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Mediators of weight loss in an internet-based intervention for African American adolescent girls

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MEDIATORS OF WEIGHT LOSS IN AN INTERNET-BASED INTERVENTION FOR
AFRICAN-AMERICAN ADOLESCENT GIRLS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by
Marney Ann White
B.S., University of Virginia, 1991
M.A., James Madison University, 1998
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For Tookie

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On the off-chance that I do not win an Oscar some day, I am forced to acknowledge that this might be the closest I ever get to an acceptance speech. So, with my political agenda in check, I would like to thank the following people:

Obviously, to my agent and director, Donald A. Williamson, I couldn't have done it without you. Thanks for getting me the audition, teaching me the fine nuances of the role, allowing me to ad-lib occasionally, and pushing me until I nailed it in the final cut. Your choreography, as always, deserves an award of its own. Thank you.

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Um… I know I'm forgetting someone.

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I love you all.

All the way up to the sky.

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ABSTRACT

The primary aim of this study was to assess the process variables involved in a weight loss program for African-American adolescent girls. This internet-based intervention compared a behavioral treatment program to an educational treatment program; it was hypothesized that participants randomized to the behavioral condition would lose more weight at 6 months than those in the educational condition. Several process variables have been identified as affecting success in *in vivo* weight loss programs for adults and children, including program adherence, self-efficacy, and social support. The current study sought to broaden the understanding of these process variables as they pertain to an intervention program that is presented via the internet. It was hypothesized that variables such as program adherence, dietary self-efficacy, psychological factors, and social support factors would mediate the effect of experimental condition on weight loss. Results partially supported the hypotheses. For weight loss among adolescents, parent variables pertaining to life and family satisfaction were the strongest mediating variables. For parent weight loss, changes in dietary practices over the course of 6 months were the strongest mediators. These findings suggest that family/parental variables exert a strong influence on weight loss efforts for adolescents. Future treatment studies should emphasize the role of the family and incorporate components to address psychological well-being of other family members to facilitate success.

INTRODUCTION

Obesity is associated with a myriad of health problems such as diabetes and other metabolic disorders, essential hypertension, and coronary heart disease. Despite the known chronic health problems that result from overweight status, the prevalence of obesity in America continues to rise (National Task Force on the Prevention and Treatment of Obesity, 1994). In addition, the rate of obesity among children and adolescents has increased in recent years; recent estimates report a 22% rate of overweight status among children between 6 and 17 years old (Wisniewski & Marcus, 1998). Childhood obesity is particularly problematic in that children who are overweight are at increased risk of becoming obese as adults (Bandini & Dietz, 1992; Lissau-Lund-Sørensen & Sørensen, 1992; National Task Force on the Prevention and Treatment of Obesity, 1994; Serdula et al., 1993), and obesity in adolescence is more likely to continue into adulthood than childhood obesity (Dietz, 1999). Compared to overweight adults who were normal-weight in childhood, adults who were overweight as children are more likely to be severely obese (Rimm & Rimm, 1976). In addition, there is a strong positive relationship between body weight and blood pressure among school-aged children (Foster, Voors, Webber, Frerichs, & Berenson, 1977), and overweight children are more likely than non-obese children to have cardiovascular risk factors such as high blood pressure and unhealthy serum lipid levels (Dwyer et al., 1998; Freedman et al., 1985).

Among overweight children, the risk of developing chronic obesity is increased if at least one biological parent is overweight (Dietz, 1999; Eck, Klesges, Hanson, & Slawson, 1992; Wisniewski & Marcus, 1998). Indeed, parental obesity has been cited as the most important variable in predicting obesity for children (Epstein, Valoski, Wing, &

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McCurley, 1990); this association is likely due to both genetic (Greenlund et al., 1996) and environmental factors (Allison, Heshka, Neale, & Heymsfield, 1994). In addition, a stronger association has been found among females, such that the relationship between maternal weight and that of her offspring is stronger than that of the father (Greenlund et al., 1996).

These population estimates underscore the need for primary and secondary prevention programs for obesity and associated chronic health problems (National Task Force on the Prevention and Treatment of Obesity, 1994). Research from intervention programs has shown that a reduction in body weight can substantially decrease the risk of developing diabetes and cardiovascular disease. For example, among children identified as overweight, weight loss maintained throughout adolescence predicted reductions in blood pressure at 11-year follow-up (Clarke, Woolson, & Lauer, 1986). Coates, Jeffery, Slinkard, Killen, and Danaher (1982) found strong relationships (correlations of .40 - .70) between weight loss and reductions in serum lipids and blood pressure. In addition, weight loss achieved in childhood can reduce the likelihood of developing obesity in adulthood. As such, there is a need for secondary prevention programs geared toward children identified as at-risk for developing obesity in adulthood.

REVIEW OF THE LITERATURE

Obesity among African-Americans

While the prevalence of obesity is increasing in general, particular sub-groups of the population are more likely to be obese than others and to be at greater risk of developing serious physical/medical problems as a function of overweight status (Bray, 1998; National Task Force on the Prevention and Treatment of Obesity, 1994). For example, African-Americans are more likely than Caucasians to be obese (Abrams, Allen, & Gray, 1993; Klesges, DeBon, & Meyers,1996; Rand & Kuldau, 1990), and to suffer cardiac and metabolic disorders such as diabetes (Fitzgibbon, Stolley, & Kerschenbaum, 1995). Similarly, African-American children are more likely to be obese than are Caucasian children (Dwyer et al., 1998; Morrison et al., 1995). Compared to other gender and ethnic groups, African-American girls are at highest risk for developing chronic health problems associated with obesity (Fitzgibbon et al., 1995).

Several factors have been hypothesized to contribute to the discrepancy in prevalence of obesity across racial/ethnic groups. Eating and exercise behaviors differ across cultural groups, indicating sociocultural factors play a role in rates of obesity (Jeffery, 1991). In particular, it has been speculated that sociocultural factors drive standards of desirable body shapes or body ideals within cultures, which in turn drive dieting behavior (Flynn & Fitzgibbon, 1998). For example, Abrams, Allen and Gray (1993) found that black college women were less concerned about weight loss than were white women. Therefore, it may be that within the black culture, there is less emphasis on the thin ideal for women; likewise there may be a greater acceptance of heavier figures, as well as less stigma associated with obesity (Hebl & Heatherton, 1998). It has been

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suggested that black women are likely to be more accepting of heavier frames because obesity is simply more normative in black cultures (Allan, Mayo, & Michel, 1993; Klesges, DeBon, & Meyers, 1996). Indeed, Powell and Kahn (1995) found that African-American women preferred a heavier ideal body shape than did white women.

Among white women, concerns about weight and efforts to control weight exist regardless of actual overweight status. Several studies have found that although black women are significantly heavier than white women, white women report greater body dissatisfaction and a greater desire to lose weight than black women (Abood & Chandler, 1997; Abrams, Allen, & Gray, 1993; Akan & Grilo, 1995; Cash & Henry, 1995; Harris, 1994; Harris, Walters, & Waschull, 1991; Henriques, Calhoun, & Cann, 1996; Miller et al., 2000; Molloy & Herzberger, 1998). Although black women may perceive themselves to be overweight, they still consider their bodies to be attractive (Kumanyika, Wilson, & Guilford-Davenport, 1993). Rucker and Cash (1992) reported that the 64% of the African-American women in their sample reported that they would rather be "a little overweight" than "a little underweight." Body image research has found that Caucasian women are less satisfied with their body shapes than African-American women (Altabe, 1998; Rosen et al., 1991; Williamson et al., 2000). Using figural stimuli to measure perceptions of body image, Williamson et al. (2000) found that African-American women do not perceive themselves to be as overweight as their BMI-matched Caucasian counterparts. African-American women reported less discrepancy between their current and ideal body sizes than Caucasian women. Similarly, Rand and Kuldau (1990) found that African-American women did not report that they had a weight problem until reaching a significantly higher BMIs than their white counterparts.

Taken together, the body image literature indicates that among black women, positive body image and an acceptance of heavier body shapes are likely to serve as risk factors for obesity (Flynn & Fizgibbon, 1998; Williamson et al., 2000). While there are certain psychological benefits of positive body images, the negative consequences of increased obesity risk cannot be ignored. Black females perceive themselves as normal or healthy weight when they are actually overweight (Dawson, 1988). African-American women are less likely than Caucasians to report that they are overweight (Klesges, DeBon, & Meyers, 1996). Indeed, moderately overweight black women are seldom told by health professionals that their weight is cause for concern; as such many black women may be unaware of the health risks associated with obesity until a serious health problem develops (Kumanyika et al., 1993).

Recent investigations indicate that a similar pattern exists among children. Compared to Caucasian adolescents, African-American girls are less likely to experience body image dissatisfaction and are less likely to diet in an effort to lose weight (White, Kohlmaier, Varnado-Sullivan, & Williamson, 2003).

Additional Problems Associated with Obesity. In addition to the health problems associated with overweight status, obese individuals suffer a variety of social and psychological sequelae, including social stigmatization. For example, obese individuals are judged to be less socially competent (Davis-Pyles, Conger, & Conger, 1990), and may face job discrimination as a function of their overweight status (Rothblum, Miller, & Garbutt, 1988). In addition, obese children exhibit more social withdrawal, depression, and somatization than their normal-weight peers (Israel & Shapiro, 1985).

