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Influences on Active Family Leisure and Its Relationship to Obesity

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Master of Science

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ABSTRACT

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The purpose of this study was to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure and furthermore to explore the nature of the relationship between active family leisure and body mass index (BMI) among adolescents. Adolescents (N = 472) completed an online questionnaire assessing the theory of planned behavior (TPB) variables, active family leisure, individual active leisure, and BMI. Structural equation modeling was used to analyze the data. Tests of direct paths of attitude, subjective norm, and perceived behavioral control to intent indicated these variables were significant predictors of intent to participate in active family leisure. The combination of attitude and subjective norm was the greatest predictor of intent. The TPB was extended to examine the relationship between active family leisure and BMI. There was not a significant relationship; however the TPB did accurately model the behavior of active family leisure. Findings suggest the influence of friends and family is a strong predictor for active family leisure. This highlights the important role families and friends can play to encourage adolescents' participation in active family leisure.

Keywords: active family leisure, adolescents, physical activity, leisure, theory of planned behavior

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Table of Contents

List of Tables

Tables

List of Figures

Figures

Influences on Active Family Leisure and Its Relationship to Obesity

Shallie M. Taylor, M. S.

Peter Ward, Ph. D.

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Abstract

The purpose of this study was to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure and furthermore to explore the nature of the relationship between active family leisure and body mass index (BMI) among adolescents. Adolescents (N = 472) completed an online questionnaire assessing the theory of planned behavior (TPB) variables, active family leisure, individual active leisure, and BMI. Structural equation modeling was used to analyze the data. Tests of direct paths of attitude, subjective norm, and perceived behavioral control to intent indicated these variables were significant predictors of intent to participate in active family leisure. The combination of attitude and subjective norm was the greatest predictor of intent. The TPB was extended to examine the relationship between active family leisure and BMI. There was not a significant relationship; however the TPB did accurately model the behavior of active family leisure. Findings suggest the influence of friends and family is a strong predictor for active family leisure. This highlights the important role families and friends can play to encourage adolescents' participation in active family leisure.

Keywords: active family leisure, adolescents, physical activity, leisure, theory of planned behavior

Influences on Active Family Leisure and Its Relationship to Obesity

Obesity is a growing problem for adolescents. Body weight has increased in adolescents over the last 20 years and is now considered an epidemic by the Institute of Medicine (Institute of Medicine, 2001). Weight-related conditions, which typically are not seen until adulthood, are being diagnosed in children and teens. Illnesses such as diabetes, hypertension, and dyslipidemia are rising in frequency among adolescents. Beyond the physical health consequences, children and adolescents also face weight stigmas and psychosocial problems (Rodearmel et al., 2007).

Active family leisure is one way to incorporate physical activities within the family to combat adolescent obesity. Active family leisure is any non-work activity that is freely chosen, benefits those involved, is participated in with the family, and includes physical movement by the participants (Russell, 1996). If adolescents are involved in regular physical activities with their families, then they are most likely starting to adopt the behavior of living an active lifestyle that reduces the likelihood of becoming obese (Shaw & Dawson, 2001; Rodearmel et al., 2007).

Physical activity has been viewed by many as leisure and as a means to influence an individual's weight, which is often measured by body mass index (BMI; Davidson & Birch, 2002; Sizer & Whitney, 2003). Russell (1996), defined leisure as any non-work activity undertaken in free or spare time, is freely chosen, and has a purpose. Numerous activities such as hiking, biking, or walking can be physically challenging yet are viewed as leisure. In addition, these types of activities have been shown to benefit individuals by decreasing BMI as well as reducing the risk for other chronic illnesses (Thompson, Rehman, & Humbert, 2005). Adolescents can meet their health needs and find enjoyment by participating in physical leisure. Unfortunately, many adolescents are spending their discretionary time participating in passive activities such as playing video games and watching television (Godbey, 1997). The concept of

being active throughout the day is, furthermore, being promoted as a way to participate in active leisure and combat the obesity epidemic (Sallis & Linton, 2005).

Parents have an influence on the leisure patterns their children develop and can promote active family leisure within the home. For many, the home and family environment is the most common arena for the development of habits around leisure activities (Shaw & Dawson, 2001). For example, a family may develop the leisure habit of watching DVDs and eating out on weekends or the active leisure habits of bike riding and skiing together. As parents participate in active leisure with their adolescent children, they model and promote positive behaviors that can influence the adolescent well into adulthood and shape their future lifestyle choices (Thompson et al., 2005). Participating in active family leisure is a way for children and adolescents to develop leisure habits and techniques for being active. These habits and techniques could potentially help them maintain a healthier weight throughout their lives.

The theory of planned behavior (TPB) may explain why adolescents participate in active family leisure. The TPB states that an individual's intent to perform a specific behavior, such as active family leisure, influences the likelihood of actually performing that behavior (Ajzen & Fishbein, 1973). An individual's intent to participate in a certain behavior is influenced by his attitude, subjective norm, and perceived behavioral control toward it (Ajzen & Driver, 1992). A more positive attitude, subjective norm, and perceived behavioral control toward active family leisure would contribute to a stronger intent to participate in active family leisure. For example, examine a family taking a bike ride on a park pathway. If the teenager in the family a) has a positive attitude about bike riding, b) feels that it is important to his family that he be physically active with the family, and c) feels like he is capable of bike riding, TPB suggests he would have a strong intent to participate in the family bike ride. The prospect of the adolescent actually

going on the bike ride would increase. While bike riding, the adolescent is involved in active family leisure which combats obesity by contributing to the development of a healthy, physically active lifestyle and the likelihood of the adolescent maintaining a healthy weight. Therefore, the purpose of this study was to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent, how intent effects participation in active family leisure, and furthermore to explore the nature of the relationship between active family leisure and BMI among adolescents.

Review of Literature

Active Family Leisure

Active family leisure is one way to incorporate physical activity through leisure with the family and may teach adolescents the healthy behavior of an active lifestyle (Shaw & Dawson, 2001; Rodearmel et al., 2007). Telema, Yang, Laakso, and Viikari (1997) stated that adolescence is the time when physical activity skills, attitudes, values, and behaviors are developed. Youth develop patterns of physically active leisure behavior often in the family setting and these behaviors are thought to continue on into adulthood (Scott & Willits, 1998). Benefits of active family leisure include decreased likelihood of obesity, increasing family cohesion, adaptability, and overall family functioning (Dodd, Zabriskie, Widmer, & Eggett, 2009; Sizer & Whitney, 2003). To understand active family leisure, several components must be explored: physical activity and the perception of the activity as leisure.

Physical activity. Physical activity has numerous physiological and psychological benefits. Physical activity is any activity that makes your body muscles work harder than normal and increases energy expenditure (Goldberg & King, 2007; USNLMNIH, 2009). High self-esteem and lower levels of stress and anxiety are seen in youth who are physically active (Van

Der Horst, Paw, Twisk, & Van Mechelen, 2007). Children and adolescents who participate in regular physical activity also have lower blood pressure, weigh less than those who do not participate in regular physical activity, and have higher bone mineral densities (Purslow, Hill, Saxton, Corder, & Wardle, 2008). There is also some evidence that physical activity can increase academic performance in the form of better grades and higher scores on standardized tests (Strong et al., 2005).

Daily physical involvement through active family leisure is a critical part of weight gain prevention, weight loss, and weight maintenance throughout the life span (Goldberg & King, 2007; Simon et al., 2008). Because of technological advances such as television, computers, and home gaming systems, energy expenditure on a daily basis has decreased (Bouchard, 1997; Pergams & Zaradic, 2006; Prentice & Jebb, 1995). Sedentary activities have drastically increased in the family setting which has produced a "net decline in overall levels of physical activity" (Goldberg & King, p. 148). Strauss, Rodzilsky, Burack, & Colin (2001) found that 76% of children's leisure time was spent doing inactive activities. The U. S. Surgeon General has labeled these types of activities as a *hazard to your health* (Rennie, Johnson, & Jebb, 2005; USDHHS, 1996). Active family leisure is one venue that can be used within the home to combat a sedentary life style.

In an effort to prevent the sedentary lifestyle, researchers have begun to study the concept of active living. "Active living is a way of life that integrates physical activity into daily routines" (Sallis, Linton, & Kraft, 2005). Every movement a person makes burns calories. The more active a person is the more calories used by the body (Wardlaw & Smith, 2006). Active family leisure activities are an enjoyable way to increase daily movement. Leisure has a great potential to increase participation in daily physical activity because leisure has meaning beyond

exercise (Godbey, Caldwell, Floyd, & Payne, 2005). Active family leisure creates opportunities to be physically active in ways that are not considered exercise, but rather leisure.

Leisure. One way to view leisure is to consider it from the perspective of the use of discretionary time and the incorporation of physical activity (Godbey et al., 2005). Biking, hiking, playing a game of tag, and many other activities can be enjoyable ways to spend leisure time while simultaneously increasing physical activity and the energy expended by the body. This increased energy expenditure may be a way to meet daily physical activity requirements through leisure and influence weight.

Parents are influential in their children and adolescents participation in physically active leisure. Thompson et al. (2005) found that children of all ages are significantly influenced by their parents to participate in physically active leisure. Parents may be highly influential because home and the family are the most common arenas for leisure activities (Kelly, 1993; Shaw, 1997; Shaw & Dawson, 2001). Parents' influence may come through role modeling physical activity but also by encouraging their youth to play organized physical activities and sports (Thompson et al.). Shaw and Dawson found that parents felt active family leisure was a way to keep their children physically fit and to expose them to activities and lifestyle patterns that will benefit them in the future. Richter et al. (2000) concluded that the social environment, specifically family practices, play a role in the physical activity of children and youth. Thus the family, specifically parents, has a dramatic influence on adolescents' leisure involvement. Studies, however, have not expanded the role of active family leisure directly related to obesity.

Adolescent Obesity

In 2004, obesity for adolescent youth was estimated to be 17.4%, which had risen from the 1974 estimate of 6.1% (DHHSCDCP, 2007). Data from the National Health and

Nutrition Examination Survey (NHANES) estimated that another 15% of children are at risk of becoming overweight (DHHSCDCP, 2007; Rodearmel et al., 2007). Adolescent obesity is measured using body mass index (BMI) which has been found to be a valid and reliable measure. Adolescents who have a BMI, at or above the 95th percentile are classified as being obese (DHHSCDCP, 2008). Teaching adolescents to establish positive health behaviors and lifestyles is crucial to preventing the occurrence of chronic diseases and reducing the obesity epidemic (Pan American Health Organization, 2005).

Families can have an influence on an adolescent's tendency toward obesity. Family members share similar behavioral risk factors, such as low amounts of engagement in physical activity that can lead to weight gain (Davidson & Birch, 2002). Children often learn these risky behavior patterns by watching and modeling their parents (Golan, Weizman, Apter, & Fainaru, 1998; Klohe-Lehman et al., 2007). Parents who walk or ride their bike to pick up children after school or from sporting events model an active family life; in addition, many of these activities could be considered leisure. Active family leisure is one way for parents to model healthy behaviors such as physical activity and to combat adolescent obesity.

Theory of Planned Behavior

The theory of planned behavior (TPB) may be useful in predicting whether adolescents will participate in active family leisure. The TPB's central tenet focuses on an individual's intent to perform a specific behavior and the relationship between intent, attitudes, subjective norms, and perceived behavioral control (Fishbein & Manfredo, 1992; Sas-Nowosielski, 2006). Ajzen and Driver (1992) suggested the TPB could be a useful theory to study leisure because leisure behaviors can easily be defined; and attitudes, subjective norms, and perceived behavioral control can predict intentions to perform leisure activities. The TPB has also been used to

understand youth physical activity (Shen, McCaughtry, & Martin, 2008). Martin et al. (2005) found that youth who have positive attitudes about physical activity, perceive that others expect them to be physically active, and feel they have control over their physical activities have high intention to participate in physical activity. Thus, the TPB establishes a sound fundamental framework to study adolescent intent to participate in active family leisure activities and whether active family leisure influences weight.

Intent is defined as an individual's readiness to perform a given behavior (Ajzen & Driver, 1992). For this study, the specific behavior being examined is adolescent participation in active family leisure. Intent is influenced by attitude, subjective norm, and perceived behavioral control (Ajzen & Driver, 1991; Figure 1).

Attitude is defined as "an individual's general affective and cognitive orientations toward a given behavior" (Shen et al., 2008, p. 843). Attitude results from salient beliefs about the consequences of participating in a specific behavior. These beliefs result in a favorable or unfavorable attitude toward the behavior (Ajzen & Albarracin, 2007; Connor & Sparks, 2005).

Subjective norm is "the perceived social pressure to perform or not to perform the behavior" (Ajzen & Driver, 1991, p. 188). Subjective norms are based on the perceived expectations from referent groups such as peers and family members as to whether a particular behavior should be engaged in or not. A person's motivation to comply with these perceived expectations also influences subjective norm (Ajzen & Albarracion, 2007; Connor & Sparks, 2005).

Perceived behavioral control, the third element that contributes to intent, refers to the perceived capability of performing the behavior based on past experiences, anticipated impediments, and obstacles (Ajzen & Driver, 1991). A person bases their capability to perform a

behavior by taking into account factors that may further or hinder their ability to perform the behavior (Ajzen & Albarracion, 2007). These factors can be internal, such as information, skills, abilities and emotions, or external, such as opportunities, dependence on others, and barriers (Connor & Sparks, 2005). Perceived behavioral control is similar to Albert Bandura' construct of self-efficacy, but differs in operationalization (Ajzen & Albarracion, 2007). Perceived behavioral control tends to focus on the capability of the individual while self-efficacy is centered on task difficulty (Ajzen & Albarracion; Motl et al., 2002).

