiological cues for hunger; thirdly, giving ones self permission to eat what is desired, without feeling guilty or anxious; fourth, challenging thoughts that place moral value on foods, such as "good" or "bad"; fifth, recognizing the body's physiological cues for being full; sixth, eating foods that are satisfying, regardless of what the food may be; seventh, learning coping skills for difficult emotions, without using food; eighth, learning to respect one's body, regardless of shape or size; ninth, learn how it feels to be physically active; and lastly, tenth, honoring your body by eating in a nutritiously healthy intuitive manner, meaning eating foods that are satisfying, that taste good, and that will leave a person feeling good and energized in the long run. These are recommendations made by Tribole and Resch (1995) for learning an intuitive eating style.

Besides the mentioned benefits for eating intuitively, the findings of the current study indicate that there is a relationship between eating style and physical activity motivation. Specifically, individuals who eat intuitively experience more intrinsic motivation to engage in physical activity. Individuals who are intrinsically motivated to engage in a behavior do so because they enjoy it, they get inherent satisfaction out of doing it, and they are interested in doing it. Although the current study did not reveal a significant finding between eating style and physical activity maintenance, past research (Bacon et al., 2005) has found that individuals who use an intuitive eating style were able to maintain their physical activity significantly more than non-intuitive eaters.

The U.S. Department of Health and Human Services (2005) report that inactivity in Americans is still relatively high and little progress has been made in improving that, even with the increased push for education on the benefits of physical activity. The current recommendations are for adults to get at least two hours and 30 minutes of moderate intensity aerobic activity a week, as wells as two or more days a week of strength training activities that work all major muscle groups of the body. Health educators should be aware of these recommendations, as well as ways they can improve the probability that individuals will be more likely to maintain physical activity in their lives. If intuitive eating is a pathway that can lead to physical activity maintenance, or if nothing else, a healthier relationship with physical activity, then individuals may benefit from that knowledge.

Along the same line, previous research has found negative ramifications for individuals using restrictive eating programs. Eating disorders are of concern (Celio et al., 2006; McLean & Barr, 2003), as are self-esteem (Joshi, et al., 2004; McLean & Barr,

2003; Trottier, et al., 2005), and the use of other health-compromising methods to lose weight (Celio et al.; Krahn et al., 2005; McLean & Barr). Addictions to physical activity are not uncommon for individuals suffering from eating disorders (McLean & Barr). Again, if a healthier relationship can exist between an individual and their physical activity, health educators should know about it. This healthier relationship, as has been suggested by the current study, can possibly be obtained through an intuitive eating style. When health educators are informed, they are better prepared to teach individuals ways to improve their quality of life.

The current research has shown how eating style can affect a person's life. It has also shown how physical activity motivation can also influence an individual's choice on whether or not they choose engage in physical activity. It is important for health educators to know how eating style and physical activity motivation work together. This section has discussed these implications for health educators. The next section will discuss the recommendations and implications for future research.

Recommendations for Future Research

There were limitations to the present study that may be corrected for future research done on intuitive eating and physical activity. There were weaknesses to the IES that need to be addressed, or perhaps an entirely different scale could be used for future research. Firstly, the intrinsic eating subscale reported a .419 Cronbach's alpha score, indicating that perhaps it was measuring something other than intrinsic eating. This outcome was similar to the original Cronbach's alpha score from the instrument validation test (.420). Additionally, it was determined that the instrument was not a very

sensitive one, due to the classification system for being intuitive or non-intuitive. Using the median as the determining factor put 50% of the sample as intuitive and 50% as non-intuitive. This system would not allow for examining intuitive people scoring on the upper-end from intuitive eaters scoring on the lower-end. One recommendation would be that the IES could be further tested to determine an exact number that would classify individuals as intuitive, rather than using the sample's median.