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Treatments for Childhood Obesity

Given the grave health risks and psychosocial problems associated with childhood obesity, several primary and secondary prevention programs have been undertaken to guard against obesity in adulthood. Intervening at the level of food-service, educational programs have been successful in decreasing the level of fat consumed at school (Luepker et al., 1996). However, it is unknown whether these effects generalize to meals consumed away from school; as children did not lose weight or show improvements in blood pressure or cholesterol levels, the intervention was rather limited. School-based nutritional education efforts may be somewhat efficacious, although their primary benefit may be in increasing knowledge rather than changing behavior. In general, school-based interventions do not consistently yield much in the way of behavior change; it has been suggested that the primary obstacle in these interventions is that they do not target or involve parents (Dunn, Lackey, Kolasa, & Mustian, 1998).

Variables that Predict Success in Weight-loss Programs

A variety of strategies have been employed across weight-loss programs for children. The "straight dietary approach" provides dietary and physical activity education and recommendations, but does not advocate the use of specific behavioral techniques. In general, this approach has not been effective with children (Coates & Thoresen, 1978). Strategies employing face-to-face contact with a dietitian or other consultant are more effective than information-transmission approaches, and the frequency of contact with the consultant is an important moderator in predicting weight loss (Davis & Christoffel, 1994). However, straight dietary approaches, while occasionally effective in the short-term, do not yield positive success rates at follow-up as most of the weight is regained.

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Overall, straight dietary recommendations are insufficient as a successful weight loss treatment.

Behavioral Techniques. In addition to education regarding nutrition and the importance of physical exercise, programs that employ behavioral techniques such as stimulus control procedures and regular reinforcements for program adherence show greater success (e.g., Coates & Thoresen, 1978; Weiss, 1977). As is the case with adults, weight-loss programs employing behavioral techniques have been successful in treating children (e.g., Aragona, Cassady, & Drabman, 1975). In addition, interventions have been shown to be more successful with younger children (Davis & Christoffel, 1994), perhaps because unhealthy eating "habits" or styles are more malleable and therefore less difficult to change in younger children (Faith, Saelens, Wilfley, & Allison, 2001). Aragona et al. (1975) reported that children whose parents were taught behavioral reinforcement techniques and instructed to institute a token economy for dietary and exercise compliance showed the most weight losses following the 12-week treatment. Compared to the control and response-cost only group, the response-cost plus reinforcement group was also more successful in maintaining weight loss. Additional components of the behavioral group included parental recording of the child's food intake, the implementation of stimulus control procedures, and charting of weight. In a meta-analysis of weight-loss programs for children, Haddock, Shadish, Klesges, and Stein (1994) investigated four components in obesity-treatment programs for children to test their relative efficacy. These components are: dietary, exercise, behavioral modification, and parent participation. Of these, behavioral modification techniques

were most predictive of positive outcome. It is well established that adherence to behavioral prescriptions predicts weight loss (Sandifer & Buchanan, 1983).

Family-based Interventions. To date, the most successful prevention programs have employed behavioral techniques and have involved participation from the overweight child and at least one parent. For example, Espstein, Valoski, Wing, and McCurley (1994) reported the results of a of behavioral intervention to treat childhood obesity. In this study, children ages 6 – 12 participated in a year-long weight reduction program that employed face-to-face treatment sessions for 8-12 weeks, with monthly follow-up sessions for one year. The dietary protocol followed the "Traffic Light Diet" (Epstein & Squires, 1988) which is a dietary guideline catered specifically to children and employing a simple-to-follow classification procedure for foods. Foods are classified by the colors green, yellow, and red according to their caloric content. Green foods are those that are less than 20 calories per serving and are described as "good foods that help you lose weight." Green foods consist mainly of fruits and vegetables. Yellow foods are also described as "good" foods, but those that should be consumed in moderation. They are low-calorie proteins, grains, and some fruits and vegetables and are around 20 calories per serving. The red foods are to be avoided, as they are high in fat and calorie content but low in nutrient density, and include desserts, candies, and fried foods. Using these guidelines, children are instructed to select foods to fit within a 1200 or 1500 calorie daily diet. Additional components of this program include exercise, behavioral contracting, and assertiveness training. In addition, parents play a large role in the program, and are taught behavioral techniques (such as implementing a reward system). In addition, the importance of modeling to increase children's adherence to the program

is stressed. Investigations conducted by other research teams have underscored this aspect, as parents attempting to achieve weight loss themselves are more likely to adhere to the program than are parents who participate in only a "helper" capacity (Israel, Solotar, & Zimand, 1990).

Results of these family-based interventions indicate improvement at program completion, as well as at 5-year and 10-year follow-up. Epstein, Wing, Koeske, Andrasik, and Ossip (1981) reported that upon completion of an 8-month program, 40% of the participants had achieved non-obese status (defined as BMI within 20% of ideal weight for age group). In addition, the parent participants also achieved lower weight. These losses were, for the most part, maintained at 5-year follow-up, with a 12.7% reduction from baseline in the proportion of children classified as overweight (Epstein, Wing, Koeske, & Valoski, 1987). Treatment gains were also revealed at 10-year follow-up, with 43% of the children maintaining weight decreases (Epstein, Valoski, Wing, & McCurley, 1994).

Epstein and colleagues have investigated the importance of parental participation in the programs, and have determined that children participating with at least one parent were more successful than children participating alone both at program completion (Espstein et al., 1987) and at 10-year follow up (Epstein, Valoski, Wing, & McCurley, 1990). Collectively, the Epstein et al. studies showed successful treatment of childhood obesity that was maintained until young adulthood. In all studies described above, parents successfully lost weight as well; however at follow-up parents were more likely to have returned to baseline, following the typical pattern of weight loss and regain observed in adults (Epstein et al., 1990; Epstein et al., 1994). The addition of an exercise

component to the Traffic Light Diet led to better outcome at one-year follow-up for parents, indicating that for parents, exercise prescriptions may be particularly important to avoid weight regain (Epstein et al., 1994). Further, it has been suggested that children may be more successful than adults because the primary agent of reinforcement is external (i.e., the parent) (Faith, Saelens, Wilfley, & Allison, 2001). Therefore, these intervention studies highlight the need for early intervention that begins in childhood or adolescence in order to prevent chronic obesity in adulthood.

Social Influence of Eating Behaviors. According to social learning and observational learning paradigms, learning occurs when individuals observe a role model's behaviors and pattern their own behaviors accordingly. Early studies of imitative learning have shown consistently that children model their behaviors after those of an adult (Bandura, Ross, & Ross, 1961; 1963). Researchers have applied social learning theories to the acquisition of maladaptive eating behaviors, revealing that individuals imitate the eating behaviors of those in their environment (e.g., Polivy, Herman, Younger, & Erskine, 1979). As parents serve as the primary role models for children, intervention with parents is important in treating childhood obesity (von Almen, Figueroa-Colon, & Suskind, 1992). Since unhealthy eating behaviors may be transmitted from parents to children, parents can also model healthy behavior change.

Parental Involvement. There is a consensus that parental involvement in treating childhood obesity is beneficial (Faith, Saelens, Wilfley, & Allison, 2001; Perry, Crockett, & Pirie, 1987). Parents serve multiple functions during treatment, including delivering external reinforcements for healthful behaviors and modeling appropriate eating and exercise behaviors. Since parents are usually responsible for purchasing and cooking

foods served in the home, they are potentially strong agents for dietary change (Dietz, 1999). In addition, programs geared toward both parents and children have been effective in improving the health behaviors and weight status of parents, as well as improving their status as a role-model of healthy behaviors (Stolley & Fitzgibbon, 1997). Parental encouragement to lose weight as well as positive responses to weight loss attempts are important variables in determining whether a child is likely to initiate dieting efforts (Huon & Walton, 2000). Collectively, these studies suggest that parental variables are important in initiating and maintaining weight loss efforts among children, however scant research focusing specifically on parent variables as they relate to child weight loss has been reported.

In an investigation of parental adherence to psychological recommendations in general, MacNaughton and Rodrigue (2001) reported that parental adherence was most influenced by perceived barriers to completing recommendations. Participants were parents and legal guardians of children who sought services at a psychological treatment facility for various problems including learning disabilities, anxiety, depression, attention-deficit hyperactivity disorder, and psychosis. Treatment recommendations included psychological services, school-based recommendations, active self-help, and other non-psychological professional services. Parental adherence was not predicted by locus of control, problem severity, satisfaction with evaluation, or parental understanding of the recommendation. Of those barriers that predicted parental adherence, beliefs and attitudes about the intervention accounted for 30% of the reported barriers. Examples of negative beliefs were that 1) the parents did not believe that the intervention would be helpful, or 2) the parents did not want to follow the treatment recommendation. The most

frequently reported barriers (39%) were problems with access to treatment, such as transportation problems.

In a study of adherence and treatment success in weight loss, Israel, Silverman, and Solotar (1988) investigated the relationship between adherence and weight loss for children. Adherence was defined as the combination of parental and child completion of recommendations including food records, activity records, activity goals, following calorie limits, completion of nutrition summaries, and completing cue controls (stimulus control behaviors such as eating in one place). Of these, only the completion of food records emerged as a significant predictor of weight loss in children. It is interesting to note that the completion of food records was a joint activity, in which parents and children completed the child's food records together. This study highlights the importance of parental adherence in facilitating weight loss in children.

In addition to adherence to dietary and physical activity recommendations, a primary obstacle to weight loss treatment for children is getting parents to participate (Robinson & Killen, 2001) and/or the unwillingness of parents to travel to attend counseling sessions (Dunn, Lackey, Kolasa, & Mustian, 1998). The unwillingness of parents to attend treatment sessions is particularly unfortunate, as weight loss intervention studies involving mothers and daughters showed that weight loss in daughters was related to the number of sessions attended by the mother (Wadden et al., 1990) and that the number of sessions attended by the daughter is strongly correlated with the number attended by the mother (Stolley & Fizgibbon, 1997).