Attitude, subjective norm, and perceived behavior control influence intent, which then influences performance of the behavior. The TPB also posits that perceived behavioral control can influence behavior directly (Sas-Nowosielski, 2006). Several assumptions are made about how intent is influenced. First, it is assumed that humans can think about and understand information that is given them (Fishbein & Manfredo, 1992). The theory does not assume that the person makes reasonable or correct judgments with the information. It only postulates that the individual is capable of processing information (Sharma & Romas, 2008). The second assumption is that the behavior must be something the individual has a choice to participate in or not. This can be problematic because many behaviors are not completely autonomous, for example youth often are required to do things by their parents that are not fully volitional (Sharma & Romas).

The leisure studies and recreation and park management field have conducted little research on the physical health benefits of family leisure (Godbey et al., 2005). In an issue of *Leisure Sciences* dedicated to research on active lifestyles, Sallis and Linton (2005) called on leisure professionals to collaborate with public health professionals in studying active lifestyles in order to help combat the increasing health concern of physical inactivity which can lead to

obesity. An adolescent intent to participate in active family leisure may be driven by the adolescent's attitude toward being physically active with the family, subjective norms or social influences, and perceived behavioral control. Therefore, the purpose of this study was to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure and furthermore to explore the nature of the relationship between active family leisure and BMI among adolescents.

Methods

Study Sample

The participants consisted of a nationally representative sample of 472 adolescents who were between the ages of 10 to 20 (M = 15.11, SD = 2.35). There was approximately equal numbers of males (n = 215) and females (n = 257). The majority of the participants were White (n = 370) followed by African American (n = 43), Hispanic (n = 35), and Other (Asian, Pacific Islander, Native American, and Other; n = 24).

Data Collection Procedures

A questionnaire that addressed intent, attitude, subjective norm, perceived behavioral control, active family leisure, individual active leisure, BMI, and general demographics was posted online using Qualtrics. Online data collection procedures were chosen because of the ability to gain a nationally representative sample. Online data collection has similar limitations to other methods of self-report data collection (Ward & Buswell, 2009). A link to the online questionnaire was given to Survey Sampling International who then forwarded that link to parents of qualifying adolescents in its research database. Parents then asked their adolescent to participate in the study. Survey Sampling International randomly drew from its data base of potential participants until the target sample size of 500 participants had completed the

questionnaire. Once 501 surveys had been collected, the data were downloaded from the Qualtrics site into SPSS 18 and AMOS 18 to be analyzed.

Instrumentation

Numerous instruments were used to measure the variables: (a) four questionnaires to measure the TPB constructs, (b) BMI to measure obesity, and (c) the Godin Leisure Time Exercise Questionnaire to measure active family leisure and individual active leisure. The TPB items were based on guidelines given by Ajzen (2004) and Ajzen and Madden (1986). The instruments' validity and reliability has been demonstrated through its use in youth physical activity research (e.g., Martin et al., 2005; Martin, McCaughtry, & Shen, 2008; Shen et al., 2008). The TPB questionnaires were used to measure attitude, subjective norm, and perceived behavioral control's influence on adolescents' intent to participate in active family leisure and how this intent affects behavior (active family leisure). Participants responded to these items on a 7-point Likert scale. Attitude was measured using three items with the anchors *unhealthy/healthy*, *good/bad*, and *enjoyable/unenjoyable.* Subjective norm asked the participant to complete two pairs of questions. The first question of each pair assessed the beliefs of the peers or family members with the anchors *strongly disagree/strongly agree*. The second question of the pair measured the participant's motivation to comply with the beliefs and was anchored by *not at all important/very important*. Perceived behavioral control items asked participants to answer four questions. The first and fourth questions were anchored by the terms *strongly disagree/strongly agree*. The second question was anchored by *impossible/possible* and the third question by *no control/complete* control. The anchors used to measure intent were *definitely false/definitely true* for the first two items and *definitely do/definitely do not* for the last

item. The TPB model was then extended beyond the behavior of active family leisure to examine its influence on adolescent's obesity.

Obesity was operationalized as BMI. Body mass index was calculated by taking weight in kilograms divided by height in meters squared. The BMI score was plotted on Center for Disease Control (CDC)-BMI-for-age growth charts that were gender specific. From these charts, adolescents were given a percentile ranking. The childhood and adolescent percentile ranking is a measure of fatness compared to adolescents of the same age and gender. The BMI percentile rankings were then transformed into Z scores as directed by the CDC in order to normalize the data for analysis (DHHSCDCP, 2009).

The Godin Leisure Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) is typically used to measure individual leisure time physical activity. This study, however, modified these instruments to measure adolescents' active family leisure by adding the phrase *with my family* to the items. To collect individual active leisure, the phrase *individually, with your friends, or with a team* was inserted into the GLTEQ questions. The GLTEQ has been shown to be a valid and reliable measure of physical activity in children and adolescents (e.g., Martin et al., 2005; Sallis, Buono, Roby, Micale, & Nelson, 1993; Shen et al., 2008).

Participants completed the GLTEQ by reading the header "How many times in an average week do you do the following kinds of activities with your family for more than 15 minutes during your free time?" and then responded to three statements of physical activity levels: strenuous (unable to talk while participating in the activity), moderate (can talk, but with a little difficulty), and mild (no difficulty talking). Answers for strenuous, moderate, and mild were then multiplied by 9, 5, and 3 metabolic equivalents (METs; the amount of energy used in physical activity), respectively, and summed to create a total active family leisure score.

Answers for the questions regarding leisure activities that were participated in individually, with peers, or with a team were multiplied and summed in the same manner to create a total individual active leisure score. The final question was "In an average week, during your free time, how often do you do any physical activity with your family during your leisure time long enough that it causes you to sweat (make your heart beat quickly)?" Participants marked one of the following three choices: often, sometimes, never/rarely. This item was used as a check to add validity to the self-reported responses to the GLTEQ.

Data Analysis

Data were first screened and cleaned for improbable outliers within the given ranges. Based on the screening, participants who did not meet the established criteria were eliminated prior to analysis. Twenty-nine cases were eliminated because they did not meet inclusion criteria. Structural equation modeling was conducted using a maximum likelihood estimation technique in Amos 18.0 to evaluate the model. Maximum likelihood estimation was used because it is robust even when the data are not normally distributed (Chou & Bentler, 1995).

As specified by the model, direct paths were placed from attitude, subjective norm, and perceived behavioral control to intent, from perceived behavior control to behavior, from intent to behavior, and finally the model was extended beyond the TPB framework to include a direct path from behavior to obesity. In addition, attitude, subjective norm, and perceived behavior control were allowed to correlate (Figure 2). A four step approach (Kline, 2005) was used to estimate the relationships of attitude, subjective norm, perceived behavioral control on intent and intent on behavior leading to obesity. First, model specification tested if the structural model was consistent with the data. This involved building a path diagram and testing it. The path analysis first tested deleted paths based on the theory, tested the specified paths, and finally

trimmed the model. Revisions to the path diagram were based on both theory and statistical diagnostics. Second, was to revise the measurement model if needed. Confirmatory factor analysis (CFA) was used to test attitude, subjective norm, perceived control, intent, and active family leisure. A CFA did not test obesity. This variable was measured by BMI exclusively. Third, model estimation combined the path diagram and CFA to construct the hybrid model. Analysis was done to test the specified paths and trim paths based on the model's theory and statistical diagnostics. Fourth, the model's fit was estimated using model fit indices to determine if the modified model was better than the null (Kline).

As recommended by Kline (2005) a variety of conservative model fit indices were examined to evaluate overall model fit. First, a chi-square test. A nonsignificant chi-square statistic is unlikely (Kline) and a significant chi-square test is typically not used to reject a model because of the large sample size. To account for the expected large sample size a χ^2 / df ratio was examined. The comparative fit index (CFI) was considered to evaluate the model's absolute or parsimonious fit relative to the null or hypothetical model. An index score of .95 or greater is desired. The root mean square error of approximation (RMSEA) was considered to assess fit based on the magnitude of the residuals. An index score of .08 or less is desired.

Results

The majority of the adolescents in the study were from family sizes with four or five members (59.9%). Families with three members were 20.3% followed by families of six (9.7%), seven or greater (5.6%), and two or less (4.2%). Sixty-one percent of the sample reported living in an intact family with parents with or without siblings in the home. Twenty percent lived only with their mother with or without other siblings. Respondents living with a biological parent and a step parent with or without siblings were 13%. The remainder of the sample reported living in

a different family situation. When participants were asked if they felt their families had enough money to provide for their needs 82.4% agreed and 59.1% responded to having some or most of their wants satisfied. On the extremes, 13.6 % felt they did not have their needs provided and 4% felt they had all of their needs and wants provided. Approximately 75% were satisfied with their family life. When asked about their family's obesity history, 43.4% said obesity was a factor in their families while 48.3% said it was not. Approximately 8% were not sure if they had obesity in their families. Approximately one-third of participants reported one or both parents were considered obese. Means and standard deviation for attitude, subjective norm, perceived behavior control, intent, total active family leisure, and total individual active leisure can be found in Table 1. The estimates of skewness and kurtosis were acceptable for all the variables.

The just identified path analysis tested TPB in relationship to active family leisure (Fam Leis) and obesity (BMIZ). The path analysis yielded the following relationships at the .05 alpha level: attitude (Att) to Intent (b = .158), subjective norm (SN) to Intent (b = .637), perceived behavioral control (PBC) to Intent (b = .140), and Intent to Fam Leis (b = .322). Fam Leis to BMIZ was not a significant path; however, the path was retained based on established theoretical relationships. All remaining paths were trimmed from the model. Moderately positive correlations were present between SN and Att (r = .562), PBC and Att (r = .534), and SN and PBC (r = .473).

Confirmatory factor analyses (CFA) were conducted for Att, SN, PBC, Intent, Fam Leis, and individual active leisure (Ind Leis). A CFA was not done for BMIZ because this is a directly measured variable. All the CFAs had beta weights that were significant and ranged from .370 to .934 (See Table 2). All the individual CFA models had an acceptable check fit indices of chi-square/degrees of freedom of less than three (Kline, 2005; Tabachnick & Fidell, 2001).

The hybrid model, a combining of the path analysis and measurement model, was tested. This initial model resulted in a strong positive correlation of SN and Att (r = .810), thus these constructs were collapsed, as recommended by Kline (2005), into the new variable subjective norm/attitude (SN & Att) and used in further analysis. The new variable's (SN & Att) CFA had a satisfactory fit with the chi-square/degrees of freedom and beta weights of indicator items ranging from .453 to .889. The structural equation model yielded the following results at a .05 alpha level: SN & Att to Intent and Intent to Fam Leis. PBC to Intent was significant at .1 alpha level (Figure 3). Fam Leis to BMIZ was not a significant path. The correlation between SN & Att and PBC was moderately positive. The covariance of estimates are provided in Table 3. Fit indices for this model were acceptable using CFI = .967 and RMSEA = .051. Hoelter was used due to the large sample size which suggested the model would have not been significant using chi-square as a fit index with a sample size of 260, suggesting the model's significance was not driven by its large sample size.

A post-hoc analysis was conducted to control for the effects of participants' individual active leisure, hereditary obesity history, and general social demographics on activity family leisure and the influence it may have on BMIZ. These control variables did not make a significant contribution to the model and were thus trimmed. However, a significant post hoc model that included individual active leisure as an indicator to active family leisure was found (Figure 4). This model yielded the following results at a .05 alpha level: SN & Att to Intent and Intent to Fam Leis. PBC to Intent was significant at .1 alpha level. Fam Leis to BMIZ remained not a significant path. The correlation between SN & Att and PBC was moderately positive. The correlations between SN & Att and Ind Leis and PBC and Ind Leis were weakly positive. Fit indices for this model were acceptable using CFI = .963 and RMSEA = .047. Hoelter was

used due to the large sample size which suggested the model would have not been significant using chi-square as a fit index with a sample size of 273.

Discussion

The purpose of this study was to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure within the TPB framework and furthermore to extent the TBP to explore the nature of the relationship between active family leisure and adolescent BMI. Subjective norm and attitude were strongly, positively correlated and thus collapsed into a single variable. Statistically significant relationships were found between the combined variable subjective norm/attitude, perceived behavioral control, intent, and active family leisure as was predicted by the TPB. This sample, however, showed no significant relationship between active family leisure and adolescent body weight; despite controlling for participants' individual active leisure, hereditary obesity history, and general social demographics. Thus, the TPB accurately modeled the relationship between subjective norm/attitude and perceived behavioral control to intent and intent to active family leisure, but the theory could not be extended beyond the behavior of active family leisure and its traditional framework to include adolescent weight.

Attitude and subjective norm were combined because they were strongly, positively correlated (r = .833). The TPB states that subjective norm and attitude are related but different variables (Connor & Sparks, 2005). However, Miniard and Cohen (1981) have noted that the distinction between the determinants, or indirect measures, of attitude and subjective norm is undetermined, thus suggesting error may be shared between these two constructs. These determinants are often highly correlated and scholars have argued that subjective norm and attitude are closely related, if not the same construct (O'Keefe, 1990, Trafimow, 2007). With

this particular sample, highly correlated shared error between attitude and subjective norm may have been present and unable to be accounted for within the Martin et al.'s (2005) instrument. Suggesting, adolescents may not be able to distinguish between the attitude that it is good to participate in active family leisure and the perceived family pressure to participate based on the reason that it is what the family does. This shared error may have been influencing the direct independent measures of attitude and subjective norm.

Subjective norm combined with attitude was the greatest contributor to an adolescent's intent to participate in active family leisure; which varies from studies which have shown perceived behavioral control to be the stronger predictor (Hagger, Chatzisarantis, & Biddle, 2002). Ajzen (1991), however, stated that the prediction power of attitude, subjective norm, and perceived behavior control will vary across behaviors and situations. Also, perceived behavior control is less predictive when a strong subjective norm is present (Connor & Sparks, 2005). Meaning, the influence of subjective norm will override the other influences. During adolescence, behavior is often driven by what youth have become accustomed to. If families' general standard is that participation in active family leisure is expected, then the youth may be participating based on what they perceive as the established subjective norm. Furthermore, if the same standards are held in their peer groups, these attitudes and subjective norms may have a great influence on adolescent's intent to participate. This logic makes sense for adolescents because they are often highly influenced by the opinions and attitudes of their family and friends (Muuss, Velder, & Parton, 1996). The friends and family influence would appear to be strong for active family leisure which lessened the strength of their perceived ability to participate in active family leisure. This highlights the important role families and friends can play to encourage adolescents' intent to participate in active family leisure.