The present study did not use a random sample, but rather a convenient sample of undergraduate college students. A random sample could help strengthen results, as well as help with generalizability. In addition to a random sample, a sample that is more reflective of the general population could be of value. College students typically live a different lifestyle as compared to individuals who may be established in careers, communities, or have children, which may affect their eating style and physical activity motivation. If the sample included more individuals at different ages and stages of life, results could potentially change. Researchers could recruit in ways to capture a broader demographic.

In addition, it is recommended that researchers address participants about their current level of physical activity when taking the survey. Questions regarding physical activity maintenance were asked, however current physical activity participation may help shed more light on physical activity motivation.

Participants self-reported their physical activity maintenance, and there is a possibility that they may have over- or under-exaggerated this variable. People may do this to avoid negative stereotypes for not being physically active enough or perhaps being

too dependent on physical activity. Another possible recommendation would be to use an observational design to help reduce the amount of error in participant responses.

In addition to the previously mentioned items, it is unknown if an individuals' level of motivation increases directly in correlation as their intuitive eating behaviors increase, or if it is simply the one-shot examination of the current sample. Additional research needs to be conducted, using a longitudinal design to determine whether or not this is true. Non-intuitive eaters would be needed in order to conduct a study where level of motivation for physical activity is measured throughout the study. This would help draw stronger conclusions on the relationship between intuitive eating and physical activity motivation. It would also be beneficial to use a control group/experimental group design with a longitudinal study to further examine this relationship. This could help control for potentially confounding variables.

Summary

This chapter has discussed the results of the analyses conducted on the data. Implications for health educators, as well as recommendations for future research have been proposed. More research is needed to determine how intuitive eaters and non-intuitive eaters experience motivation to engage in physical activity.

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APPENDICES

Appendix A

Intuitive Eating Scale

After honest consideration, please indicate how strongly you agree with each of the following statements.

1= Strongly Disagree
2= Somewhat Disagree
3= Neutral
4= Agree Somewhat
5= Strongly Agree

1. Without really trying, I naturally select the right types of food to be healthy.
   1 2 3 4 5

2. I generally count calories before deciding if something is OK to eat.
   1 2 3 4 5

3. One of my main reasons for exercising is to manage my weight.
   1 2 3 4 5

4. I seldom eat unless I notice that I am physically hungry.
   1 2 3 4 5

5. I am hopeful that I will someday find a new diet that will actually work for me.
   1 2 3 4 5

6. The health and strength of my body is more important to me than how much I weight.
   1 2 3 4 5

7. I often turn to food when I feel sad, anxious, lonely, or stressed out.
   1 2 3 4 5

8. There are certain foods that I really like, but I try to avoid them so that I won't gain weight.
   1 2 3 4 5

9. I am often frustrated with my body size and wish that I could control it better.
   1 2 3 4 5

10. I consciously try to eat whatever kind of food I think will satisfy my hunger the best.
    1 2 3 4 5

11. I am afraid to be around some foods because I don't want to be tempted to indulge myself.
    1 2 3 4 5

12. I am happy with my body even if it isn't very good looking.
    1 2 3 4 5

13. I normally eat slowly and pay attention to how physically satisfying my food is.
    1 2 3 4 5

14. I am often either on a diet or seriously considering going on a diet.
    1 2 3 4 5

15. I usually feel like a failure when I eat more than I should.
    1 2 3 4 5

16. After eating, I often realize that I am fuller than I would like to be.
    1 2 3 4 5

17. I often feel physically weak and hungry because I am dieting to control my weight.
    1 2 3 4 5

18. I often put off buying clothes, participating in fun activities, or going on vacations (hoping I can get thinner first).
    1 2 3 4 5

19. When I feel especially good or happy, I like to celebrate by eating.
    1 2 3 4 5

20. I often find myself looking for something to eat or making plans to eat- even when I am not really hungry.
    1 2 3 4 5