In addition, parental psychopathology may interfere with program effectiveness. Favaro and Santonastaso (1995) found that mothers' neuroticism and obsessive-

compulsive symptoms as measured by the Brief Symptom Index were inversely related to weight loss, such that children with more neurotic mothers were less successful in treatment.

Computer-assisted Therapy

In recent years, the use of computer technology has been suggested as a cost-effective approach to supplement or replace traditional face-to-face counseling for weight reduction (Agras, Taylor, Feldman, Losch, & Burnett, 1990; Taylor, Agras, Losch, Plante, & Burnett, 1991). Computers provide a means of convenient and accurate recording of daily food intake and physical activity. In addition, computers afford more opportunity for "interactions" and feedback, as responses may be automatized and therefore more immediate than would be provided during weekly counseling sessions with a psychologist or dietitian. Computer technology has been applied in the form of internet-based interventions as well.

The internet is being used for psychological research, psychological testing, diagnostic assessment, and in the treatment of several disorders, including eating disorders, anxiety disorders, substance abuse problems, bereavement, and mood disorders (Briscoe, 1997; Laszlo, Esterman, & Zabko, 1999). In particular, the internet provides unique opportunities for the delivery of services, resulting in the growing fields of clinical intervention now referred to "telehealth," "behavioral telehealth," "teletherapy" and "telemedicine."

Very few studies have examined the efficacy of telehealth treatments (Laszlo et al., 1999; Schneider, 1999). However, the few research studies that have been conducted reveal that virtual communities may be effective in the treatment of mental disorders.

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Although teletherapies have been shown to be superior to no treatment, it is currently unknown if teletherapies are as effective as *in vivo* therapy. One study compared face-to-face, audio, and video therapy and found no differences among the media (Schneider, 1999). These findings indicate that the internet may be particularly useful in situations in which *in vivo* therapy is impossible. For example, telehealth interventions may be particularly useful for those people who are homebound due to illness or disability, or those who live in remote areas in which travel for *in vivo* sessions would be difficult or impossible. Teletherapy also provides a unique means to provide family therapy to those families who are geographically separated (King, Engi, & Poulos, 1998).

Cognitive-behavioral therapy may be particularly amenable to a text-based medium such as email or chat room formats (Laszlo et al., 1999). Clinicians can point out themes and cognitive errors through analysis of written word which would be informative for the clients in learning to recognize their cognitive errors. In addition, the internet provides a unique means for clients to complete self-monitoring forms (either via web-based forms or email) which allows more immediate and sophisticated analysis of reported behaviors. In addition, the electronic communications are flexible and may be organized into asynchronous (time-delayed) format or synchronous (real-time) modalities (Grohol, 1999).

In other situations, the internet may be used to supplement real-life therapy. Neill, Mainous, Clark, and Hagen (1994) reported survey results in which the majority of patients expressed a desire to use email to communicate with health care providers, citing the perceived advantages of increased efficiency and speed, improved documentation, and avoidance of telephone tag. Kane and Sands (1998) point out that email

correspondence with patients allows for carefully chosen words and provides more permanence than oral conversations. Patients may refer back to didactic components that are presented in emails. Email provides a means to communicate with clients between sessions much as one would via the telephone. However email communication provides unique benefits: the communication is asynchronous, and therefore less time-consuming. Essentially the use of email replaces the telephone, but with less urgency as both the clients and providers can check email and respond at their own convenience. Intermittent emails, therefore, may be used throughout the course of treatment to provide reminders to complete homework and to allow for verbal reinforcements and feedback.

Overall, the internet provides a unique opportunity to provide services to individuals who might not otherwise seek treatment. In addition, electronic communication can be used to complement and expand real-life therapy.

With regard to obesity treatment specifically, the use of computer-assisted therapy may be a novel way to overcome barriers to treatment. It is widely acknowledged that a primary component in increasing adherence to treatment is the provision of easily accessible interventions (National Task Force on the Prevention and Treatment of Obesity, 1994). As discussed above, often-cited reasons for dropout or non-adherence include transportation difficulties that prevent attendance in face-to-face counseling sessions. Therefore, the use of electronic media such as interactive websites and email affords a unique opportunity to provide participants with a convenient means of acquiring program information during convenient, yet frequent, times.

To date, two published studies have employed the use of internet technology in treatment for obesity. Harvey-Berino et al. (2002) tested the effectiveness of an internet-

based program to facilitate weight maintenance following successful weight loss. This study indicated that the internet-based program was not as effective in maintaining weight as face-to-face follow-up treatment. However, Tate, Wing, and Winett (2001) found that the internet was an effective medium for a behavioral weight loss program. Tate et al. compared an internet-based behavioral treatment program for weight loss to an internet-based educational treatment program. Participants were obese adults who were given access to a website that discussed topics relevant to weight loss. The behavioral treatment group was also sent educational materials via email (therefore directly "receiving" the educational material). Participants in the behavioral group were required to submit weekly food monitors and received individualized feedback from a therapist via email. Participants in the education group did not communicate with the therapists and were not required to submit food records. Results showed that the internet-based behavioral group lost more weight at 6 months than did the participants in the educational group. Therefore, this study paralleled the findings of *in vivo* weight loss studies, showing the superiority of behavioral interventions to straight educational approaches.

Computer Anxiety. Factors such as computer anxiety and lack of computer knowledge may serve as barriers to treatment in telehealth interventions. For example, computer anxiety has been shown to be related to computer usage in educational settings, such that college students with high computer anxiety are less likely to use computers (Necessary & Parish, 1996). Taylor et al. (1991) reported that adherence to a computer-assisted data collection procedure in which participants entered food records on a hand-held computer was correlated with measures of computer confidence. Previous research has shown that computer usage (i.e., adherence to submitting information via the

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computer) was related to weight loss in computer-assisted behavioral therapy programs (Burnett, Taylor, & Agras, 1992). As computer anxiety will likely affect computer usage, it logically follows that computer anxiety may influence the extent to which participants adhere to telehealth program requirements, as well as the extent to which they benefit from the interventions.

Culturally-tailored Approaches

As particular populations are at increased risk for obesity, the need for prevention and intervention studies aimed at these groups is paramount. As such, there is a need to tailor approaches to be culturally-sensitive and relevant (Dounchis, Hayden, & Wilfley, 2001; Kumanyika, 1987). For example, it has been suggested that in designing programs for African-Americans, treatments targeted to the family unit rather than the individual may be more appropriate and effective (Dounchis et al.). In creating an intervention program specifically for African-Americans, the heightened health risks for African-American females should be highlighted. Preliminary investigations of nutrition education for low-SES African-American mothers and daughters have shown some success in increasing general nutritional knowledge and decreasing daily fat intake (Fitzgibbon et al., 1995).

Dietary Self-efficacy

Current models of social-learning theory incorporate self-efficacy as a central component of behavior change (Bandura, 1978; Lytle & Achterberg, 1995). In this manner, an individual's beliefs in his or her ability to behave in a certain way, as well as his/her expectations regarding the outcome of the behavior influence the likelihood of the behavior's occurrence (Bandura, 1978). Similarly, the outcome of the behavior (i.e.,

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perceived environmental changes) influences self-efficacy and expectations regarding continued behaviors. Dietary self-efficacy refers to an individual's belief in his/her ability to adhere to dietary recommendations. As such, successful weight-loss would be predicted by dietary self-efficacy. In addition, weight loss and dietary self-efficacy are likely reciprocal in nature, such that weight reduction may lead to increases in self-efficacy.

Although self-efficacy is a central component of social-cognitive theories of weight loss and other health behaviors, limited research on self-efficacy and treatment outcome for obesity has been conducted. Among adults, low dietary self-efficacy has been found to be related to binge eating (Cargill, Clark, Pera, Niaura, & Abrams, 1999). Self-efficacy has also been related to session attendance and outcome in weight loss programs for adults (Clark, Abrams, Niaura, Eaton, & Rossi, 1991). In an investigation involving adults with binge-eating disorder, dietary self-efficacy was found to be related to treatment success, such that increases in self-efficacy were related to decreases in binge behaviors (Goodrick et al., 1999). However, the directionality of this association is not known; improved self-efficacy could have led to the improvements or could have been caused by the improvement. The authors did not compare baseline self-efficacy to treatment gains.

Among children, the construct of self-efficacy has been investigated with regard to other behaviors, such as school achievement (Parcel et al., 1995). Scant research has investigated the influence of dietary self-efficacy among children. In a school-based intervention to promote healthy eating and physical activity, Parcel, Simons-Morton, O'Hara, Baranowski, and Wilson (1989) showed that education regarding healthful food

choices led to increases in dietary self-efficacy. A survey of the literature regarding dietary self-efficacy revealed that self-efficacy is considered to be a primary individual risk-factor that is likely related to success in weight loss programs (Perry et al., 1990). However, to date no research has been reported that investigated the influence of dietary self-efficacy on weight reduction among children.

Summary

The next stage of intervention research for African-American females should address several factors. It is well-established that family-based treatments for childhood obesity are more successful than those treating the child alone. However, an often cited problem in providing family-based treatments is parental adherence due to low attendance in face-to-face treatment sessions. As barriers to treatment such as transportation are common, a novel approach to providing weight counseling services is needed. The use of computer technology to communicate information to weight loss participants may overcome these barriers by bringing the program components "into the home" where participants may review information and communicate at their convenience. A test of behavioral versus strict dietary informational approaches provided via the computer medium is a logical next extension of the accumulating literature indicating the superiority of behavioral treatments.