Active family leisure did not significantly contribute to adolescents' BMI. This is worthy of note because physical activity is often intuitively related to weight (Anderson, Franckowiak, Christmas, Walston, & Crespo, 2001; Davidson & Birch, 2002; Kruger, Yore, Kohl III, 2007). This could be explained because families are becoming increasingly busy and there is not the time to participate in active family leisure (Daly, 1996). The limited leisure time families do have together is often spent participating in sedentary activities such as watching television or playing video games. The trend of reduced active family leisure time may result in active family leisure not being a meaningful enough aspect of adolescents' lives to have an influence on their BMI. A second reason active family leisure may not have contributed to an adolescent's body weight is diet. Numerous studies have linked both physical activity and diet as contributors to obesity (Heber, 2010; Rodearmel et al., 2007). The participants' diet could have counteracted benefits received through their active family leisure. For example, families may participate in an active family leisure such as swimming together for an afternoon. They then often desire to continue the leisure experience once they return home through eating high calorie foods (i.e. getting a treat afterwards). Thirdly, is the established poor measurement of adolescent BMI. It is already well documented that adolescent BMI needs further work to accurately be measured (DHHSCDCP, 2010).

Active leisure activities may be a subset of having an active family. Families that are active together through their leisure time may also incorporate physical activity into daily life (such as walking to the corner store instead of driving). Furthermore, parents often establish the family environment. Parents who continuously model active family leisure foster the attitudes that active leisure is important. Also, if active leisure is discussed and adolescent family

members are expected to participate in active family leisure, then the subjective norm of this behavior becomes part of the family environment.

In a post-hoc analysis, individual active leisure was found to have a significant direct effect on active family leisure. This strong positive relationship (b = .618) presents the idea that individual leisure and family leisure do not have to be in opposition to each other; they can be complimentary. Adolescents who participate in individual active leisure may play a role to encourage the family to be engaged in active family leisure. Youth who pursue individual active leisure likely enjoy this type of recreation and will want their family to also participate with them. For example, an adolescent that enjoys playing basketball with friends, will likely ask parents and other family members to play basketball with him. This individual desires to share his personal leisure enjoyment with his family and thus encourages his family to participate. Conversely, adolescents who are inactive in their individual leisure likely will have low levels of active family leisure and desire their family to participate in sedentary recreational activities. This could possibly be explained through the family environment. Families that place high value on being physically active may encourage their adolescent to become involved in individual active leisure as well as active family leisure. Families that create a sedentary lifestyle may not convey the importance of being active as a family or individually in leisure time.

Limitations

This study had several limiting factors. Collecting data from only adolescents limited this study. Adding the parental perception of time spent in active family leisure would have been a way to check the reliability of the data. A second limitation was using self-report data for BMI. This method, while commonly used, would have been more accurate if the researcher had been able to weigh and measure each adolescent reducing the likelihood of self-reported error or

respondents' estimates about their height and weight. A third limitation was the diversity of the sample. While effort was made to collect a diverse sample, the majority of the adolescents were white with at least a middle class social economic status.

Direction for Further Research

Further research on active family leisure is needed in many areas. Few studies beyond this one have addressed active leisure in the family. Further exploration is needed to better understand what it means to have an active family. The role individual active leisure may play to encourage active family leisure should be further investigated as well. Instrumentation should be developed to better measure and understand how families participate in active leisure activities. Along with measuring active family leisure, studies should include the measurement of diet. Energy expended in physical activity can be counteracted by what is eaten; thus it is needful to account for diet to determine the net health benefits associated with active family leisure.

Implications for Practice

The results of this study indicated that adolescents are participating in active leisure more on an individual basis than they are with their families. Where family was once the source of leisure activities (Shaw & Dawson, 2001), it appears to be moving away from the family and towards opportunities provided by the community. City sponsored programs, for example youth sports teams, are providing adolescents with active leisure. Program directors must find ways to promote participation because youth are less likely to participate in physical activities at home where many sedentary leisure activities such as the PC, TV, and gaming system are readily available. Community recreation professionals could work to increase active family leisure by providing active leisure activities that involve the whole family. For example, sponsoring family bike rides or family day at the park may help to change the way families spend their leisure time.

If within the family setting, children are being taught that leisure activities are active instead of sedentary, they likely will adapt this model for future leisure activities.

The greatest influence on adolescents' intent to participate in active family leisure was the influence of parents and peers. Targeting parents and helping them realize the importance of being active as a family and role modeling active leisure will in turn influence their adolescents to participate in more active leisure. Recreation professionals can influence parents by promoting active family leisure at individual active leisure events where parents will likely be in attendance. Announcers or coaches can encourage parents to go home and try the activity as a family or practice with their child on the team. Parents who role model active family leisure place value upon participation in such activities. For example, parents that gather the family to practice baseball with the adolescent convey the message that active family leisure is important. This value placed on active family leisure by the parents teaches the adolescent to develop the same value. Values taught in adolescence often continue throughout the adult years. Adolescents who value active family leisure participate in active leisure with the family will likely model active family leisure in their future family.

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Table 1

Means and SDs for TPB Variables, Active Family Leisure, and Individual Leisure

Variable	M	SD
Att	5.31	1.24
SN	21.10	12.66
PCB	5.26	1.24
Intent	4.46	1.68
Fam Leis	25.77	32.091
Ind Leis	56.25	40.37

Note. All variables had $p < .05$

Table 2

Confirmatory Factor Analyses of TPB variables, Active Family Leisure, and Individual Active Leisure

Variable	Beta Weights
Attitude (Att)	.649 to .843
Subjective Norm (SN)	.463 to .871
Perceived Behavioral Control (PBC)	.438 to .870
Intent	.787 to .934
Active Family Leisure (Fam Leis)	.553 to .836
Individual Active Leisure (Ind Leis)	.370 to .816

Table 3

Covariance of Estimates

Covariance of Estimates

	Attgood_1	atthealth_1	Attenjoy_1	SNpeerl_1	SNpeer_1	SNfaml_1	SNfam_1	PBCwant_1	PBCme_1	PBCcontr_1	PBCupto_1	Itry_1	Idec_1	Iplan_1	BMIZ	fstrenm	fmodm	fmildm	Indstenm	Indmodm	Indmildm
Attgood_1	2.133																				
atthealth_1	1.274	2.125																			
Attenjov_1	1.245	1.045	2.424																		
SNpeerl_1	.276	.711	.753	4.324																	
SNpeer_1	.709	.639	1.324	2.380	3.560																
SNfaml_1	1.213	1.031	1.629	1.486	1.724	3.077															
SNfam_1	1.121	1.052	1.398	1.348	1.606	2.164	2.831														
PBCwant_1	1.243	.947	1.112	.540	.886	1.113	1.245	2.679													
PBCme_1	1.175	.906	1.240	.701	1.020	1.228	1.368	1.570	2.355												
PBCcontr_1	.451	.360	.797	.525	.922	.653	.826	1.055	1.196	2.482											
PBCupto_1	.384	.539	.684	.296	.589	.507	.783	1.006	.925	1.536	2.510										
Itry_1	1.053	.983	1.395	1.868	1.841	1.901	1.780	1.216	1.251	.792	.540	3.236									
Idec_1	1.130	.791	1.695	1.710	1.936	2.300	2.082	1.271	1.375	.942	.805	2.417	3.488								
Iplan_1	1.126	.839	1.715	1.614	1.977	2.359	2.144	1.143	1.352	.909	.651	2.414	2.908	3.327							
BMIZ	-.036	-.053	-.071	.213	-.017	-.055	-.033	.002	-.027	-.003	.069	.038	.023	-.008	1.084						
Fstrenm	1.223	1.465	5.375	11.362	8.874	8.403	7.884	4.471	5.193	5.892	2.696	10.839	11.847	10.541	1.304	445.428					
Fmodm	2.176	1.796	4.820	6.736	3.885	5.348	4.654	3.309	3.517	2.804	1.953	7.057	6.923	6.664	.700	116.868	143.761				
Fmildm	1.233	.942	2.106	2.215	1.875	2.663	1.972	1.861	1.920	1.504	1.369	2.934	3.373	3.253	.253	45.682	39.260	37.015			
Indstenm	4.620	3.652	8.345	7.076	3.760	8.442	5.254	6.773	5.699	1.480	-1.446	6.963	9.746	10.205	.897	216.228	114.988	41.672	916.325		
Indmodm	1.967	1.937	3.222	1.954	.399	2.947	2.850	3.269	2.649	.754	.465	2.611	3.197	2.740	-.576	57.592	67.445	26.405	164.619	156.520	
Indmildm	.977	.899	1.495	1.485	.850	1.109	1.167	2.141	1.622	1.460	.739	1.546	1.960	1.278	.105	53.085	23.361	22.994	49.037	31.017	67.404

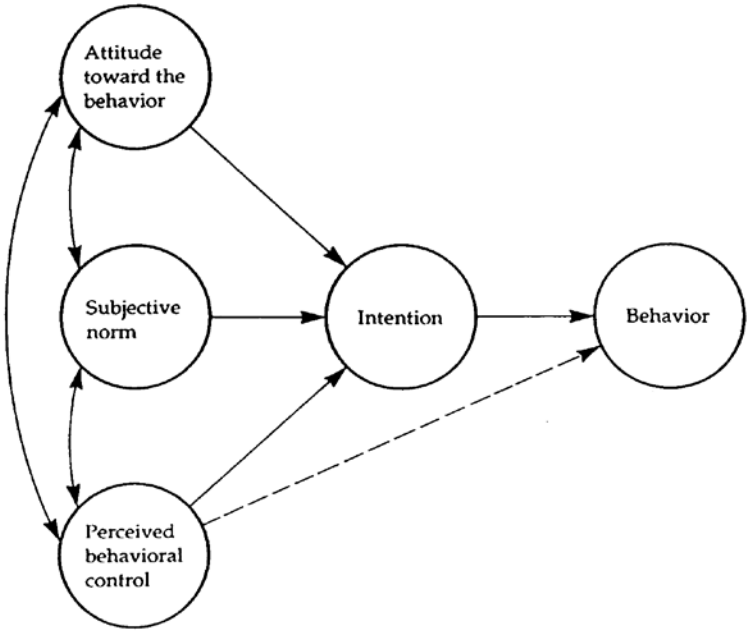

Figure 1. The theory of planned behavior (Ajzen & Driver, 1992).

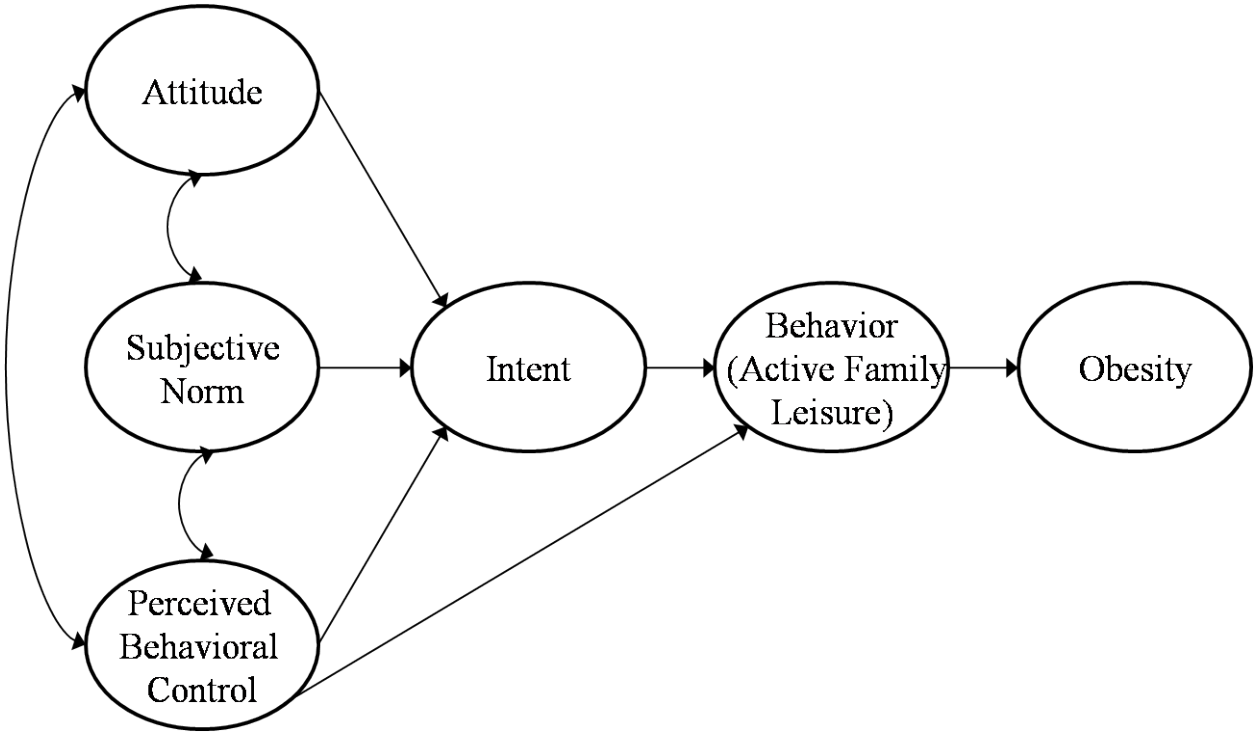

Figure 2. Hypothesized Structural Equation Model for Active Family Leisure and Obesity