21. I feel pressure from those around me to control my weight, or to watch what I eat.
    1 2 3 4 5

22. I worry more about how fattening a food might be, rather than how nutritious it might be.
    1 2 3 4 5

23. It's hard to resisit eating something good if it is around me, even if I'm not very hungry.
    1 2 3 4 5

24. On social occasions, I feel pressure to eat the way those around me are eating—even if I'm not hungry.
    1 2 3 4 5

25. I honestly don't care how much I weight—as long as I'm physically fit, healthy, and can do the things I want.
    1 2 3 4 5

26. I feel safest if I have a diet plan, or diet menu, to guide my eating.
    1 2 3 4 5

27. I mostly exercise because of how good it makes me feel physically.
1 2 3 4 5

Appendix B

Intuitive Eating Scale Scoring Instructions:

Reverse Score the following items (1=5, 2=4, 3=3, 4=2, 5=1):

2, 3, 5, 7, 8, 9, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26

After reverse scoring the appropriate scale items, add points for each subscale.

Intrinsic	Extrinsic	Anti-dieting	Self-Care
1	7	2	6
4	16	3	12
10	19	5	25
13	20	8	27
	23	9	
	24	11	
		14	
		15	
		17	
		18	
		21	
		22	
		26	
Total	Total	Total	Total

Appendix C

Physical Activity Questionnaire (BREQ)

After honest consideration, please indicate to what extent each of the following items is true for you. There are no right or wrong answers.

	Not true for me	**Sometimes true for me**			**Very true for me**
1. I am physically active because other people say I should be	**0**	**1**	**2**	**3**	**4**
2. I feel guilty when I am not participating in physically activities	**0**	**1**	**2**	**3**	**4**
3. I value the benefits of being physically active	**0**	**1**	**2**	**3**	**4**
4. I am physically active because it's fun	**0**	**1**	**2**	**3**	**4**
5. I take am physically active because my friends/family/spouse say I should be	**0**	**1**	**2**	**3**	**4**
6. I feel ashamed when I am not physically active	**0**	**1**	**2**	**3**	**4**
7. It's important to me to be physically active regularly	**0**	**1**	**2**	**3**	**4**
8. I enjoy my physical activity times	**0**	**1**	**2**	**3**	**4**
9. I am physically active because others will not be pleased with me if I am not	**0**	**1**	**2**	**3**	**4**
10. I feel like a failure when I have not been physically active in a while	**0**	**1**	**2**	**3**	**4**
11. I think it is important to make the effort to be physically active regularly	**0**	**1**	**2**	**3**	**4**
12. I find physical activity a pleasurable experience	**0**	**1**	**2**	**3**	**4**
13. I feel under pressure from my friends/family to be physically active	**0**	**1**	**2**	**3**	**4**

14. I get restless if I don't engage in physical activity regularly	**0**	**1**	**2**	**3**	**4**
15. I get pleasure or satisfaction from participating in physical activity.	**0**	**1**	**2**	**3**	**4**
16. I have engaged in regular physical activity at least 4 times a week for the past 6 months.	**0**	**1**	**2**	**3**	**4**
17. I plan on being physically active at least 4 times a week for the next 6 months.	**0**	**1**	**2**	**3**	**4**
18. I have never been good at maintaining my physical activity regularly.	**0**	**1**	**2**	**3**	**4**
19. I have been physically active for at least 4 times a week for the past 12 months.	**0**	**1**	**2**	**3**	**4**

Appendix D

BREQ Scoring Instructions

As with other measures of the continuum of self-determination, the BREQ/BREQ-2 can be used either as a multidimensional instrument giving separate scores for each subscale, or as a unidimensional index of the *degree* of self-determination, known as the relative autonomy index (Ryan & Connell, 1989). The choice of method will depend upon the research question being asked or perhaps by the constraints imposed by sample size and the intended statistical analyses.

Multidimensional scoring

In order to use the BREQ/BREQ-2 as multidimensional scales, simply calculate the mean scores for each set of items as indicated below (the original BREQ scoring key is given for anyone still using that version).