Computer technology also affords a unique advantage in terms of tracking program adherence. As participants are required to "log on" in order to access program information, the time spent reviewing materials can be systematically assessed. In addition, self-monitoring forms submitted in computerized form afford an advantage in that they can be stored and reviewed electronically.

In addition, several personal variables have been identified or theorized to influence the effectiveness of weight loss treatments. Drawing from social learning theory, dietary self-efficacy is viewed as a central component in dietary adherence. Although research with adults indicates that self-efficacy predicts individual's success in weight loss programs, little research on the dietary self-efficacy of children has been conducted to date. Further, social learning theory would suggest that a role model's behaviors would strongly influence those of a child. As such, a parent's adherence to the program, as well as the parent's motivation and/or psychological well-being, could be hypothesized to affect the child's adherence to behavioral prescriptions. Finally, as the primary adherence measures were collected through computer technology, it is possible that computer anxiety may have influenced adherence and ultimately weight loss.

Primary Aims

The primary aim of the current study was to investigate the influence of process variables in a behavior change program for weight loss, using an innovative form of information transmission through the internet. Research using face-to-face interventions has shown the superiority of behavioral treatments to educational treatments for weight loss. Further, research with adults has shown that internet-based behavioral treatments are superior to internet-based educational methods in promoting weight loss. The current program is the first internet-based weight loss intervention geared specifically toward adolescents.

Research on process variables in behavior change programs indicates that adherence to behavioral recommendations, such as attendance in face-to-face treatment sessions, is related to successful weight loss. One possible explanation for this finding is

that attendance in face-to-face sessions increases the opportunity for learning about healthy lifestyle choices. The current study provided a unique opportunity to assess the extent to which participants accessed the program components and educational material by measuring the number of times the participants accessed the website. In addition, the use of weekly quizzes provided a rough index of the extent to which participants read and understood the educational materials.

It was hypothesized that experimental condition (behavioral vs. control) would exert the strongest influence on weight loss. However, the influence of experimental condition was hypothesized to be mediated by various process variables (e.g., adherence) and psychological variables (e.g., satisfaction with life) of the adolescents and parents. Statistical mediation refers to a phenomenon in which some third variable (the mediator variable) influences the relationship between the two primary variables of interest. A mediator variable must be related to both variables; it is the process or means through which an independent or predictor variable influences a primary dependent variable. This process is diagrammed in Figure 1. For example, it was hypothesized that a significant mediator variable in the current study would be change in eating habits. Experimental group was hypothesized to influence both weight loss (path a) and changes in eating habits (path b). In addition, changes in eating habits were hypothesized to influence weight loss (path c). A significant test of mediation would occur if, after controlling for the influence of eating habits on weight loss, the effect of experimental group on weight loss (path a) were eliminated or diminished.

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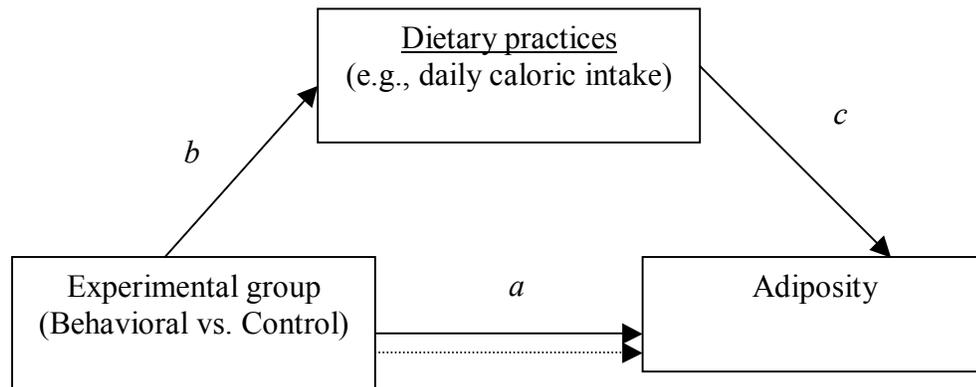
Figure 1. Graphical Depiction of Mediation

Secondary Aims

Dietary self-efficacy is an important personal variable that influences success in weight loss programs for adults. To date, no study has directly assessed the extent to which dietary self-efficacy predicts behavior change among children. Therefore, the current study sought to assess the extent to which dietary self-efficacy influenced the effect of experimental condition on successful weight loss.

Finally, this study investigated the influence of psychological variables on adherence measures and ultimately weight loss. It was hypothesized that variables such as global self-esteem and depressive symptomatology would affect a participants' successful weight loss. In addition, it was hypothesized that a participant's level of anxiety toward computers would be related to computer usage. It was hypothesized that successful weight loss would be related to positive changes in self-esteem, self-efficacy, depression, satisfaction with life, and dietary practices.

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Study Hypotheses

The specific hypotheses of the current study were:

Hypothesis 1: It was hypothesized that the adolescent participants in the behavioral condition would lose more weight at 6 months than participants in the control condition.

Hypothesis 2: It was hypothesized that for adolescents, program adherence (measured by website hits) would mediate the effect of experimental condition on weight loss at 6 months.

Hypothesis 3: It was hypothesized that for adolescents, dietary self-efficacy indices measured at baseline would mediate the effect of experimental group on weight loss at 6 months. It was also hypothesized that dietary self-efficacy and weight loss would be reciprocal, such that weight loss would be related to improvements in self-efficacy.

Hypothesis 4: It was hypothesized that for adolescents, parental adherence would mediate the effect of experimental group on weight loss at 6 months.

Hypothesis 5: It was hypothesized that compared to the control participants, adolescents in the behavioral condition would demonstrate more improvements in exercise and eating habits, as measured by changes in the Exercise subscale of the Weight Loss Behavior Scale and 24-hour dietary recalls from baseline to 6 months. It was further hypothesized that changes in dietary and exercise practices would mediate the effect of experimental group on weight loss.

Hypothesis 6: It was hypothesized that baseline levels of depressive symptoms would be negatively associated with program adherence.

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Hypothesis 7: It was hypothesized that parental weight loss would be influenced by experimental condition, with parents in the behavioral condition losing more weight than those in the control condition. Further, it was hypothesized that the effect of experimental condition on parent weight loss would be mediated by adherence, changes in dietary and exercise behaviors, and psychological variables.

Hypothesis 8: Computer anxiety at baseline was hypothesized to be related to adherence as measured by website hits.

METHOD

<u>Participants</u>

Participants were 57 obese African-American girls between the ages of 11 and 15 years old and one obese biological parent. As body mass index is highly variable during adolescence, obesity was defined as a body mass index at or exceeding the 85th percentile of body mass according to age in months. BMI-for-age growth charts were calculated by the National Center for Health Statistics and provide normative information for children ages 2 to 20 years. As each participant had a BMI-for-age in the upper 15% of her age group, she was assumed to be at-risk for developing adult obesity if not treated, following the guidelines suggested by Himes and Dietz (1994). In addition, each adolescent participant had at least one obese biological parent, indicating a genetic risk for developing adulthood obesity. It should be noted that although a participant had to have a BMI in excess of the 85th percentile in order to qualify for the study, the vast majority (>90%) of participants had a BMI in excess of the 95th percentile for her age.

Participants and their parents were screened for the presence of an eating disorder or other mental disorder. Once admitted to the study, participants were randomized to either the behavioral or control condition. The randomization scheme stratified according to age and body mass index, in an attempt to balance the behavioral and control groups on these variables.

<u>Treatment Program – The Health Improvement Program for Teens (HIP-Teens)</u>

The HIP-Teens program was a family-based intervention program for weight loss in African-American girls ages 11 to 15 years old. HIP-Teens was funded by the National Institute of Health grant 5 RO1 HD39104-03 (Announcement OK-99-010:

"Innovative Approaches To Prevention of Obesity") and was a three-year program consisting of one year of program development and two years of active treatment. The current study involves outcome data from the first six months of the two-year program. The program was an internet-based intervention study, in which the primary components of the study were communicated via a locked website created specifically for the program. Whereas typical intervention programs employ face-to-face counseling for the duration of the intervention, the HIP-Teens program was innovative in that the communication with interventionists took place mainly via email. In addition, automated feedback regarding changes in weight, food selections, and goal-setting was generated by the website. At the study outset, participants were provided with a personal computer for the home and were given free internet access. On a weekly basis, participants accessed new material, specifically catered toward weight-loss and including information regarding nutrition, physical activity, and healthy food choices.

The project consisted of two primary conditions. The behavioral condition incorporated behavior modification techniques and heavy emphasis on email communication with a case manager who was a graduate-level clinical psychology student specializing in weight management. The control condition was primarily educational in nature, and provided basic information about nutrition and physical activity. Participants in the control condition logged in to a separate website and were managed by a registered dietitian. The website topics for each condition are provided in Appendix B.

Daily recommended caloric guidelines were calculated and provided by a registered dietitian and were based on either a 1200, 1500, or 1800 calorie-per-day diet.

In the behavioral condition, participants were required to complete daily food records and submit them via an automated form housed on the website. Food records were submitted to the project dietitian, who reviewed them for accuracy and compliance with the recommended calorie levels. In addition, automated feedback was provided such that following submission of the forms, a computer program embedded in the form generated an image of the Food Guide Pyramid and indicated the extent to which the food records complied with the recommended nutritional values. Foods were coded following the system employed in the Traffic Light Diet (Epstein & Squires, 1988), with green foods indicating healthy, low-calorie food choices, yellow foods indicating foods that are healthy in small amounts, and red foods signaling high-fat, high-calorie selections. In this manner, immediately following the submission of food records, participants were able to view how well their dietary choices matched the dietary recommendations. In the control condition, participants were not required to submit food records.