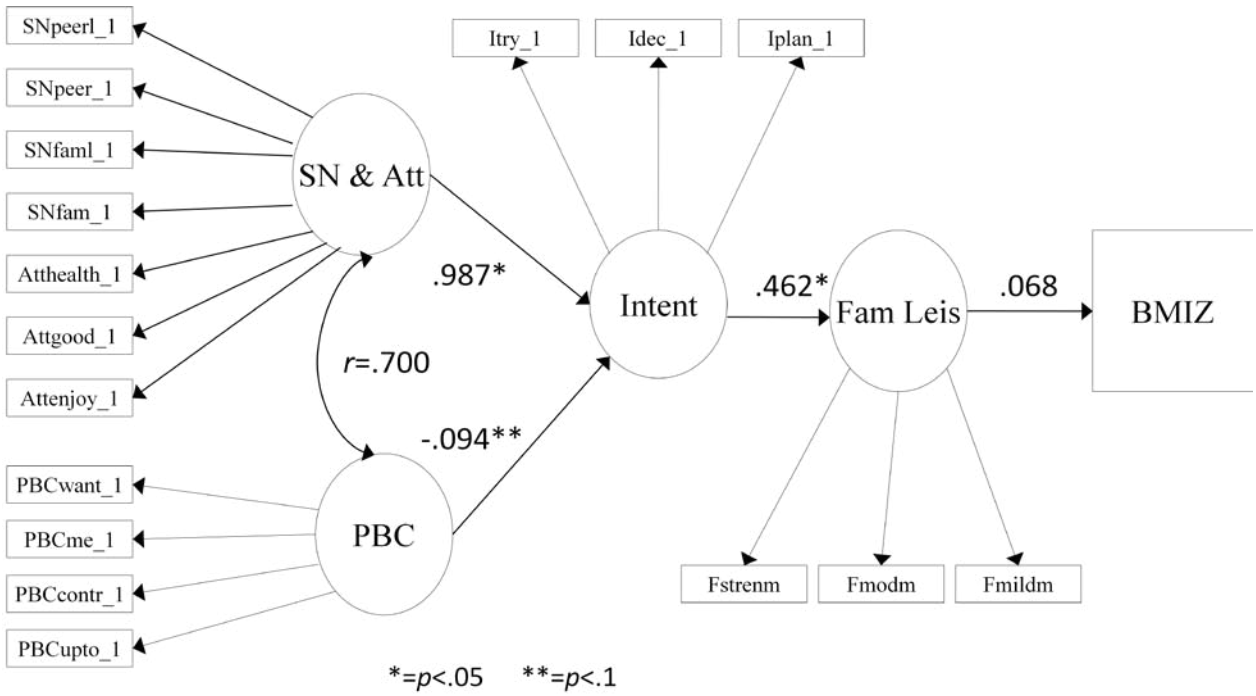

Figure 3. Structural Equation Model of SN&Att, PBC, Intent, Fam Leis, and BMIZ

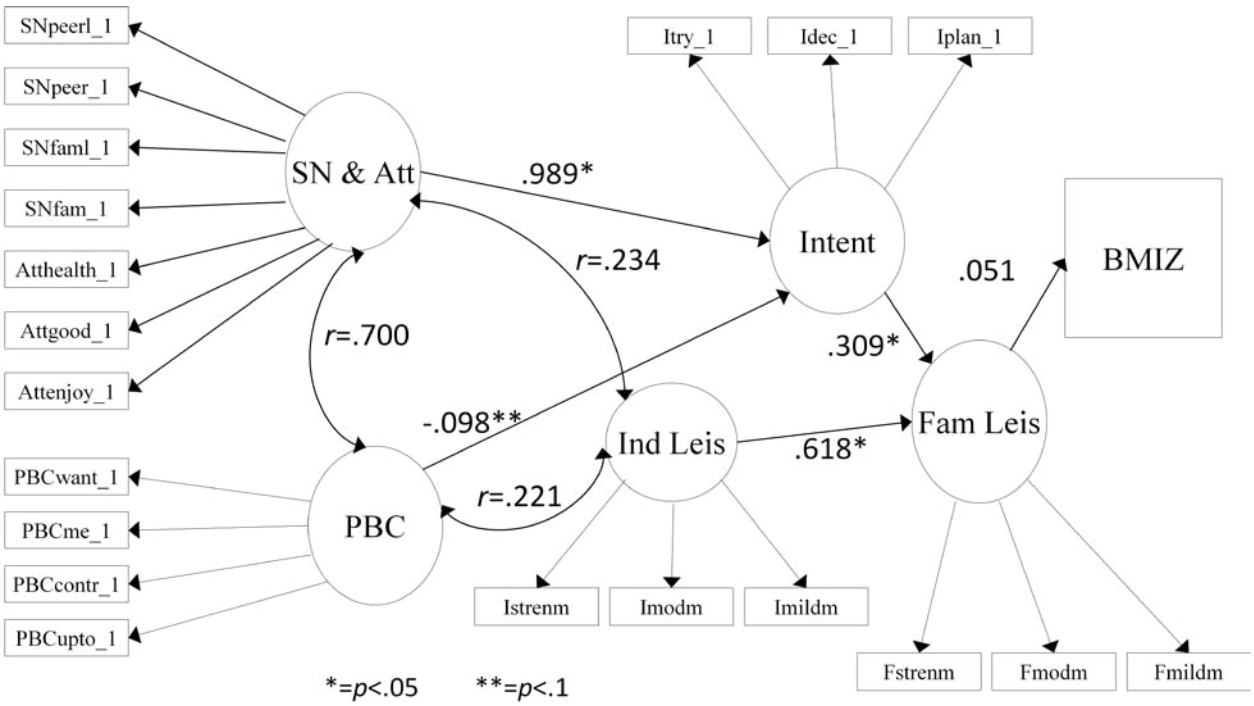

Figure 4. Post Hoc Structural Equation Model of SN&Att, PBC, Intent, Fam Leis, and BMIZ

Appendix A

Prospectus

Chapter 1

Introduction

Obesity is a growing problem for adolescents. Body weight has increased in adolescents over the last twenty years and is now considered an epidemic by the Institute of Medicine (DHHSCDCP, 2007a; Institute of Medicine, 2001). Weight related conditions, which typically are not seen until adulthood, are being diagnosed in children and teens. Illnesses such as diabetes, hypertension, and dyslipidemia are rising in frequency amongst youth and adolescents. Beyond the physical health consequences, children and adolescents face weight stigmas and psychosocial problems (Rodearmel, Wyatt, Stroebele, Smith, Ogden, & Hill, 2007). Many children are teased by their peers because of weight, which can lead to eating disturbances and lasting psychological damage (Latner, Simmonds, Rosewall, & Stunkard, 2007; Thiel, Alizadeh, Giel, & Zipfel, 2008).

Physical activity has long been known to influence weight (Davidson & Birch, 2002; Klohe-Lehman, Freeland-Graves, Clarke, Cai, Voruganti, Milani, et al., 2007; Sizer & Whitney, 2003). Physical activity throughout the lifecycle has been shown to benefit individuals by decreasing weight as well as reducing the risk for other chronic illnesses (Thompson, Rehman, & Humbert, 2005). Physical activity does not have to be limited to a fitness center or a designated workout area to be beneficial to weight; it can be done in many everyday activities such as transportation, housework, or playing catch (Godbey, Caldwell, Floyd, & Payne, 2005). The concept of being active throughout the day's activities is being promoted as a way to combat the obesity epidemic (Sallis & Linton, 2005).

Leisure is any non-work activity undertaken in free or spare time, is freely chosen, and has a purpose (Russell, 1996). One way to view leisure is to consider it from the perspective of

the use of discretionary time and the incorporation of physical activity (Godbey et al., 2005; Sallis & Linton, 2005). Numerous activities such as hiking, biking, or walking can be physically challenging yet viewed as leisure. Youth and adolescents can meet health needs while finding enjoyment through leisure. Unfortunately, many adolescents are spending their discretionary time participating in passive activities such as playing video games and watching television (Godbey, 1997; Thompson et al., 2005).

Parents have an influence on the lifestyle patterns their children develop. For many, the home and family is the most common arena for leisure activity (Shaw & Dawson, 2001). As parents participate in active leisure with their adolescent children, they model and promote positive behaviors that can influence the adolescent well into adulthood and shape their future lifestyle choices (Thompson et al., 2005). Shaw and Dawson found that parents felt pursuing physical activities as part of family leisure was a way to keep their children physically fit and expose them to healthy behaviors that could continue as the children grew up. Participating in active family leisure is a way to teach children and adolescents these lifestyle habits and techniques to potentially keep them healthier throughout their lives.

The Theory of Planned Behavior (TPB) may explain why adolescents participate in active family leisure. The TPB states that an individual's intent to perform a specific behavior, such as active family leisure, influences the actual performance of that behavior (Ajzen & Fishbein, 1973). The TPB includes three variables that influence intent: attitude, subjective norm, and perceived behavioral control (Ajzen & Driver, 1992; Sas-Nowosielski, 2006). The more positive the adolescents' attitude, subjective norm, and perceived behavioral control are toward active family leisure, the stronger the intent is to participate in active family leisure. For example, examine a family taking a bike ride on a park pathway. If the teenager in the family a)

has a positive attitude about bike riding, b) feels that it is important to his family that he be physically active with the family, and c) feels like he is capable of bike riding, TPB suggests he would have a strong intent to participate in the family bike ride and the prospect of the adolescent actually going on the bike ride would increase. While bike riding with the family, the adolescent is being physically active, thus, contributing to the likelihood of the adolescent maintaining a healthy weight. Therefore, the purpose of this study is to determine the nature of the relationship between active family leisure and weight among adolescents; furthermore, to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure.

Statement of the Problem

The problem of this study is two fold: 1) to determine the nature of the relationship between active family leisure and weight among adolescents and 2) to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure.

Purpose of the Study

The purpose of the study is to investigate whether a potential for active family leisure activities to reduce adolescent weight exists. Research has shown that if a child is overweight then that child is more likely to become obese as an adult (Srinivasan, Bao, Wattigney, & Berenson, 1996). Understanding influences on overweightness in adolescence may prevent obesity later in the life cycle (Adair, 2008). A second purpose of the study is to determine the intent of adolescents to participate in active family leisure. It is important to understand why adolescents participate in active family leisure in order for both health and leisure professionals to teach adolescents active family leisure habits.

Significance of the Study

Obesity hinders the lives of adolescents. It not only causes physical problems, but it can cause psychological damage as well (Dietz, 1998). Adolescence can be a difficult phase of life as these youth try to define themselves and become more independent. Being obese adds physical and social stress to an already challenging transition. Finding ways to help prevent or reduce the prevalence of obesity can improve adolescents' lives by eliminating the social stigmas and health issues associated with being overweight and allow these youth to enjoy the hallmarks of adolescence such as dating and just being kids.

Physical activity is known to help control weight, but people have a difficult time sustaining it. Often they become bored or give the excuse they do not have time (Fogelholm, 2008). Being active through family leisure may be an untapped avenue to incorporate physical activity. Leisure has been studied in a variety of ways such as leisure's influence on self-efficacy (Sibthorp, 2003), therapeutic leisure (Hawkins, 1993), and how marital satisfaction is influenced by leisure (Orthner & Mancini, 1991), but little has been done to examine the health benefits that can be derived through active leisure. The majority of the research conducted on leisure health benefits has focused on examining individual leisure time physical activity, but no studies have measured the health benefits of active family leisure.

The leisure field has called for more research into the health benefits of leisure and to collaborate with other disciplines, such as public health professionals, as a way to gain knowledge into the health challenges of today (Sallis & Linton, 2005). This study responds to that call and contributes to a growing body of knowledge that is becoming recognized as important and needed. Relationships are being established between scholars from the leisure field and the health field as they work together to complete this study. These relationships will be

useful for future research into the health benefits of leisure and are in accordance with the challenge of Sallis and Linton to collaborate with other disciplines.

Delimitations

The study is delimited to the following:

1. Adolescents ages 12-18.
2. Weight status will be determined by self-reported height and weight.
3. Data will be collected online June/July of 2009 only.
4. Physical activity will only be measured during leisure time and when participated in with the family.

Limitations

The study has the following limitations:

1. The investigators will be unable to control for the influence of other forms of exercise besides active family leisure.
2. Information will not be collected from the parents about active family leisure participation.
3. The sample will not be randomly selected.
4. The investigators will not examine the influence of genetics on obesity.

Assumptions

The study was based upon the following assumptions:

1. The families have the knowledge and skills necessary to plan and participate in active leisure activities.
2. Participants will answer the questionnaire truthfully and accurately.

Hypotheses

The study will be designed to test the following hypotheses:

1. Participating in active family leisure activities is a way to help adolescents maintain a healthy weight.

   HA: There is a relationship between the amount of active family leisure and weight of adolescents. The more active family leisure adolescents participate in the less likely they are to be classified as obese.

2. The attitude an adolescent has toward participating in active family leisure influences the adolescent's intent to participate.

   HA: There is a positive relationship between attitude and the intent to participate in active family leisure. A positive attitude about active family leisure results in a greater intent to participate in active family leisure.

3. Adolescents are influenced by how their families feel about participating in active family leisure.

   HA: There is a positive relationship between subjective norms and the intent to participate in active family leisure. The more positive the adolescent feels their family is toward active family leisure, the stronger the adolescent's intent to participate.

4. Adolescents need to feel like they are capable of participating in active family leisure.

   HA: There is a positive relationship between perceived behavioral control and the intent to participate in active family leisure. The more ease they feel toward participation the stronger the intent to participate.

Definition of Terms

The following terms are defined to clarify their use in the study:

Active family leisure. A non-work activity that is freely chosen, benefits the participants, is participated in with the family, and involves physical movement by the participants (Russell, 1996).

Attitude. "An individual's general affective and cognitive orientations toward a given behavior" (Shen, McCaughtry, & Martin, 2008, p. 843).

Body Mass Index (BMI). A measure of fatness that is calculated by taking height in meters squared divided by weight in kilograms that is charted on the Center for Disease Control (CDC)-BMI-for-age growth chart as a measure of body fatness (DHHSCDCP, 2008a).

Intention. An individual's readiness to perform a given behavior (Ajzen & Driver, 1992).

Leisure. Any non-work activity undertaken in free or spare time, is freely chosen, and has a purpose (Russell, 1996).