BREQ

	Items			
External regulation	1	5	9	13
Introjected regulation	2	6	10	
Identified regulation	3	7	11	14
Intrinsic regulation	4	8	12	15

BREQ-2

Amotivation	5	9	12	19
External regulation	1	6	11	16
Introjected regulation	2	7	13	
Identified regulation	3	8	14	17
Intrinsic regulation	4	10	15	18

The Relative Autonomy Index

The relative autonomy index (RAI) is a single score derived from the subscales that gives an index of the *degree* to which respondents feel self-determined. The index is obtained by applying a weighting to each subscale and then summing these weighted scores. In

other words, each subscale score is multiplied by its weighting and then these weighted scores are summed.

For the **BREQ** the weightings are as follows:

External regulation	-2
Introjected regulation	-1
Identified regulation	+1
Intrinsic regulation	+2

Computation of an RAI for the **BREQ-2** is a little more problematic as it comprises an odd number of subscales. For the time being, I recommend applying the following weightings, bearing in mind the need for further research to establish the best way to weight these scales:

Amotivation	-3
External regulation	-2
Introjected regulation	-1
Identified regulation	+2
Intrinsic regulation	+3

It should be borne in mind that an RAI score only makes sense if the subscales do reflect a continuum of ordered variations in self-determination. Empirically, this means that subscale scores should conform to a simplex pattern, with subscales adjacent on the continuum showing stonger positive correlations than non-adjacent subscales. Researchers should check this assumption before using the RAI with their data. It should be noted that the use of the RAI results in a considerable loss of information.

Appendix E

Demographic Questions

Please complete the following questions. Answer the questions to the best of your knowledge.

Do you participate in collegiate athletics? Yes No

Are you pregnant? Yes No

Gender: Male Female

Race/Ethnicity: American Indian or Alaskan Native

White Hispanic or Latino Asian

Native Hawaiian or other Pacific Islander

Black or African American

Age:_____

Freshman Sophomore Junior Senior Graduate N/A

Major of Study:_____

Height_____ Weight_____

Appendix F

Dr. Hawks Letter of Approval

Hi Amy,

Good luck with your research. Please let me know how it turns out.

Have a nice day,

Steve

-----Original Message-----
From: Amy Campbell [mailto:amycampbell512@yahoo.com]
Sent: Wednesday, October 24, 2007 9:59 PM
To: Steven Hawks
Subject: IES

Dear Dr. Hawks,

I met you at USU when you came up to do the brown bag lunch presentation. I was going to use an intuitive eating scale made by Tylka, but I have changed my mind and would like to use your scale. If this is okay, could you possibly send me a copy with the item codes?

Sincerely,

Amy Campbell

Appendix G

Dr. Markland Letter of Approval

Dear Amy,

You are welcome to use the BREQ. Good luck with your thesis.

David.

David Markland, PhD, C.Psychol
Senior Lecturer/Deputy Head of School (Research)
School of Sport, Health & Exercise Sciences
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Email: d.a.markland@bangor.ac.uk
Tel: (01248) 382756
Fax: (01248) 371053
Exercise motivation measurement website:
http://www.bangor.ac.uk/~pes004/exercise_motivation/scales.htm

Appendix H

Permission from the IRB. Will add when obtained.

Appendix I

Date Created: January 7, 2009; Page 109 of 112
USU IRB Approved: 01/21/2009
Approval terminates: 01/20/2010
Protocol Number: 2204
IRB Password Protected per IRB Administrator

Department of Health, P.E., and Recreation
7000 Old Main Hill
Logan UT 84322-7000
Telephone: (435) 797-1490

Letter of Information
Intuitive Eating and its Relationship with Physical Activity Motivation

Introduction/ Purpose: Associate professor Julie Gast, in the Department of Health, Physical Education, and Recreation and Amy Campbell Nielson, a graduate student in HPER are conducting research study to find out more about eating behaviors and physical activity motivation. You have been asked to take part because you are in this class. Participants must be 18 years of age and older to be in this research study. Approximately 400 participants will be involved in this study. It is important for participants to complete the entire survey so that researchers have sufficient data for analysis.