In addition, participants were encouraged to engage in regular physical activity. In the behavioral group, participants established physical activity goals as exercise goals were incorporated into behavioral contracts.

Assessment Measures: Adolescent Participants

Changes in Body Fat. Proportion body fat was measured using the dual-energy x-ray absorptiometry (DEXA) procedure. DEXA provides a more valid measure of body composition than body weight alone (Harsha & Bray, 1996). Further, given the instability of BMI as a measure of adiposity during growth years (Himes & Dietz, 1994), DEXA was used as a primary anthropometric index of body fat. The DEXA procedure measures photon absorption rates of tissues (bone, fat, and other soft tissue) and provides an

estimate of body fat. Percent change in proportion of body fat as measured by DEXA was a primary measure of adiposity. The Bioelectrical Impedance Analysis (BIA) provided an additional measure of adiposity. The BIA procedure measures the proportion of body fat by passing an electrical signal through the body and measuring the rate of current. As fat slows the rate of current, an estimate of proportion of body fat can be calculated. Change in body weight was also measured by body mass index (BMI), which is a function of height and weight. BMI is calculated by dividing weight (in kilograms) by height (in meters) squared. For parents, DEXA, BMI, BIA, and weight were used in analyses.

Child Dietary Self-Efficacy Scale (CDSS; Parcel et al., 1995). The CDSS is a 15-item self-report questionnaire to assess dietary self-efficacy. The CDSS defines dietary self-efficacy as it relates to fat and sodium intake. Participants were asked to rate the extent to which they were "sure" that they could opt for a healthy food alternative, such as a baked potato in lieu of french fries. Items are geared toward school-aged children and the efficacy for behaviors appropriate to that age is assessed. Therefore, the items assess the efficacy for selection, simple preparation, substitution, and requesting. The scale possesses good internal consistency (Coefficient alpha = .84). The CDSS has good concurrent validity indicated by its correlation with a measure of usual food choices. The CDSS appears in Appendix C. Scores range from –15 to 15.

Adherence Measures. Program adherence was assessed via the frequency of "hits" on the internet site. As visiting the website to access program information is analogous to session attendance in standard weight loss programs, this measure tabulated the number of times each participant visited the website. Over the course of the study,

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the site was housed through three different web-based educational software systems, each of which required the participants to log-in to the site. In so doing, the software automatically tracked the number of times a participant visited the website. A website "hit" was generated when a participant linked from one area to another within the website. For example, a simple log-on to the study main page was considered a hit. To enter a weekly lesson, the participant had to click on a link to that particular area of the website, so logging another hit. Hits were accrued each time a participant "moved" within the website or submitted a form over the website. The primary adherence measure was a frequency count of the number of website hits during the first 6 months of the program.

In addition, the completion of weekly quizzes was used as a secondary measure of adherence for participants in the behavioral group. Quizzes were provided at the end of each weekly lesson and required the participant to complete a series of multiple choice questions about the program material and submit their responses via the internet. Completion of the quizzes therefore served the purpose of informing the case managers that the participant had accessed the weekly informational material and provided a rough measure of whether the participant understood the material. Quiz scores were automatically stored in a database that was housed within web server software. Within the first 6 months of the study, there were 25 weekly quizzes. Frequency counts of the number of quizzes with adequate scores (i.e., 60% correct or greater) were tabulated. In addition, average quiz scores were computed for each participant.

For participants in the behavioral group, frequency counts of the number of food diaries and exercise monitors submitted were tabulated.

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Weight Loss Behavior Scale (WLBS; Smith, Williamson, Womble, Johnson, & Burke, 2000). The WLBS is a 35-item questionnaire designed to be a brief measure of changes in eating and exercise habits over the course of weight loss treatment. The scale consists of 5 subscales measuring concern for dieting and weight, exercise, overeating, avoidance of fattening foods and sweets, and emotional eating. Subscale scores range from 5 to 35. The scale has adequate internal consistency and retest reliability. Subscale scores have been found to correlate with weight change; exercise and avoidance of fattening foods were positively correlated with weight loss and overeating and emotional eating were negatively correlated with weight loss.

Multi-Pass 24-Hour Recall and Food Frequency Questionnaire. The multi-pass 24-hour recall of dietary intake is a procedure in which a registered dietitian interviews participants about the amount and types of foods consumed over the prior 24 hours (Johnson, Driscoll, & Goran, 1996). Based on information gathered through the recall procedure, the dietitian estimates the daily caloric intake and macro-nutrient content of foods consumed. The 24-hour recall procedure has been found to be reliable with adults and children (Freund, Johnson, Silverstein, & Thomas, 1991). The Food Frequency Questionnaire (Block et al., 1986) is a self-report measure in which participants report the frequency of eating various foods as well as typical serving sizes. Responses range from "Never or Less than once per month" to "2+ (servings) per day." Food items are classified as fruits and vegetables, breakfast foods, vegetables, meat, fish, poultry, lunch items, breads, snacks, spreads, dairy products, sweets, and beverages. Information gathered from the Food Frequency Questionnaire can be used to estimate typical eating patterns.

Children's Depression Inventory (CDI; Kovacs, 1980). The CDI is a 27-item self-report questionnaire designed to assess the severity of depressive symptoms in children. The CDI is a well-validated measure with acceptable levels of internal consistency (.70-.86) and test-retest reliability over a one-month interval (.82). The CDI is the most frequently used self-report measure of childhood depression (Fristad, Emery, & Beck, 1997).

Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS is a brief measure of global life satisfaction. It is comprised of 5 items that assess the degree to which the participant agrees or disagrees with statements such as "The conditions of my life are excellent" and "I am satisfied with my life." Items are scored on a 1 to 7 Likert scale; total scores range from 5 to 35. The scale has adequate test-retest reliability and internal consistency and has been found to highly correlate (r's>.50) with longer measures of subjective well-being.

Rosenberg Self-Esteem Scale (Rosenberg, 1965). The Rosenberg Self-esteem scale is a 10-item questionnaire designed specifically for adolescent participants. The scale assesses global self-esteem by asking participants the extent to which they agree or disagree with statements such as "On the whole, I am satisfied with myself" and "I certainly feel useless at times." Total scores range from 0 to 10, with higher numbers indicating a more positive global self-esteem. The scale possesses good internal (.77) and test-retest (.82) reliability.

Computer Anxiety Index (CAIN; Simonson, Maurer, Montag-Torardi, & Whitaker, 1987). The Computer Anxiety Index is a 26-item self-report questionnaire designed to measure computer anxiety, defined as irrational fears pertaining to computer

usage. Participants were asked to rate the extent to which they agree with statements such as "Having to use a computer could make my life less enjoyable" and "I am usually uncomfortable when I have to use computers." The CAIN has strong internal consistency (.94) and test-retest (.90) reliability, and has been shown to correlate with other anxiety measures (Simonson, 2000).

Assessment Measures: Parent Participants

Parental adherence was assessed in the same manner as the adolescents. The primary index was a frequency count of the number of "hits" on the program website. In addition, the frequency of food and physical activity records submitted was tabulated for the participants in the behavioral condition.

Secondary Self-report measures. The self-reported dietary, exercise, motivation for change, and computer anxiety measures (i.e., Food Frequency Questionnaire, Multiple-Pass 24-hour recall, Satisfaction with Life Scale, Weight Loss Behavior Scale, Computer Anxiety Index) were administered to adult participants. In addition, parents completed an adult version of questionnaires to assess dietary self-efficacy, life satisfaction, and depression and other psychological variables.

The Eating Habits Confidence Questionnaire (Sallis, Pinski, Grossman, Patterson, & Nader, 1988) is a 27-item questionnaire that measures adult participants' confidence in their ability to change their eating habits, food selections, and cooking methods. The Eating Habits Questionnaire is a reliable and valid measure of dietary self-efficacy and has been shown to be related to changes in eating behaviors (Sallis et al., 1988).

The Kansas Family Life Satisfaction Scale (Schumm, McCollum, Bugaighis, Jurich, and Bollman, 1986) is a 4-item questionnaire assessing the parent's satisfaction

with their spouse, children, and quality of relationships within the family. Participants rate their degree of satisfaction on a 7-point Likert scale ranging from "extremely dissatisfied" to "extremely satisfied." Scores may range from 7 to 28, with higher scores indicating greater satisfaction. The scale possesses good internal consistency (.85) and has been shown to correlate highly with other indices of quality of life.

Symptom Checklist - 90 - Revised (SCL-90-R; Derogatis, 1977) is a 90-item questionnaire designed to measure psychological distress in 9 domains: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. Participants rate on a 5-point Likert scale the extent to which they were distressed by various symptoms over the previous 7 days. The scale possesses good test-retest and reliability coefficients for each of the 9 subscales.

Statistical Analyses

An alpha level of .05 was used for all analyses. To detect group differences for adiposity and other variables, independent t-tests were conducted. Analyses were run independently for adolescents and parents. Tests for mediation were first explored using correlation analyses, followed by a series of linear regressions following the methods of Baron and Kenny (1986). Tests of several adherence variables were conducted on data available from participants in the behavioral arm of the study. Missing data were imputed using the mean of other participants within each experimental group. All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS for Windows version 10.0.7 SPSS Inc., Chicago, IL.).

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RESULTS

Of the original 57 families enrolled, 50 participants remained in the study at the 6 month assessment. The baseline sample consisted of 29 participants in the control condition and 28 participants in the behavioral condition. Independent t-tests were conducted to confirm that the participants in each group were equivalent in terms of age, body mass index, and adiposity measures at baseline. The descriptive statistics for the adolescent participants and their participating parents appear in Table 1.