Obesity. A physical state of fatness that falls within a "range of weight that is greater than what is generally considered healthy for a given height" (DHHSCDCP, 2009, par. 1).

Perceived behavioral control. The perceived capability of performing the behavior based on past experiences, anticipated impediments, and obstacles (Ajzen & Driver, 1991).

Physical activity. Any activity that makes your body muscles work harder than normal and increases energy expenditure. (Goldberg & King, 2007; USNLMNIH, 2009).

Subjective norm. “The perceived social pressure to perform or not to perform the behavior” (Ajzen & Driver, 1991, p. 188).

Chapter 2

Review of Literature

Obesity is a growing problem for adolescents. Body weight has increased in adolescents over the last twenty years and is now considered an epidemic by the Institute of Medicine (DHHSCDCP, 2007a; Institute of Medicine, 2001). Being physically active through family leisure may be a way to fight the obesity epidemic. The TPB is a useful framework for predicting behavior and intention to participate in family leisure. For organization purposes, the literature will be presented under the following topics: (a) Adolescent Obesity, (b) Theory of Planned Behavior, (c) Active Family Leisure, and (d) Summary.

Adolescent Obesity

Over the last 20 years, the prevalence of obesity has substantially increased to become a major public health concern in the United States and is now considered an epidemic by the Institute of Medicine (see Figure 1 in Appendix A) (Andersen, Franckowiak, Christmas, Walston, & Crespo, 2001; DHHSCDCP, 2007a; Flegal, Graubard, Williamson, & Gail, 2005; Institute of Medicine, 2001; Ogden, Carroll, McDowell, & Flegal, 2007). In 2007, approximately 34% of adults 20 years or older in the United States, or over 72 million people, are considered to be obese (Ogden et al.) Childhood obesity is on the rise as well (see Figure 2 in Appendix A) (Golan, Weizman, Apter, & Fainaru, 1998; Rodearmel et al., 2007). Data from the National Health and Nutrition Examination Survey (NHANES) estimated that 17% of US children are overweight and that another 15% of children are at risk of becoming overweight (Rodearmel et al.).The Institute of Medicine (2001) has suggested that over 60% of chronic illness, or illness that occurs over a long time span such as obesity, is the result of personal choices in health behavior. Teaching adolescents to establish positive health behaviors and lifestyles is crucial to

preventing the occurrence of chronic diseases and reducing the obesity epidemic (Pan American Health Organization (PAHO), 2005).

Obesity comes with an extensive list of adverse side effects. There is an increase in the prevalence of weight related medical problems because of the increase in childhood and adolescent obesity. Illnesses like hypertension, type 2 diabetes, pulmonary complications, dyslipidemia, and musculoskeletal problems, which are typically seen in older adults, are becoming common diagnoses amongst children (Ogden et al., 2007). There are also social stigmas and psychosocial problems that these overweight and obese children face (Rodearmel et al, 2007). Children and adolescents face negative stigmatization from numerous sources including their families and peers (Eisenberg, Neumark-Sztainer, & Story, 2003; Latner et al., 2007). Even though the incidence of childhood obesity is becoming common, it has not changed the way others view an overweight individual and stigmas towards those who are overweight have actually increased over the last four decades (Latner et al.). These stigmas present themselves in ways such as teasing from peers, preferential treatment to those who are thinner from educators and employers, being thought of as lazy, stupid, and ugly, and being socially excluded. Overweight and obese individuals who experience these stigmas often develop eating disorders, a negative body image, low self-esteem, and/or depression (Wardle & Cooke, 2005).

Families can have an influence on an adolescents' tendency toward obesity. Family members are similar in behavioral risk factors, such as low amounts of physical activity engaged in, that can lead to weight gain (Davidson & Birch, 2002). Children often learn these risky behavior patterns by watching and modeling their parents (Golan et al., 1998; Klohe-Lehman et al., 2007). Research has found statistically significant correlations between families engaging in these behavior risk factors such as a lack of physical activity and being overweight (Davidson &

Birch). Numerous studies have found that children with at least one obese parent have a significantly increased risk of becoming obese in adulthood (e.g., Burke, Beilin, & Dunbar, 2001; Casey, Dwyer, Coleman, & Valadian, 1992; Davidson & Birch; Guo, Roche, Chumlea, Gardner, & Siervogel, 1994; Serdula, Ivery, Coates, Freedman, Williamson, & Byers, 1993; Whitaker, Wright, Pepe, Seidel, & Deitz, 1997). Thus the family modeling unhealthy behaviors is part of the reason that obese parents tend to have overweight children (Bouchard, 1997; Garn, Sullivan, & Hawthorne, 1989; Mafeis, Talamini, & Tato, 1998; Wardlaw & Smith, 2006).

To combat the increasing prevalence of childhood obesity, practitioners have turned to the family. Mothers can role model health behaviors for their children. As mothers change their physical activity patterns, the children's activity patterns change to match the mothers. (Klohe-Lehman et al., 2007). Further, it has been suggested every family member's behavior influences other family members (Golan et al., 1998). Using parents and the family as the agents of change produced greater weight loss in the obese child than with the child changing on their own. This suggests that having the family support creates an atmosphere easier to sustain change.

Theory of Planned Behavior

The Theory of Planned (TPB) behavior examines the relationships between beliefs, attitudes, intentions, and behavior (Fishbein & Manfredo, 1992). The theory was first introduced by Martin Fishbein and Icek Ajzen in 1967 as the Theory of Reasoned Action (TRA) (Montano, Kasprzyk, & Taplin, 1997). The TRA proposed that intent to perform a behavior was influenced by attitude and subjective norms. Later in 1986, another construct, perceived behavioral control, was added to extend the influences on intent and the theory was renamed the Theory of Planned Behavior (Maddux & DuCharme, 1997). The TPB's central tenet focuses on an individual's intention to perform a specific behavior (Sas-Nowosielski, 2006). Intention is defined as an

individual's readiness to perform a given behavior (Ajzen & Driver, 1992). For this study, the specific behavior being examined is adolescent participation in active family leisure.

Intention is determined by three independent variables: attitude, subjective norm, and perceived behavioral control (Ajzen & Driver, 1991). Attitude is defined as "an individual's general affective and cognitive orientations toward a given behavior" (Shen et al., 2008, p. 843). Attitude results from salient beliefs about the consequences of participating in a specific behavior. These beliefs result in a favorable or unfavorable attitude toward the behavior (Ajzen & Albarracin, 2007; Connor & Sparks, 2005). For example, a belief that exercising will reduce weight and improve health can create a favorable attitude to participating in physical activity. Attitude may contain instrumental (e.g., desirable/undesirable or valuable/worthless) or experiential (e.g., pleasant/unpleasant or interesting/boring) aspects. The two components are related to each other but differ from each other in their functions and underlying belief systems (Connor & Sparks).

Subjective norm is "the perceived social pressure to perform or not to perform the behavior" (Ajzen & Driver, 1991, p. 188). Subjective norms are based on the perceived expectations from referent groups such as peers and family members as to whether a particular behavior should be engaged in or not. A person's motivation to comply with these perceived expectations also influences subjective norm (Ajzen & Albarracion, 2007; Connor & Sparks, 2005). For example, a teenager may feel that his parents want him to participate in physical activity during his leisure time and a high motivation to please his parents contributes to a high subjective norm.

Perceived behavioral control, the third construct, refers to the perceived capability of performing the behavior based on past experiences, anticipated impediments, and obstacles

(Ajzen & Driver, 1991). A person bases their capability to perform a behavior by taking into account factors that may further or hinder their ability to perform the behavior (Ajzen & Albarracion, 2007). Factors that may hinder or further perceived behavioral control can be internal, such as information, skills, abilities and emotions, or external, such as opportunities, dependence on others, and barriers (Connor & Sparks, 2005). A person is more likely to have a high perceived behavioral control if they have access to the necessary resources and perceive there are opportunities to perform the given behavior (Ajzen, 1991). For example, a teenager feels that there are opportunities to be physically active in his area will have a higher perceived behavioral control than a teenager that feels there are not opportunities. Perceived behavioral control is similar to Albert Bandura' construct of self-efficacy, but differs in operationalization (Ajzen & Albarracion). Perceived behavioral control tends to focus on the capability of the individual while self-efficacy is centered on task difficulty (Ajzen & Albarracion; Motl, Dishman, Saunders, Dowda, Felton, Ward et al., 2002).

Attitude, subjective norm, and perceived behavior control influence intention, which then influence performance of the behavior. Perceived behavioral control, however, is the only construct that can influence behavior directly (Sas-Nowosielski, 2006). The following figure illustrates the relationships between attitude, subjective norm, perceived behavioral control, intention and behavior.

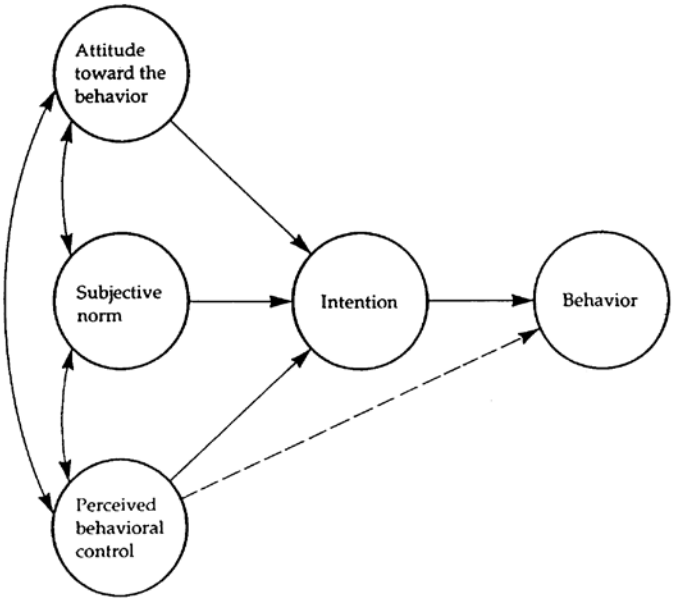

Figure 3. The Theory of Planned Behavior (Ajzen & Driver, 1992, p.210)

Several assumptions are made about how intention is influenced. First, it is assumed that humans can think about and understand information that is given them (Fishbein & Manfredo, 1992). The theory does not assume that the person makes reasonable or correct judgments with the information. It only assumes that the person is capable of processing information (Sharma & Romas, 2008). The second assumption is that the behavior must be something the individual has a choice to participate in or not. This can be problematic because many behaviors are not completely autonomous, for example youth often are required to do things by their parents that are not fully volitional. The variable of perceived behavioral control was added to the TRA to remedy this problem (Maddux & DuCharme, 1997). It is important to remember the underlying assumptions of the theory to ensure the research does not extend beyond the theory's limits.

The TPB has been used in numerous studies to predict future behavior with a variety of topics ranging from smoking (Fishbein, 1980) to sunscreen use (Abroms, Jorgensen, Southwell, Gellar, & Emmons, 2003) to exercise behavior (Downs, Graham, Yang, Bargainnier, & Vasil, 2006) to leisure time walking (Rhodes, Courneya, Blanchard, & Plotnikoff, 2007). Ajzen and

Driver (1992) suggested the TPB as a useful theory in the study of leisure behaviors because leisure behaviors can easily be defined and attitudes, subjective norms, and perceived behavioral control can predict intentions to perform leisure activities. The TPB also has been useful for understanding youth physical activity (Shen et al., 2005). Martin, Kulinna, McCaughtry, Cothran, Drake, and Fahoome (2005) used the TPB to study youth activities and found that youth who have positive attitudes about physical activity, perceive that others expect them to be physically active, and feel they have control over their physical activities have high intention to participate in physical activity. Thus, the TPB establishes a sound fundamental framework to study adolescent intent to participate in active family leisure activities and whether active family leisure influences weight.

Active Family Leisure

Active family leisure is any non-work activity that is freely chosen, benefits the participants, is participated in with the family, and involves physical movement by the participants (Russell, 1996). Incorporating physical activity through leisure activities with the family may be a way to influence adolescent weight. Many behaviors influence weight. Weight gain is caused by having a positive energy balance, meaning the calories taken into the body exceed the calories expended by the body. Positive energy balance can be affected by several factors including metabolism, genetics, environment, culture, socioeconomic status, and behaviors (DHHSCDCP, 2008b). Behaviors that relate to health are defined as “any activity undertaken by an individual who believes himself to be healthy, for the purpose of preventing or detecting illness” (Glanz, Lewis, & Rimer, 1997, p. 9). Examples of health behaviors include tooth brushing, use of over-the-counter medications, or engaging in physical activity. Because of the broad range of health behaviors and the fact that adolescent overweight and obesity is largely

caused by lack of physical exercise (DHHSOSG, 2001), this study will only examine health behavior through active family leisure.

Physical Activity. Physical activity has physiological and psychological benefits. Physical activity is any activity that makes your body muscles work harder than normal and increases energy expenditure (Goldberg & King, 2007; USNLMNIH, 2009). High self-esteem and lower levels of stress and anxiety are seen in youth who are physically active (Van Der Horst, Paw, Twisk, & Van Mechelen, 2007). Children and adolescents who participate in regular physical activity also have lower blood pressure, weigh less than those who do not participate in regular physical activity, and have higher bone mineral densities (Purslow, Hill, Saxton, Corder, & Wardle, 2008). Those who engage in regular physical activity have a better outlook on life and improved brain functioning as well as feel invigorated, have healthier skin, and toner muscles (Sizer & Whitney, 2003). There is also some evidence that physical activity can increase academic performance in the form of better grades and higher scores on standardized tests (Strong, Malina, Blimkie, Daniels, Dishman, Gutin et al., 2005).