Procedures: If you agree to participate in this study, you will be given an anonymous survey in class about your physical activity and intuitive eating behaviors. The survey may take approximately 20 minutes to complete. You will be asked to return the survey to the student researcher the next time this class meets. Completed surveys must be completely filled out to validate the data. Participants who complete the survey may enter a drawing by putting their name and their instructors name on a separate piece of paper and placing it in a hat. After names are drawn, instructors will distribute to recipients, $20 gift cards which can used at the USU Bookstore. Collegiate athletes and pregnant women will not be included in the data analyses, and therefore may not enter the drawing.

New Findings: During the course of this research study, you will be informed of any significant new findings. If new information is obtained that is relevant or useful to you, or if the procedures and/or methods change at any time throughout this study, your consent to continue participating in this study will be obtained again.

Risks: Participation in this research study may involve minimal risks or discomforts. These include: minimal psychological discomfort from revealing information about eating behaviors and minimal psychological discomfort from revealing information about physical activity behaviors. If you feel extreme discomfort due to the nature of the survey, you may contact the USU Psychology Clinic, free of charge at (435) 797-1012.

Date Created: January 7, 2009; Page 2 of 112
USU IRB Approved: 01/21/2009
Approval terminates: 01/20/2010
Protocol Number: 2204
IRB Password Protected per IRB Administrator

Department of Health, P.E., and Recreation
7000 Old Main Hill
Logan UT 84322-7000
Telephone: (435) 797-1490

Benefits: There may not be any direct benefit to you from these procedures; however, the investigator may learn more about intuitive eating and its relationship with physical activity motivation and physical activity maintenance for better health promotion from health professionals. These findings can help develop health education program.

Explanation & offer to answer questions: Amy Nielson has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may reach Professor Gast at (434) 797-1490.

Compensation: To thank you for your time and for your participation in this research, you may choose to enter a drawing to win a $20 gift certificate to the USU bookstore. Those who do not complete the survey will not be eligible to participate in the drawing. Researchers will use an honor system for participants who complete the survey and want to be in the drawing. If you do not participate or do not complete the drawing, please do not participate in the drawing. There is no monetary cost to participate in this study.

Voluntary nature of participation and right to withdraw without consequence: Participation in research is entirely voluntary and you may refuse to participate or withdraw at any time. Surveys not completed in its entirety will be withdrawn from data analysis.

Confidentiality: Research records will be kept confidential, consistent with federal and state regulations. Only the student researcher and Dr. Gast will have access to data which will be kept in a locked file cabinet at the student researcher's home for three years, then the surveys will be destroyed.

IRB Approval Statement: The Institutional Review Board (IRB) for the protection of human participants at USU has reviewed and approved this research study. If you have any pertinent questions or concerns about your rights or think the research may have harmed you, you may contact the IRB Administrator at (435) 797-0567 or email irb@usu.edu. If you have a concern or complaint about the research and you would like to contact someone other than the research team, you may contact the IRB Administrator to obtain information or to offer input.

Investigator Statement "I certify that the research study has been explained to the individual, by me or my research staff, and that the individual understands the nature and

purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

Dr. Julie Gast	Amy Nielson
Principle Investigator	Student Researcher
(435) 797-1490	(435) 764-0811

Appendix J

Pilot Study Follow-Up Instrument

Were all questions on the Intuitive Eating questionnaire clear?

If no, which ones were not?

How would you correct them?

Were all questions on the Behavioral Regulations Exercise Questionnaire clear?

If no, which ones were not?

How would you correct them?

Any other comments or questions you have regarding this study are greatly appreciated.