Table 1. Participant Characteristics - Baseline

	Control (n = 29)		Behavioral (n=28)		Total (n=57)	
Adolescent	Mean	(sd)	Mean	(sd)	Mean	(sd)
Age	13.23	(1.16)	13.14	(1.59)	13.19	(1.37)
BMI	37.34	(8.16)	35.31	(7.60)	36.34	(7.89)
DEXA (%fat)	46.22	(6.45)	45.46	(8.34)	45.84	(7.40)
BIA-fat	43.07	(6.91)	41.75	(6.16)	42.41	(6.52)
Parent						
Age	42.87	(6.18)	43.53	(6.24)	43.19	(6.16)
BMI	39.03	(6.81)	37.90	(7.62)	38.48	(7.18)
DEXA (%fat)	48.99	(5.24)	47.68	(7.07)	48.33	(6.20)
BIA-fat	46.46	(4.70)	45.11	(5.36)	45.80	(5.04)

A total of 7 participants dropped out of the study before 6 month data could be collected; of those remaining at 6 months, 27 participants were in the control condition and 23 participants were in the behavioral condition. Descriptive information of those participants for whom 6-month data were collected appears in Table 2.

Table 2. Participant Characteristics - Baseline (dropouts excluded)

	Control (n = 27)		Behavioral (n=23)		Total (n=50)	
Adolescent	Mean	(sd)	Mean	(sd)	Mean	(sd)
Age	13.21	(1.17)	13.02	(1.45)	13.12	(1.30)
BMI	37.36	(8.29)	34.36	(6.42)	35.98	(7.57)
DEXA (%fat)	46.19	(6.57)	45.06	(8.80)	45.67	(7.62)
BIA-fat	42.89	(6.98)	41.22	(5.89)	42.12	(6.49)
Parent						
Age	42.69	(6.37)	44.45	(6.32)	43.50	(6.34)
BMI	39.23	(6.76)	37.33	(6.95)	38.35	(6.85)
DEXA (%fat)	49.01	(5.34)	47.67	(6.14)	48.40	(5.71)
BIA-fat	46.57	(4.77)	45.28	(4.09)	45.98	(4.47)

Manipulation Check – Adherence Measures

As a function of the more interactive nature of the behavioral condition, it was hypothesized that participants in the behavioral condition would visit the website more frequently than participants in the control condition. This hypothesis was supported for both adolescents (t (55) = 5.07, $p < .001$) and parents (t (55) = 3.38, $p < .001$, one-tailed). A graphic representation of website hits during the first 6 months appears in the figure below.
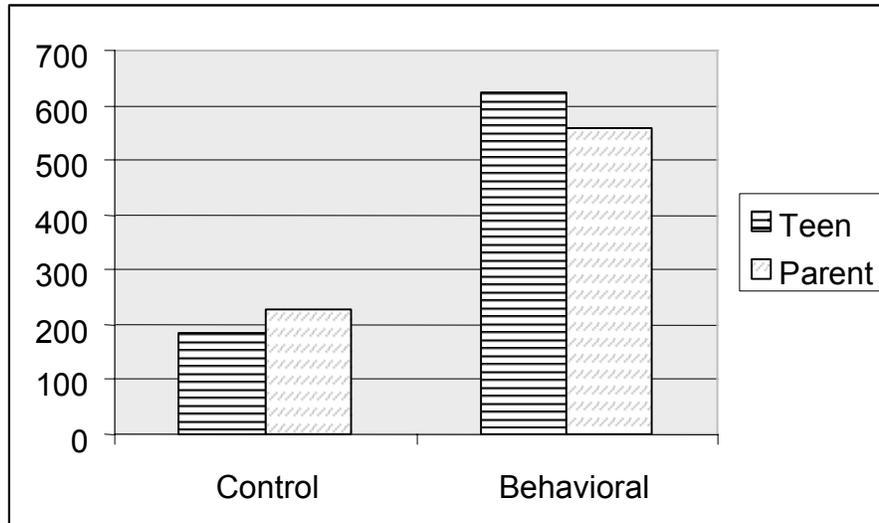
Figure 2. Mean total frequency of website hits over the 6-month period.

A correlation analysis was conducted to test the hypothesis that adolescent website hit frequency would be related to parent website hits; this hypothesis was confirmed, r (55) = .43, p < .001, 1-tailed.

A separate manipulation check was conducted to confirm that the weight loss program led to significant changes in dietary intake. Dietary recall measures were subjected to dependent t-tests to test whether participants significantly reduced intake from baseline to 6 month assessment. Results appear in Table 3. Overall, participants in both conditions showed significantly improved eating habits as measured by the Food Frequency Questionnaire and self-reported eating attitudes and behaviors as measured by the Weight Loss Behavior Scale.

Table 3. Changes in Dietary Behaviors and Attitudes - All participants

Measure	Baseline (M)	(sd)	6-mo (M)	(sd)	t (df = 56)	p
Adolescent						
CDSS - self efficacy	5.51	(4.86)	7.88	(4.25)	3.55	<.01
FFQ Calories	2000.03	(2004.78)	1593.29	(1245.38)	1.89	.03
FFQ Fat	90.44	(101.95)	69.02	(57.22)	1.95	.03
FFQ Fat Percent	38.88	(6.31)	38.14	(5.96)	0.84	.20
FR Calories	1727.02	(713.69)	1688.84	(561.46)	0.39	.35
FR Fat	62.29	(26.84)	62.83	(30.76)	-0.12	.45
FR Fat Percent	32.84	(6.47)	31.90	(8.78)	0.71	.24
WLBS Concern with Dieting	21.05	(4.93)	19.95	(3.81)	-1.35	.09
WLBS Exercise	24.34	(5.62)	25.71	(4.53)	1.76	.04
WLBS Overeating	20.17	(5.02)	18.20	(4.62)	2.98	<.01
WLBS Avoidance Fats/Sweets	17.03	(5.18)	18.73	(3.69)	2.26	.01
WLBS Emotional Eating	18.57	(5.37)	16.88	(3.95)	2.24	.01
Parent						
Eating Confidence	111.49	(12.07)	112.37	(11.89)	0.56	.29
FFQ Calories	1929.34	(1862.57)	1349.94	(655.70)	2.49	.01
FFQ Fat	91.34	(95.60)	57.98	(30.79)	2.80	<.01
FFQ Fat Percent	41.93	(5.54)	38.15	(5.52)	5.01	<.01
FR Calories	1813.33	(627.20)	1678.23	(618.04)	1.50	.07
FR Fat	70.22	(31.06)	66.38	(27.35)	0.82	.21
FR Fat Percent	34.72	(7.97)	35.73	(7.36)	-0.67	.25
WLBS Concern with Dieting	19.33	(3.44)	21.05	(3.23)	3.26	<.01
WLBS Exercise	22.40	(5.04)	25.68	(5.19)	3.70	<.01
WLBS Overeating	19.09	(4.29)	17.38	(4.44)	2.42	.01
WLBS Avoidance Fats/ Sweets	17.60	(4.32)	20.42	(4.43)	4.16	<.01
WLBS Emotional Eating	21.05	(5.38)	20.95	(5.28)	0.11	.46

Table note: Positive t-values indicate improvements from baseline to 6 months.

It was further hypothesized that compared to the control participants, adolescents in the behavioral condition would demonstrate more improvements in exercise and eating habits, as measured by changes in the Exercise subscale of the Weight Loss Behavior

Scale and changes in Food Recall measures from baseline to 6 months. Results of group comparisons and descriptive statistics appear in Tables 4 and 5. For both adolescents and parents, participants in the behavioral group showed the most improvements in dietary practices with regard to percent fat intake.

Test of Treatment Effect

To determine whether the treatment groups differed in weight loss at 6 months, independent t-tests were conducted on change scores for DEXA, BIA, and BMI for both adolescents and parents. An intention-to-treat analysis was conducted, using the last-value-carried-forward method for imputing missing data. Therefore, for participants who dropped out of the study before 6 months, change scores were entered as zero.

Results for the adolescents indicated trends in the hypothesized directions between the behavioral and control groups for all adiposity measures. For parents, only BMI changes were significant at 6 months, with non-significant trends in the anticipated direction for DEXA and BIA. Descriptive statistics for change scores appear in Table 6.

As a secondary test of the hypothesis that the behavioral intervention would lead to greater changes in adiposity than the control intervention, 2 (group) X 2 (time) repeated measures ANOVAs were conducted for each of the adiposity measures. Results indicated that for adolescents, there was a significant Group X Time interaction for each of the adiposity measures. For parents, the Group X Time interaction was significant for BMI only. Results are summarized in Table 7.