Physical activity is thought to have a strong impact on weight (Anderson et al., 2001; Davidson & Birch, 2002; DHHSCDCP, 2007b; Kruger, Yore, Kohl III, 2007; Wardlaw & Smith, 2006). Physical activity incorporated into one's daily life is a critical part of weight gain prevention, weight loss, and weight maintenance throughout the life span (Goldberg & King, 2007; Simon, Schweitzer, Oujaa, Wagner, Arveiler, Triby et al., 2008). Simon et al. conducted a controlled randomized intervention with adolescents and found that physical activity was preventative to weight gain. It has also been found that adolescents who participate in moderate to vigorous physical activity are less fat than adolescents who do not (Gutin, Yin, Humphries, &

Barbeau, 2005). Because of technological advances, energy expenditure on a daily basis has decreased (Bouchard, 1997; Pergams & Zaradic, 2006; Prentice & Jebb, 1995).

> The amount of energy expended to earn a living and obtain food, water, and shelter, as well as the amount expended for transportation, personal chores, and other aspects of daily life continues to decrease. Thus low energy expenditure appears to be the key determinant of the current epidemic of obesity. (Bouchard, p. 926)

Sedentary activities for entertainment such as television, computer use, and video games have drastically increased which has produced a "net decline in overall levels of physical activity" (Goldberg & King, 2007, p. 148). A recent meta-analysis found a positive association between TV watching and adolescent weight (Rey-Lopez, Vicente-Rodriguez, Biosca, & Moreno, 2008). Despite the increase of businesses such as gyms, sedentary leisure-time industries have grown much faster and contribute to a sedentary lifestyle (Goldberg & King).

Children and adolescents are spending more of their leisure time in sedentary activity (Thompson et al., 2005). It was estimated in 2001 that children were spending 38 hours per week in front a screen (Subrahmanyam, Kraut & Gross, 2001). Strauss, Rodzilsky, Burack, & Colin (2001) found that 76% of children's leisure time is spent doing inactive activities. As children age, they tend to become involved in more inactive leisure (Cameron, Craig, Stephens, & Ready, 2002). Sedentary activity is a risk factor for obesity and has been labeled as a *hazard to your health* by the U.S. Surgeon General (Rennie, Johnson, & Jebb, 2005; USDHHS, 1996).

In an effort to combat the sedentary lifestyle, researchers have begun to study the concept of active living. "Active living is a way of life that integrates physical activity into daily routines" (Sallis, Linton, & Kraft, 2005). Every movement a person makes burns calories. The

more active a person is the more calories used by the body (Wardlaw & Smith, 2006). “The greatest potential to increase movement in daily life will be by increasing participation in physical activity which has meaning aside from exercise-leisure, play, recreation, sport, and contact with nature” (Godbey et al., 2005, p. 152). This increased energy expenditure results in a number of physical, mental, and social benefits, including decreased weight and higher self-esteem, which improve an individual’s quality of life (Thompson et al., 2005).

The TPB may be used to predict whether adolescents will participate in physical activity. The intent to participate in physical activity may be driven by the adolescents’ attitude toward physical activity. Youth who have a positive attitude toward physical activity increase the probability of participation. Intent to participate may also be driven by subjective norms or social influences. Youth who feel their peers and families have positive opinions towards participation in physical activity are more likely to participate themselves. A third driving factor of intent is perceived behavioral control. A high feeling of capability towards being physically active leads to a greater intent to participate.

Leisure. Leisure is any non-work activity undertaken in free or spare time, is freely chosen, and has a purpose (Russell, 1996). Research on leisure and recreation and park management was begun in the late 19th century in response to the urbanization and industrialization of the time period in an effort to address the health and wellness needs of the people (Godbey et al., 2005).

As the fields of leisure studies and recreation and park management grew, research showed many benefits for families who participated in leisure activities together, such as higher marital satisfaction (Orthner & Mancini, 1991), improved communication (Huff, Widmer, McCoy, & Hill, 2003; Orthner, 1976; Presvelou, 1971), increased family strength (Kelly &

Kelly, 1994; Orthner, 1998; Orthner & Mancini, 1991), family problem solving (Holman & Jacquart, 1988; Orthner, 1998), building parent-child bonds (Barnett, 1991; Orthner, 1998), and improving social support (Orthner, 1998). Children specifically benefit from leisure by gaining an understanding of the society they live in and developing physical and social skills that will benefit them in their homes and communities (Kemperman & Timmermans, 2008).

One way to view leisure is to consider it from the perspective of the use of discretionary time and the incorporation of physical activity (Godbey et al., 2005). Many activities can be considered leisure as well as physical activity. Biking, hiking, playing a game of tag, and many other activities can be enjoyable ways to spend leisure time while simultaneously increasing the energy expended by the body's muscles. This increased energy expenditure may be a way to meet daily physical activity requirements and influence weight. While leisure has examined the influences of obesity as a constraint to leisure, little research, however, has been conducted on the health benefits (Henderson & Bialeschki, 2005; Liechty, Freemna, & Zabriskie, 2006; Sallis & Linton, 2005).

A handful of studies have examined the influence of physically active leisure and weight. A recent review of the physical activity literature found that those who participate in leisure time physical activity tend to weight less than those who do not (Wareham, van Sluijs, & Ekelund, 2005). Another study, a 15-year longitudinal study, found leisure time walking can prevent weight gain (Gordon-Larsen, Hou, Sidney, Sternfeld, Lewis, Jacobs et al., 2009). However, these studies examine adults and individual leisure. No studies have examined active family leisure and weight.

Parents are influential in the participation of children and adolescents in physically active leisure. Thompson et al. (2005) conducted a qualitative study to determine the factors that

influence children's and youth's physically active leisure. They found that children of all ages are significantly influenced by their parents to participate in physical activity. Part of the reason parents are so influential is because home and the family are the most common arenas for leisure activities (Kelly, 1993; Shaw, 1997; Shaw & Dawson, 2001). Parents are influential through role modeling physical activity but also through encouragement to play and support of organized physical activities and sports (Thompson et al.). In a qualitative study about leisure, Shaw and Dawson found that parents feel it is important to participate in active leisure as a family. The parents felt active family leisure was a way to keep their children physically fit and to expose them to activities and lifestyle patterns that will benefit them in the future. Richter, Harris, Paine-Andrew, Fawcett, Schmid, Lankenau, et al. (2000) conducted a review of the literature and concluded that the environment, specifically family practices, play a role in the physical activity of children and youth.

Adolescence is an important time to teach children to become physically active. Godin and Shephard (1986) studied the intention to exercise in children in grades seven to nine and found evidence that encourages the development of physical activity early in childhood. Telema, Yang, Laakso, and Viikari (1997) stated that childhood is the time when physical activity skills, attitudes, values, and behaviors are developed. These patterns of physically active leisure behavior developed in childhood and adolescence are thought to continue on into adulthood (Scott & Willits, 1998).

The TPB may be useful in predicting whether adolescents will participate in active family leisure. The intent to participate in active family leisure may be driven by the adolescents' attitude toward being physically active with the family. Youth who have a positive attitude toward active family leisure increase the probability of participation. Intent to participate may

also be driven by subjective norms or social influences. Youth who feel their families have positive opinions towards participation in physically active leisure with the family are more likely to participate themselves. A third driving factor of intent is perceived behavioral control. A high feeling of capability towards being physically active with the family leads to a greater intent to participate.

Despite having origins in health and wellness, the leisure studies and recreation and park management fields have conducted little research on the physical health benefits of family leisure (Godbey et al., 2005). In an issue of Leisure Sciences dedicated to research on active lifestyles, Sallis and Linton (2005) called on leisure professionals to collaborate with public health professionals in studying active lifestyles in order to help combat the increasing health concern of physical inactivity which can lead to obesity. The purpose of the study, therefore, is to examine the nature of the relationship between active family leisure and weight among adolescents and to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure.

Summary

Data from the National Health and Nutrition Examination Survey (NHANES) estimated that 17% of US children are overweight and that another 15% of children are at risk of becoming overweight (Rodearmel et al., 2007). Numerous negative physical and psychological effects are experienced by those who are overweight such as increased risks for diabetes and hypertension as well as teasing and discrimination (Latner et al., 2007; Ogden et al., 2007; Wardle & Cooke, 2005). Physical activity is thought to have a strong impact on weight (Andersen et al., 2001; Davidson & Birch, 2002; DHHSCDCP, 2007b; Kruger et al., 2007; Wardlaw & Smith, 2006).

Physical activity incorporated into one's daily life is a critical part of weight gain prevention, weight loss, and weight maintenance throughout the life span (Goldberg & King, 2007).

In an effort to combat the sedentary lifestyle, researchers have begun to study the concept of active living. "The greatest potential to increase movement in daily life will be by increasing participation in physical activity which has meaning aside from exercise-leisure, play, recreation, sport, and contact with nature" (Godbey et al., 2005, p. 152). Parents are influential in this development of early childhood physical activity through leisure with the family.

The TPB states that the intent to participate in active family leisure is influenced by attitude, subjective norm, and perceived behavioral control. As the intent to participate increases, so does the likelihood of the adolescent participating in active family leisure (Ajzen & Driver, 1992; Fishbein & Manfredo, 1992. The purpose of this study, therefore, is to determine the nature of the relationship between active family leisure and weight among adolescents and to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure.

Chapter 3

Methods

Procedures related to conducting a study to determine the nature of the relationship between active family leisure and weight among adolescents and to examine how attitude, subjective norm, and perceived behavioral control influence adolescents' intent to participate in active family leisure is reviewed. Specifically this chapter will address (a) Study Sample, (b) Data Collection Procedures, (c) Instrumentation, (d), and Data Analysis.

Study Sample

The sample will consist of a nationally representative sample of 350 adolescents which have agreed to take surveys for the company Survey Sampling International. These adolescents will be between the ages of 12 to 18 and there will be approximately equal numbers of males and females. Online data collection through Survey Sampling International was chosen because of the ability to gain a nationally representative sample. Adolescents were chosen because adolescence is a time when youth will be developing lifelong habits which will affect their health behavior as adults (Torresp, Fernandez, & Maceira, 1995).

Data Collection Procedures

A questionnaire that addresses intention, attitude, subjective norm, perceived behavioral control, active family leisure, and BMI will be posted online using Qualtrics for participant's responses. The link to the online questionnaire will be given to Survey Sampling International who will forward that link to adolescents in its research database. Survey Sampling International will randomly draw from its data base of potential participants until the target sample size has completed the questionnaire. The first page of the questionnaire will explain the study, inform the participant that completion of the survey implies their consent to be a part of this study, and

remind participants they must have a parent's consent to continue with the survey. Once 350 surveys have been collected, the data will be downloaded from the Qualtrics site into SPSS for data analysis.

Instrumentation

The research questionnaire will include the following: a) an adapted questionnaire to assess the independent variables intention, attitude, subjective norm, and perceived behavioral control from the TPB, b) an adapted version of the Godin Leisure Time Activity Questionnaire to measure active family leisure, and c) demographics which will include age, gender, height and weight in order to calculate BMI. The TPB questionnaires and the Godin Leisure Time Activity Questionnaire are typically used to test individual leisure time physical activity, but were modified by adding the phrase *with my family* to the questions to measure the variables according to adolescents' active family leisure.

Intent. Three items will be used to assess the adolescent's intention. The terms *definitely false/definitely true* anchored the 7-point Likert scale for the following two questions: "I have decided to do physical activity with my family that makes me breathe hard or feel tired during my leisure time this week" and "I will try to do physical activity with my family that makes me breathe hard or feel tired during my leisure time this week." The third question, "I plan to do physical activity with my family that makes me breathe hard or feel tired during my leisure time this week" will be anchored by the terms *definitely do/definitely do not*. Scores from both the questions will be averaged together to create a total intention score. The questions were based on guidelines given by Ajzen (2004) and Ajzen and Madden (1986). Cronbach's alpha was found to be acceptable for this instrument ($\alpha = 0.81$) (Martin et al., 2005). Validity has been demonstrated

through its wide use in youth physical activity research (e.g. Martin et al., 2005; Martin, McCaughtry, & Shen, 2008; Shen et al., 2008).

Attitude. Attitude will be measured using three items that used a 7-point Likert scale. The questions will all begin with the phrase "Participating in physical activity with my family during my leisure time that makes me breathe hard or feel tired is…" and then the adolescent will be asked to respond to three different sets of anchors. The first set of anchors, *enjoyable/unenjoyable,* will be used to assess the experiential aspect of attitude. The functional part of attitude will be measured using the anchors *unhealthy/healthy*. The third question will gain an overall estimate of attitude by using the anchors *good/bad*. (Ajzen, 2004). Scores for the three questions will be averaged together to create a total attitude score. The questions were based on guidelines given by Ajzen (2004) and Ajzen and Madden (1986). Cronbach's alpha was found to be acceptable for this instrument ($\alpha = 0.64$) (Martin et al., 2005). Validity has been demonstrated through its wide use in youth physical activity research (e.g., Martin et al., 2005; Martin et al., 2008; Shen et al, 2008).

Subjective Norm. Subjective norm will be measured by assessing the adolescents' perceptions of the beliefs of their peers and family members towards participating in active family leisure. The adolescents' motivation to comply with the beliefs of their peers and families will also be measured. To do this, the participant will be asked to complete two pairs of questions. The first question will assess the beliefs of the peers or family members and will use a 7-point Likert scale with the anchors *strongly disagree/strongly agree*. The second question of the pair will measure the participant's motivation to comply with the beliefs. This question also will use a 7-point Likert scale, but will use the anchors *not at all important/very important*. The scores for the questions in the pair will be multiplied together to create a composite score ranging

from 1 to 49. The composite scores from both pairs will then be averaged together to create a total subjective norm score.

An example of a pair of questions is “My family believes that it is important that I participate in active family leisure that makes me breathe hard or feel tired during my leisure time” (strongly disagree/strongly agree) and “How important is it to you that your family believes you should participate in physical activity with your family during your leisure time that makes you breathe hard or feel tired?” (not at all important/very important). The questions were based on guidelines given by Ajzen (2004) and Ajzen and Madden (1986). Cronbach’s alpha was found to be acceptable for this instrument ($\alpha = 0.81$) (Martin et al., 2005). Validity has been demonstrated through its wide use in youth physical activity research (e.g., Martin et al., 2005; Martin et al., 2008; Shen et al., 2008).

Perceived Behavioral Control. Participants will be asked to answer two questions measured on a 7-point Likert scale to assess perceived behavioral control. The questions will be “If I want to, I can participate in physical activity with my family that makes me breathe hard or feel tired during my leisure time” and “It is mostly up to me whether I participate in physical activity with my family that makes me breathe hard or feel tired during my leisure time.” The questions will be anchored by the terms *strongly disagree/strongly agree*. Scores for both of the questions will be averaged together to create a total perceived behavioral control score. The questions were based on guidelines given by Ajzen (2004) and Ajzen and Madden (1986). Cronbach’s alpha was found to be acceptable for this instrument ($\alpha = 0.75$) (Martin et al., 2005). Validity has been demonstrated through its wide use in youth physical activity research (e.g., Martin et al., 2005; Martin et al., 2008; Shen et al., 2008).

Godin Leisure Time Exercise Questionnaire. The Godin Leisure Time Exercise Questionnaire (GLTEQ) is a four item questionnaire that will be used to measure participants' active family leisure. Participants will first read the header "How many times in an average week do you do the following kinds of activities with your family for more than 15 minutes during your free time?" Following the header, participants will be asked to respond to three statements of physical activity levels: strenuous (unable to talk while participating in the activity), moderate (can talk, but with a little difficulty), and mild (no difficulty talking). Examples of activities for each level will be provided after each statement as well as space for the participant to mark how often they participate per week in each of the levels. Answers for strenuous, moderate, and mild will then be multiplied by 9, 5, and 3 metabolic equivalents (METs), respectively, and summed to create a total active family leisure score. A MET is a measure of the rate of energy expended while sitting at rest and is a common reference point for how intense a physical activity is (DHHSCDCP, 2009). A fourth question "In an average week, during your free time, how often do you do any physical activity with your family during your leisure time long enough that it causes you to sweat (make your heart beat quickly)?" Participants will then mark one of the following three choices *often, sometimes, never/rarely*. The GLTEQ has been shown to be a valid and reliable measure ($\alpha = 0.81$) of physical activity in children and adolescents (e.g., Martin et al., 2005; Sallis, 1991; Sallis, Buono, Roby, Micale, & Nelson, 1993; Shen et al., 2008).

Body Mass Index. Obesity will be operationalized as BMI. Body mass index is calculated different for children and adolescents than adults in order to account for the change in normal body fat as children age and for the different amounts of body fat between boys and girls. Thus, BMI for children and adolescents is age and sex specific. Body mass index is calculated by

taking height in meters squared divided by weight in kilograms. The BMI score is plotted on Center for Disease Control (CDC)-BMI-for-age growth charts. From the charts, the adolescent is given a percentile ranking. The childhood and adolescent percentile ranking is a measure of fatness compared to adolescents of the same age and gender. Adolescents who have a BMI that is at or above the 95th percentile are classified as being obese (DHHSCDCP, 2008a).

Body mass index has been found to be a valid and reliable measure of obesity for children and adolescents (DHHSCDCP, 2008a). Body mass index is not a direct measure of body fatness, but has been found to be comparable to direct measures of body fat such as underwater weighing and is considered a useful alternative to direct measures (Mei, Grummer-Strawn, Pietrobelli, Goulding, Goran, & Dietz, 2002;Widhalm, Schonegger, Huemer, & Auterith, 2001).

Demographic information will be used as controlling factors as well as to calculate BMI. The following will be included: age, height, weight, gender, ethnicity, family size, socioeconomic status, and family status.

Data Analysis

Data will first be screened and cleaned for improbable outliers within the given ranges. Based on the screening, participants who do not meet the established criteria will be eliminated prior to conducting a structural equation model (SEM). Structural equation modeling will be conducted using a maximum likelihood estimation technique in Amos 17.0 to evaluate the model. Maximum likelihood estimation will be used because it is robust even when the data are not normally distributed (Chou & Bentler, 1995).

As specified by the model, direct paths will be placed from attitude, subjective norm, and perceived behavioral control to intention, from perceived behavior control to behavior, from intention to behavior, and finally from behavior to obesity. In addition, attitude, subjective norm,

and perceived behavior control will be allowed to correlate (see figure 4).

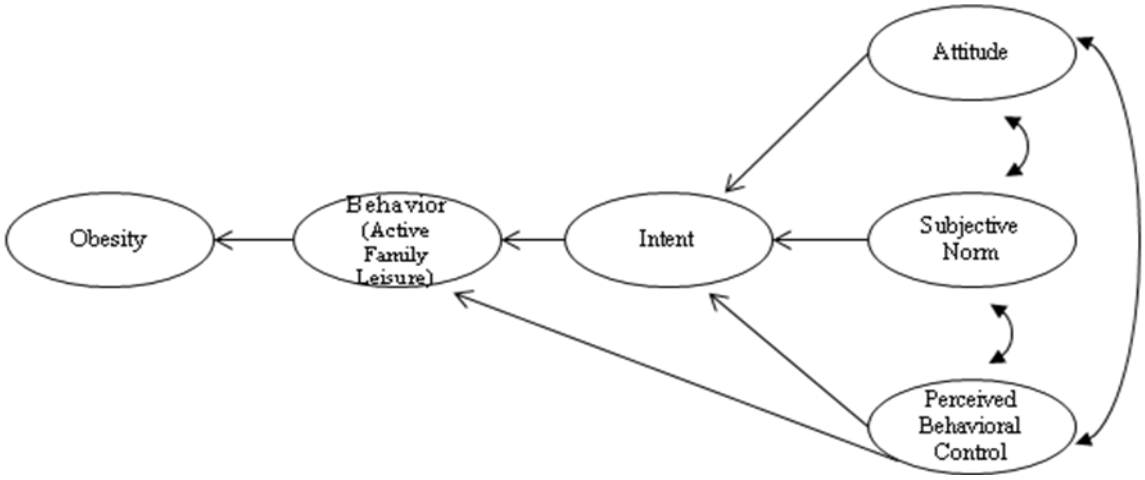

Figure 4. Direct Paths Model of the TPB

A four step approach (Kline, 2005) will be used to estimate the relationships of attitude, subjective norm, perceived control on intention and intention on behavior leading to obesity. First, model specification will test if the structural model is consistent with the data. This involves building a path diagram and testing it. The path analysis will first test deleted paths based on the theory, test the specified paths, and finally trim the model. Revisions to the path diagram will be based on both theory and statistical diagnostics. Second, revise the measurement model if needed. Confirmatory factor analysis (CFA) will be used to test attitude, subjective norm, perceived control, intention, and behavior. A CFA will not test obesity. This variable is measured by BMI exclusively. Third, model estimation will combine the path diagram and CFA to construct the hybrid model. Analysis will be done to test the specified paths and trim paths based on the model theory and statistical diagnostics. Fourth, the model will be tested using model fit indices to determine if the modified model is better than the null (Kline).

As recommended by Kline (2005) a variety of conservative model fit indices will be examined to evaluate overall model fit. First, a chi-square test. A nonsignificant chi-square statistic is unlikely (Kline) and a significant chi-square test is typically not used to reject a

model. To account for the expected larger sample size a χ^2/df ratio will be examined. Absolute fit indexes will be examined, the comparative fit index (CFI) will be considered to evaluate the model's absolute or parsimonious fit relative to the null or hypothetical model. An index score of .95 or greater is desired. The root mean square error of approximation (RMSEA) will be considered to assess fit based on the magnitude of the residuals. An index score of .08 or less is desired. The RMSEA is often considered one of the most valuable fit indices in SEM (Martin et al., 2005). Different potential models such as gender or family status comparisons will be compared using the Akakike's information criterion model (AIC), when comparing models the lower the AIC index score, the better the model fit. The AIC adds a penalty for model complexity.

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Appendix A-1

Obesity Trends in America

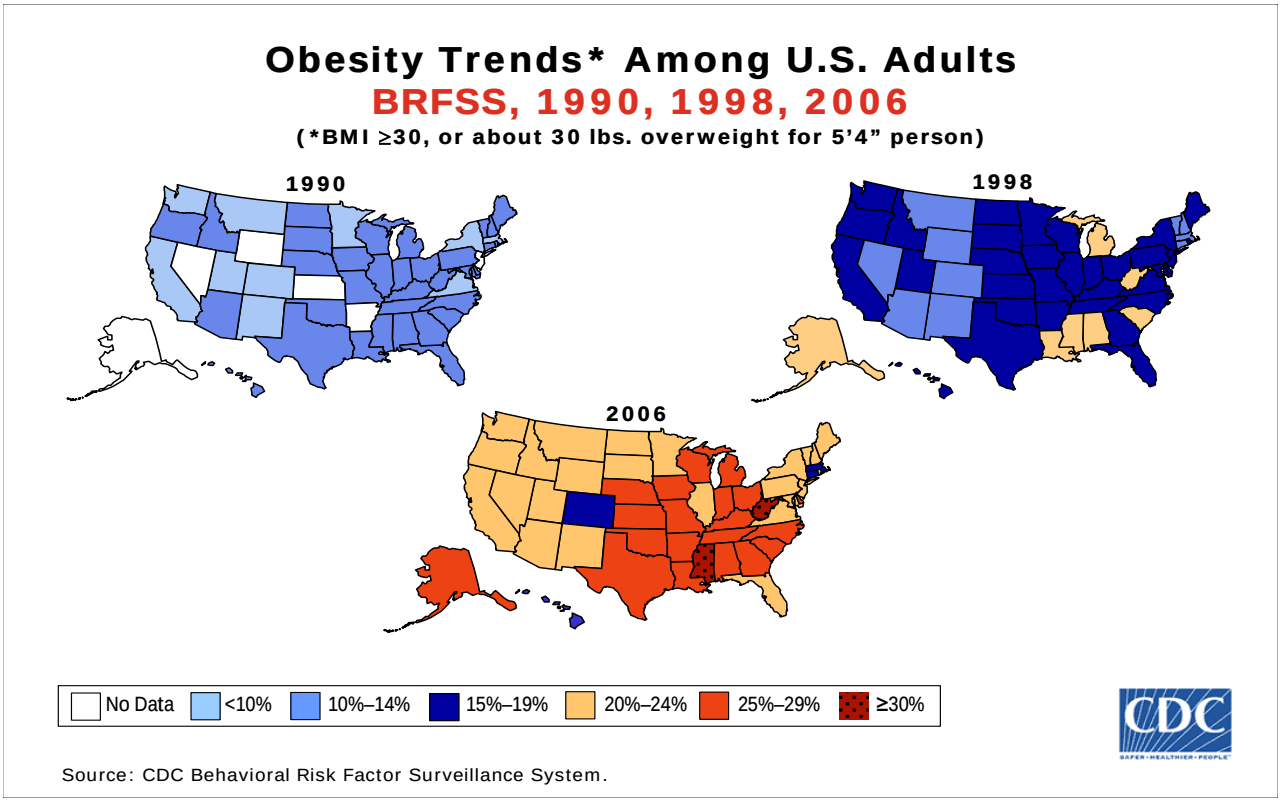

Figure 1. Obesity Trends among U.S. Adults

Note: (DHHSCDCP, 2007b)

Prevalence of Overweight* Among U.S. Children and Adolescents (Aged 2–19 Years)				
	Survey Periods			
	NHANES I 1971–1974	**NHANES II 1976–1980**	**NHANES III 1988–1994**	**NHANES 2003–2004**
Ages 2 through 5	5%	5%	7.2%	13.9%
Ages 6 through 11	4%	6.5%	11.3%	18.8%
Ages 12 through 19	6.1%	5%	10.5%	17.4%

*Sex-and age-specific BMI ≥ 95th percentile based on the CDC growth charts
Sources:

Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999–2002. *JAMA* 2004;291:2847–2850.

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Figure 2. Prevalence of Overweight among U.S. Children and Adolescents (Aged 2-19 Years)

Note: (DHHSCDCP, 2007)

Appendix A-2

Consent to Participate

As a participant in this study, you will be asked to complete a questionnaire, which will take approximately 10-15 minutes. There are minimal risks of participation in this study; however you may feel some emotional discomfort when answering questions about your weight. There are no direct benefits of participation in this study. Participation is voluntary. Please be honest. You have the right to withdraw at anytime or refuse to participate entirely without any repercussions.

If you have questions regarding this study please contact Shallie Ehlers at (801) 422-8914. If you have questions regarding your rights as a participant please contact Dr. Christopher Dromey, Chair of the Institutional Review Board for Human Subjects at Brigham Young University (133 TLRB, BYU, Provo, UT 84602; phone 801-422-6461; email:dromey@byu.edu).

Please answer all questions. If the next page does not load properly, click the "back" button on your browser and try again.

By answering yes and submitting the following demographic survey and assessments, you are giving your consent to participate.

Do you consent to be a participant in this research study?

___Yes ___No

Appendix A-3

Theory of Planned Behavior Questionnaires

Behavioral Intention

I have **decided** to do physical activity **with my family** that makes me breathe hard or feel tired during my leisure time this week

Definitely False						Definitely True
1	2	3	4	5	6	7

I **will try** to do physical activity **with my family** that makes me breathe hard or feel tired during my leisure time this week.

Definitely False						Definitely True
1	2	3	4	5	6	7

I **plan** to do physical activity **with my family** that makes me breathe hard or feel tired during my leisure time this week.

Definitely Do						Definitely Do Not
1	2	3	4	5	6	7

Attitude

Participating in physical activity **with my family** during my leisure time that makes me breathe hard or feel tired is…

Unenjoyable	1	2	3	4	5	6	7	Enjoyable
Unhealthy	1	2	3	4	5	6	7	Healthy
Bad	1	2	3	4	5	6	7	Good

Subjective Norm

My **family** believes that it is important that I participate in **active family leisure** that makes me breathe hard or feel tired during my leisure time.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

How important is it to you that your **family** believes you should participate in **physical activity with your family** during your leisure time that makes you breathe hard or feel tired?