Table 4. Descriptive Statistics and Tests of Group Differences in Diet and Exercise Behaviors - Adolescents

	Control				Behavioral				
	Baseline M	6 month M	Δ^1	(sd)	Baseline M	6 month M	Δ	(sd)	$\underline{t}^2$
FFQ Calories	2271.47	1904.78	366.69	(2111.21)	1718.91	1270.67	450.96	(923.31)	0.19
FFQ Fat	100.61	84.75	15.86	(107.81)	79.92	52.73	27.63	(46.10)	0.53
FFQ Fat Percent	37.25	38.69	-1.44	(5.06)	40.57	37.57	3.12	(7.34)	2.74*
Free Recall Calories	1800.54	1812.17	-11.62	(812.07)	1573.15	1638.84	-60.07	(662.81)	-0.25
Free Recall Fat	67.56	64.91	2.65	(31.71)	56.83	60.67	-4.01	(35.57)	-0.75
Free Recall Fat Percent	33.90	31.29	2.61	(9.14)	31.74	32.53	-1.06	(10.57)	-1.4
WLBS Exercise	22.14	24.79	2.71	(7.11)	26.61	26.67	0.29	(3.53)	-1.63*
WLBS Avoidance fat/sweet	17.82	18.34	0.61	(6.61)	16.22	19.13	2.43	(3.81)	1.27

[1] Positive change (Δ) values indicate improvement.
[2] df = 55, positive t-values indicate greater improvement for the behavioral group.
*p < .05

Table 5. Descriptive Statistics and Tests of Group Differences in Diet and Exercise Behaviors - Parents

| | Control | | | | Behavioral | | | | |
	Baseline M	6 month M	Δ^1	(sd)	Baseline M	6 month M	Δ	(sd)	$\underline{t}^2$
FFQ Calories	2099.09	1329.31	769.77	(2413.30)	1753.52	1371.30	326.47	(463.76)	-0.95
FFQ Fat	98.94	57.99	40.95	(123.59)	83.48	57.96	23.26	(26.26)	-0.74
FFQ Fat Percent	41.22	38.70	2.52	(5.37)	42.67	37.58	5.03	(5.81)	1.69*
Free Recall Calories	1849.28	1790.32	58.96	(737.75)	1776.10	1562.13	213.30	(619.16)	0.85
Free Recall Fat	72.94	73.96	-1.02	(38.49)	67.41	58.53	8.78	(31.38)	1.05
Free Recall Fat Percent	35.54	36.81	-1.27	(11.33)	33.87	34.62	-0.79	(11.51)	0.16
WLBS Exercise	21.38	23.82	2.46	(6.87)	23.46	27.60	4.54	(6.28)	1.19
WLBS Avoidance fat/sweet	16.58	19.39	3.08	(5.80)	18.65	21.48	2.79	(4.06)	-0.21

[1] Positive change (Δ) values indicate improvement.
[2] df = 55, positive t-values indicate greater improvement for the behavioral group.
*p < .05

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Table 6. Group differences for Changes in Adiposity

	Control		Behavioral		Total			
	Mean[1]	(sd)	Mean	(sd)	Mean	(sd)	t[1]	p
Adolescent								
DEXA Change	0.38	(2.95)	-1.04	(2.00)	-0.32	(2.60)	2.11	.02
BIA Change	0.75	(1.49)	-0.05	(1.20)	0.36	(1.40)	2.23	.01
BMI (kg/m^2) Change	0.71	(1.19)	-0.24	(1.38)	0.24	(1.36)	2.77	<.01
Weight (kg) Change	2.40	(2.86)	0.55	(3.26)	1.49	(3.18)	2.28	.03
Parent								
DEXA Change	0.13	(1.59)	-0.51	(2.02)	-0.18	(1.83)	1.33	.09
BIA Change	-0.02	(0.82)	-0.44	(1.10)	-0.23	(0.98)	1.63	.05
BMI (kg/m^2) Change	-0.12	(0.83)	-0.90	(2.01)	-0.50	(1.57)	1.91	.03
Weight (kg) Change	-0.52	(2.55)	-2.16	(4.95)	-1.33	(3.97)	1.57	.06

[1] Negative numbers reflect difference scores from baseline to 6 months and are indicative of weight loss. Positive t-values indicate greater improvements in the behavioral group.

Table 7. Group X Time Interaction for Adiposity Measures

	Control Mean (sd)		Behavioral Mean (sd)			
Adolescents	Baseline	6 months	Baseline	6 months	F (1, 53)	p
DEXA	46.22 (6.45)	46.61 (6.45)	45.14 (8.32)	44.07[b] (8.10)	4.48	.04
BIA	43.07 (6.91)	43.85[a] (6.50)	41.32 (5.83)	41.27 (5.89)	5.00	.03
BMI	37.34 (8.16)	38.04[a] (8.51)	34.47 (6.29)	34.22 (6.68)	7.56	<.01
Weight (kg)	96.81 (24.44)	99.22[a] (25.27)	87.92 (18.31)	88.50 (19.01)	4.95	.03
Parents						
DEXA	48.99 (5.24)	49.13 (5.36)	47.53 (7.16)	47.00 (6.80)	1.78	.19
BIA	46.76 (4.78)	46.73 (4.66)	44.90 (5.51)	44.42[b] (5.50)	2.56	.12
BMI	39.34 (6.72)	39.22 (6.39)	37.68 (7.86)	36.72[b] (7.29)	3.90	.05
Weight (kg)	102.75 (19.66)	102.22 (18.39)	99.29 (17.44)	97.04[b] (15.63)	2.65	.11

a. Dependent t-tests conducted within group indicated a significant increase from baseline to 6 months.
b. Dependent t-tests conducted within behavioral group indicated a significant decrease from baseline to 6 months.

The primary hypothesis was that for both adolescents and parents, experimental condition would be associated with weight loss at 6 months, such that the participants in the behavioral group would lose more weight than those in the control condition. It was further hypothesized that adherence measures, psychological indices, and dietary change measures would mediate this effect.

The methods of Baron and Kenny (1986) were used to test possible mediating effects on weight loss. To establish that a variable acts as a mediator between experimental group and changes in adiposity, the following conditions must hold in regression equations: 1) Group must significantly affect change in adiposity (path a); 2) Group must be significantly related to the potential mediator variable (path b); 3) Variations in the mediator variable must be significantly related to changes in adiposity (path c); and 4) When the effect of the mediator variable on changes in adiposity is controlled, the effect of group on adiposity (path a) is diminished (or is no longer significant). Perfect mediation would occur if experimental condition had no effect on changes in adiposity after the mediator variable was controlled.
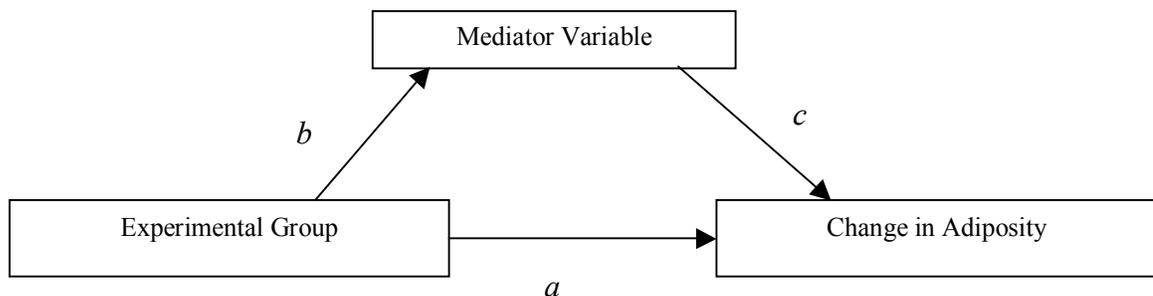
Figure 3. Graphical Depiction of Hypothesized Mediation Effect

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Adolescents. Regression analyses were performed to confirm the effect of experimental group on changes in adiposity, after controlling for baseline adiposity (path *a*). Due to the variability of body weight during growth periods, DEXA was used as the primary measure of adiposity for the adolescent participants. The regression analysis indicated that experimental condition influenced weight loss as measured by DEXA, such that adolescents in the behavioral group lost more fat than those in the control group (F = 3.44, p = .04, b = -.28, p =.03).

In order to identify potential mediator variables, correlational analyses were conducted between DEXA change and adherence (website hits), dietary changes as measured by the FFQ and Free Recall assessments, and baseline psychological variables for both parents and adolescents. In order to be considered a potential mediator variable, the variable had to differ across experimental groups and correlate with DEXA change. The variables meeting this criterion were: Parent Exercise Confidence (r = -.27, p =.02), Parent Family Satisfaction (r = -.23, p =.04), and Parent Satisfaction with Life (r = -.29, p = .02).

A second series of regression analyses was conducted to confirm the influence of the potential mediating variables on changes in DEXA after controlling for baseline DEXA. Parent exercise confidence was signficantly related to change in DEXA (F = 3.16, p = .05, R = .33, b = -.27, p = .04), as was parent satisfaction with life (F = 3.45, p = .039, R = .34, b = -.285, p = .03). After controlling for baseline DEXA, the relationship between Parent family satisfaction at baseline and change in DEXA approached significance (F = 2.43, p = .09, R = .29, b = -.22, p = .09).

A final series of regression analyses was conducted to determine whether the hypothesized mediator variables (i.e., those that emerged as significantly related to changes in DEXA) significantly attenuated the effect of experimental group on changes in DEXA. For change in DEXA, the effect of experimental group alone was significant ($\underline{b}$ = -.28, $\underline{p}$ = .032). After controlling for Parent Exercise confidence, the effect of group was no longer significant ($\underline{b}$ = -.22, $\underline{p}$ = .102). After controlling for Parent family satisfaction, the effect from group was no longer significant ($\underline{b}$ = -.24, $\underline{p}$ = .079). The same effect was observed with Parent Satisfaction with Life, such that after entering this variable into the equation, the effect of experimental group was diminished ($\underline{b}$ = -.20, $\underline{p}$ = .162).

As a further test of mediation, the same variables were evaluated within the behavioral group only. In these analyses, the potential mediator variables were entered as covariates in a repeated measures ANCOVA comparing baseline to 6-month DEXA values. Within the behavioral group, Parent Family Satisfaction was correlated with DEXA change scores ($\underline{r}$ (26) = -.37, $\underline{p}$ = .03). Exercise Confidence was not significantly correlated with DEXA change ($\underline{r}$ (26) = -.10, $\underline{p}$ = .30), nor was Parent Satisfaction with life ($\underline{r}$ (26) = -.26, $\underline{p}$ = .21). Before controlling for the potential mediator variables, the effect for time was significant $\underline{F}$ (1, 26) = 7.62, $\underline{p}$ = .01. After controlling for Parent Exercise Confidence, the Time effect was no longer significant, $\underline{F}$ (1, 25) = .099, $\underline{p}$ = .75. After controlling for Parent Family Satisfaction, this effect diminished, $\underline{F}$ (1, 25) = 3.71, $\underline{p}$ = .06. The same effect was found for Parent Satisfaction with life, $\underline{F}$ (1, 25) = .298, $\underline{p}$ = .59. Therefore, these analyses provided additional support for the hypothesis that Parent

Exercise Confidence, Parent Family Satisfaction, and Parent Satisfaction with Life significantly mediated the effect of the intervention.