Not at all Important						Very Important
1	2	3	4	5	6	7

My **peers** believe that it is important that I participate in **active family leisure** that makes me breathe hard or feel tired during my leisure time.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

How important is it to you that your **peers** believe you should participate in **physical activity with your family** during your leisure time that makes you breathe hard or feel tired?

Not at all Important						Very Important
1	2	3	4	5	6	7

Perceived Behavioral Control

If I want to, I can participate in physical activity **with my family** that makes me breathe hard or feel tired during my leisure time

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

It is mostly up to me whether I participate in physical activity **with my family** that makes me breathe hard or feel tired during my leisure time.

Strongly Disagree						Strongly Agree
1	2	3	4	5	6	7

For me to participate in physical activity **with my family** that makes me breathe hard or feel tired during my leisure time would be:

Impossible						Possible
1	2	3	4	5	6	7

How much control **do you believe** you have over participating in physical activity **with my family** that makes me breathe hard or feel tired during my leisure time?

No Control						Complete Control
1	2	3	4	5	6	7

Appendix A-4

Godin Leisure Time Exercise Questionnaire

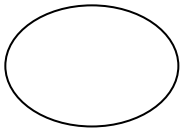
Active Family Leisure

Considering a **7-day** period (a week), how many times on average do you do the following kinds of exercise for **more than 15 minutes** during your free time **with your family**?

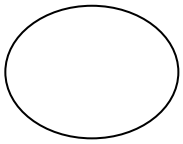
For each category, underline all the activities you participate in **with your family**, and write the total number of times for all activities in the corresponding circle. For example, if you play basketball **with your family** for more than 15 minutes on three occasions a week, and hockey **with your family** for more than 15 minutes once a week, underline basketball and hockey and put 4 in the first circle. Then go on to the next category, etc.

TIMES PER WEEK

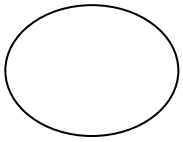
STRENUOUS EXERCISE
(HEART BEATS RAPIDLY)
(i.e., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling, other [specify] _____)



b) **MODERATE EXERCISE**
(NOT EXHAUSTING)
(i.e., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing, other [specify] _____)



c) **MILD EXERCISE**
(MINIMAL EFFORT)
(i.e., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking, other [specify] _____)



Considering a **7-day** period (a week), during your leisure-time, how often do you engage in any regular activity **with your family** long enough to **work up a sweat** (heart beats rapidly)?

1. ❑ Often 2. ❑ Sometimes 3. ❑ Never/Rarely

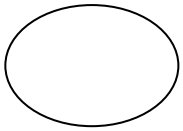
Individual Active Leisure

1. Considering a **7-day** period (a week), how many times on average do you do the following kinds of exercise for **more than 15 minutes** during your free time **with a sports team, friends, or individually**?

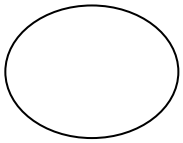
For each category, underline all the activities you participate in **with a sports team, friends or individually**, and write the total number of times for all activities in the corresponding circle. For example, if you play basketball with **a sports team, friends, or individually** for more than 15 minutes on three occasions a week, and hockey with **a sports team, friends, or individually** for more than 15 minutes once a week, underline basketball and hockey and put 4 in the first circle. Then go on to the next category, etc.

TIMES PER WEEK

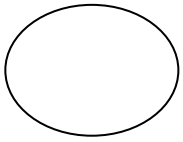
a) **STRENUOUS EXERCISE**
(HEART BEATS RAPIDLY)
(i.e., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling, other [specify] _____)



b) **MODERATE EXERCISE**
(NOT EXHAUSTING)
(i.e., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing, other [specify] _____)



c) **MILD EXERCISE**
(MINIMAL EFFORT)
(i.e., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking, other [specify] _____)



2. Considering a **7-day** period (a week), during your leisure-time, how often do you engage in any regular activity **a sports team, friends, or individually** long enough to **work up a sweat** (heart beats rapidly)?

1. ❑ Often 2. ❑ Sometimes 3. ❑ Never/Rarely

Appendix A-5

Center for Disease Control-Body Mass Index-For-Age Growth Charts

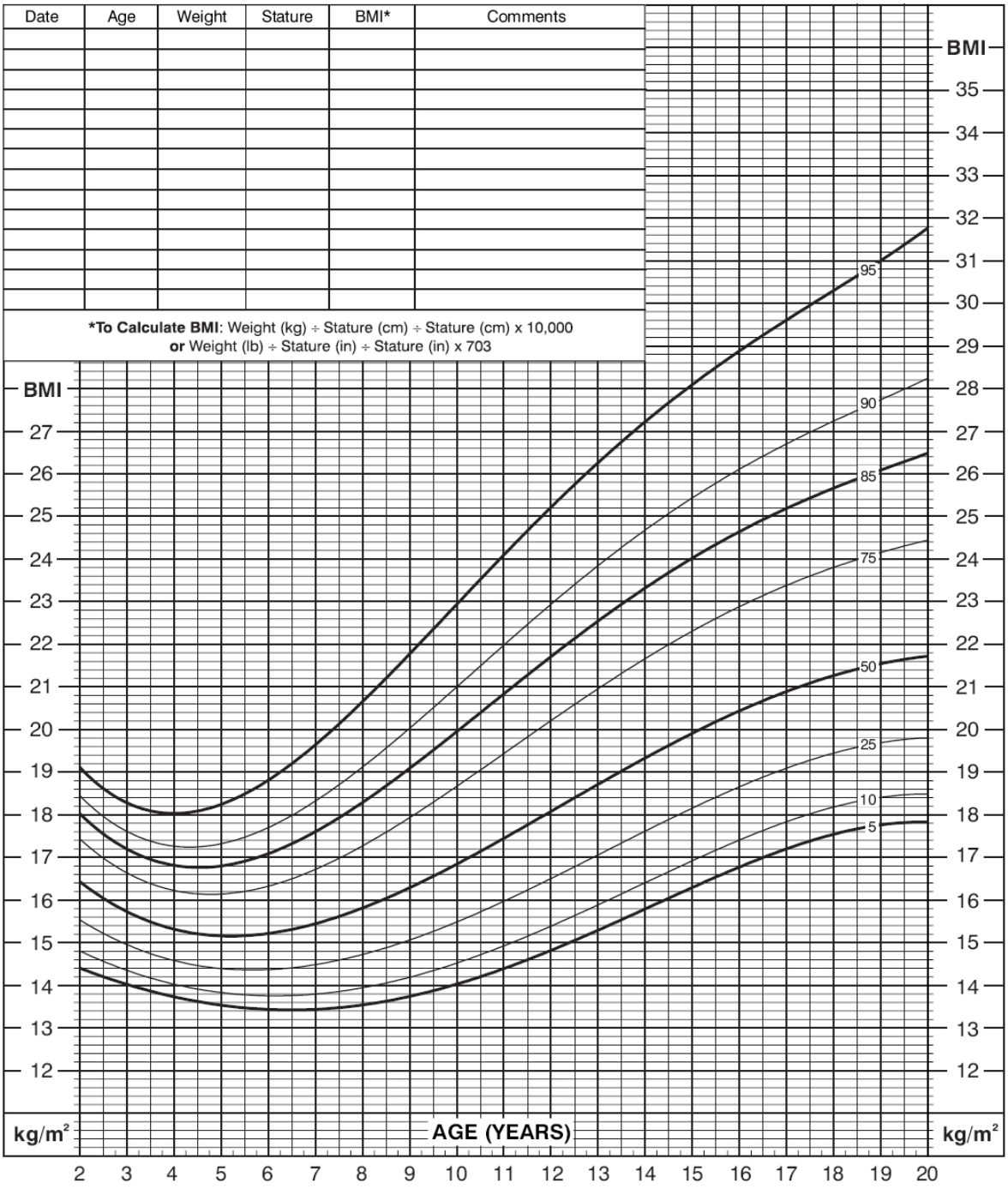
2 to 20 years: Girls
Body mass index-for-age percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 10/16/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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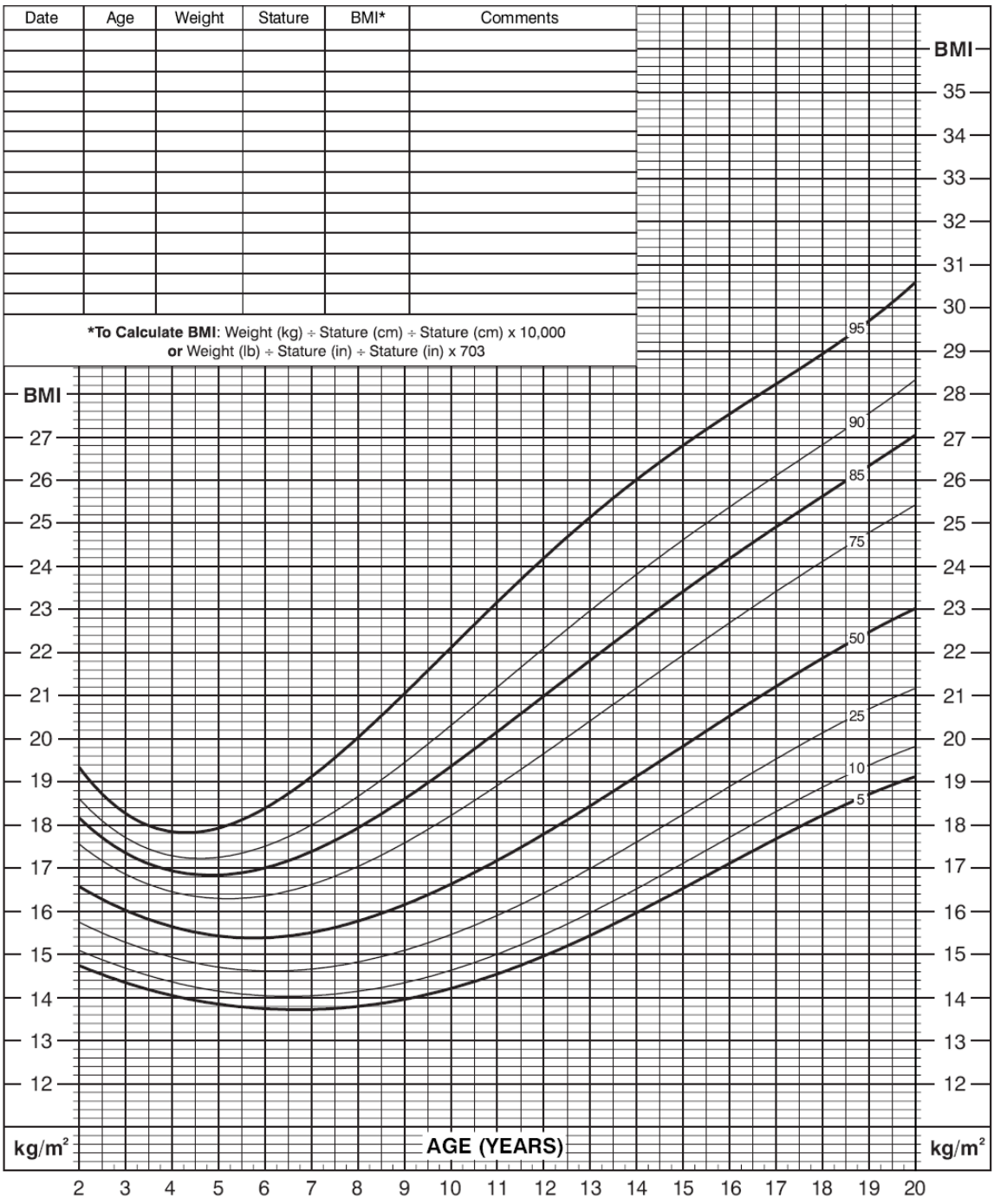
2 to 20 years: Boys
Body mass index-for-age percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 10/16/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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Appendix A-6

Demographic Questions

What is your gender?

___Male ___Female

What is your age?

___10 years ___14 years ___18 years
___11 years ___15 years ___19 years
___12 years ___16 years ___20 years
___13 years ___17 years

What is your height? ____ft _____in

What is your weight? _____lbs

What is your ethnicity?

___Caucasian
___African American
___Hispanic
___Asian
___Pacific Islander
___Native American
___Other (please specify)_____

Which one of the following categories does your family fit under?

___Upper class
___Upper-middle class
___Middle class
___Lower-middle class
___Lower class
___Poverty

What is your parent's annual income?

___5,000-$9,999 ___$30,000-39,000 ___$60,000-$69,000 ___$90,000-$99,000
___$10,000-19,999 ___$40,000-$49,000 ___$70,000-$79,000 ___$100,000+
___$20,000-29,000 ___$50,000-$59,000 ___$80,000-$89,000

Do you feel that you have…(please choose one)

___less than what you need
___what you need
___what you need and some of what you want
___what you need and most of what you want
___what you need and all of what you want

How many people are in your family?

___1 ___4 ___7 ___10+
___2 ___5 ___8
___3 ___6 ___9

What is your family status?

___Live with both parents	___Live with both parents and sibling(s)
___Live with mother only	___Live with mother only and sibling(s)
___Live with father only	___Live with father only and siblings(s)
___Live with mother and stepfather	___Live with mother and stepfather and sibling(s)
___Live with father and stepmother	___Live with father and stepmother and sibling(s)

Do you have a parent, brother or sister, related by blood, who is considered by health professionals as being overweight or obese?

___Yes ___No ___Not sure ___Not Applicable

Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by circling the appropriate number on the line following that item. Please be open and honest in responding.

1	2	3	4	5	6	7
Strongly Disagree	disagree	slightly disagree	neither agree nor disagree	slightly agree	agree	strongly agree

1.	In most ways my family life is close to ideal.	1 2 3 4 5 6 7
2.	The conditions of my family life are excellent.	1 2 3 4 5 6 7
3.	I am satisfied with my family life.	1 2 3 4 5 6 7
4.	So far I have gotten the important things I want in my family life.	1 2 3 4 5 6 7
5.	If I could live my family life over, I would change almost nothing.	1 2 3 4 5 6 7