The hypotheses that program adherence, dietary self-efficacy, and parental adherence would be significant mediators of experimental group on weight loss were not supported. Of the potential mediators, only those pertaining to parent satisfaction emerged as significant mediator variables.

Parents. Regression analyses were conducted to determine the effect of experimental group on adiposity change measures for parents. After controlling for baseline adiposity, only change in BMI was significantly influenced by experimental condition ($\underline{F}$ = 6.37, $\underline{p}$ =.003, $\underline{R}$ = .44, $\underline{b}$ = -.28, $\underline{p}$ = .027).

To begin the tests for mediation, a series of correlational analyses were conducted to investigate significant relationships between change in BMI and potential mediator variables (i.e., those that differed across experimental groups). Due to the theorized directional nature of familial influence (parent to adolescent), adolescent baseline measures were not considered as possible mediator variables in these analyses. As such, potential mediators were limited to parent baseline motivational/psychological variables and parent dietary change measures. Of these, only change in Percent Fat Intake (as measured by the Food Frequency Questionnaire) emerged as a significant correlate of change in BMI. After controlling for baseline BMI, the FFQ Percent Fat difference was significantly related to changes in BMI ($\underline{F}$ = 9.66, $\underline{p}$ = .000, $\underline{R}$ = .51, $\underline{b}$ = .39, $\underline{p}$ = .002). Finally, to test the effect for mediation, FFQ percent fat change was entered into regression analyses to test whether the effect of experimental group would diminish. The results indicated that prior to controlling for percent fat dietary change, the effect of

experimental group on BMI was significant ($\underline{b}$ = -.28, $\underline{p}$ = .027). This effect was not observed after controlling for FFQ percent fat reduction ($\underline{b}$ = -.21, $\underline{p}$ = .087). As an additional test of mediation, data were again analyzed using a repeated measures analysis of the BMI data from the behavioral group only. Within the behavioral group, the Percent Fat reduction was correlated with BMI change, $\underline{r}$ (26) = .46, $\underline{p}$ < .01. The repeated measures ANOVA indicated that the effect for time was significant, $\underline{F}$ (1, 25) = 5.61, $\underline{p}$ = .03. However, after controlling for Percent Fat Intake, this effect was not significant, $\underline{F}$ (1, 24) = .11, $\underline{p}$ = .74.

The hypothesis that program adherence (as measured by website hits) would mediate weight loss among parents was not supported.

Secondary Hypotheses

Adherence within the Behavioral Group. It was hypothesized that the adherence measures would be correlated, such that within the behavioral group, the number of website hits would be related to the number of quiz submissions and food and physical activity records submitted by both adolescents and parents. However, at various stages throughout the program, several computer programming problems occurred such that the food and physical activity applications did not function properly. As such, the tabulations of record submissions may not accurately reflect the number of attempted submissions. Therefore, these analyses were conducted on the number of submissions that were registered on the website; it is assumed that these approximations represent the true trend in the frequency of participant submissions. Due to the volume of incomplete records, the data were not imputed, and analyses are only intended to be interpreted as descriptive.

In an effort to assess the participants' understanding of the material, the percentage of items correct on each quiz was also calculated. Quizzes were included in the behavioral condition in an attempt to gauge whether the participants had read and understood the website content; as such, quiz scores are presumed to indicate whether a participant "received" the instructional material. If a participant completed a quiz, but earned a score at or below the chance level, it may be safe to assume that they either did not read or did not understand the website content. Therefore, as an index of whether the instructional material was effectively communicated, a tabulation of "correct" quizzes was calculated, such that only quiz scores above 60% correct were included. Descriptive statistics of Quiz Submissions appear in Table 8.

There was a significant decrease in quiz completion from the first 3 months of the study to the second three months for both adolescents ($\underline{t}$ (27) = 5.37, $\underline{p}$ < .001) and parents ($\underline{t}$ (27) = 4.26, $\underline{p}$ < .001.)

Correlation analyses were conducted to determine the interrelationships among overall website hits, emails, weight graph, food record, and activity graph submissions, quiz completions, average quiz scores, and computer anxiety. The correlation matrix for both adolescents and parents appears in Table 9. For adolescents, there was a significant relationship between the adiposity measures and weight graph submissions. Weight graph submissions also related to the number of quizzes completed. Of the adherence measures, the average quiz score was most consistently correlated with other adherence measures, and may indicate that those participants who correctly understood the material may have been more adherent with the other study tasks.

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For parents, several more significant relationships emerged, with quiz submissions most consistently related to the other compliance variables. However, none of the adherence measures significantly correlated with weight loss. Parent data are represented in bold type.

Table 8. Descriptive Statistics of Quiz Submissions for Adolescents and Parents

Adolescents	Min	Max	Mean	sd
Completed Quizzes	0	25	9.75	8.17
Completed Quizzes (Scores over 60%)	0	24	7.96	7.10
Completed Quizzes Weeks 1-13	0	13	5.93	4.15
Completed Quizzes Weeks 14-26	0	11	2.04	3.91
Average Quiz Score (Percent)	0	100.00%	64.46%	0.33
Overall Percent Correct items	0	89.09%	30.68%	0.27
Parents				
Completed Quizzes	0	23	8.89	8.11
Completed Quizzes (Scores over 60%)	0	22	8.00	7.47
Completed Quizzes Weeks 1-13	0	12	5.57	4.34
Completed Quizzes Weeks 14-26	0	12	2.43	4.09
Average Quiz Score (Percent)	0	100.00%	66.48%	0.37
Overall Percent Correct items	0	86.83%	30.41%	0.28

Table 9. Correlation Matrix of Compliance Measures with Changes in Adiposity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) BIA Change		**.68****	**.55****	**-.02**	**-.16**	**-.06**	**.02**	**-.09**	**-.04**	**.00**	**.18**
(2) BMI Change	-.71**		**.64****	**.01**	**-.34**	**-.05**	**-.10**	**-.12**	**-.04**	**-.10**	**.25**
(3) DEXA Change	-.52**	-.56**		**.13**	**-.31**	**-.10**	**-.08**	**.08**	**.07**	**.18**	**.05**
(4) Hits	.15	.07	.19		**.51***	.42	.07	**.52****	**.59****	.28	**-.18**
(5) Weight graph	-.25	-.55**	-.43*	-.16		**.54***	.24	**.68****	**.65****	**.40***	**-.25**
(6) Activity graph	-.18	.19	-.14	.02	.36		**.51***	.11	**.77****	.37	**.15**
(7) Food records	.03	.09	.17	-.13	.32	.37		.24	.34	.19	**-.34**
(8) Emails	-.10	-.20	-.39*	-.26	.71**	.25	.19		**.57****	.34	**-.37***
(9) Quizzes	.03	-.13	-.12	-.03	.54**	.43*	.21	.28		**.59****	**-.08**
(10) Average Quiz Score	-.16	-.27	-.42*	-.39*	.56**	.45*	.32	.46*	.54*		**-.13**
(11) Computer Anxiety	.07	.20	.05	.18	-.16	.19	-.37	-.02	.00	-.06	

*Correlation is significant at the 0.05 level (1-tailed).
**Correlation is significant at the 0.01 level (1-tailed).
Parent data appear in bold type. Degrees of freedom range from 16-28

It was hypothesized that adherence would be negatively correlated with depression as measured at baseline. This hypothesis was supported for adolescents; CDI scores were modestly related to website hits, r (55) = -.26, p = .03, 1-tailed, such that more depressed adolescents were less likely to log on to the study website. For parents, the hypothesis was partially supported; website hits was not related to SCL-90 Depression subscale scores, r (55) = -.03, p = .40, 1-tailed. However, when including the potentially more valid measure of adherence (average quiz score) among parents in the behavioral group, average quiz score was negatively correlated with SCL-90 Depression, r (26) = -.34, p =.04, 1-tailed.

It was hypothesized that among adolescents, weight loss would be related to changes in dietary self-efficacy, measured as the change in Child Dietary Self-Efficacy Scale scores from baseline to 6 months. Weight loss was hypothesized to be positively correlated with self-efficacy, such that changes in body fat would lead to increased dietary self-efficacy. Further, it was hypothesized that for adults, changes in adiposity would be related to improvements in self-efficacy scores as measured by the Eating Confidence Questionnaire. These hypothesis were not supported; there were no significant relationships between changes in self-efficacy and weight loss for adolescents or parents.

It was hypothesized that changes in body fat would correlate with changes in the Weight Loss Behavior Scale subscale scores from baseline to 6 months. Weight loss was hypothesized to correlate with decreases in the Overeating and Emotional Eating subscales and increases in the Physical Activity and Avoidance of Fattening Foods and

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Sweets subscales.   For both adolescents and parents, the predicted relationships were not observed.

Finally, it was hypothesized that for both adolescents and parents, program adherence would be positively correlated with scores on the computer opinion survey as measured at baseline. This hypothesis was not supported.

DISCUSSION

The primary aim of this study was to investigate process variables mediating weight loss in an internet-based obesity intervention program for African-American female adolescents. This six-month outcome study tested the effectiveness of a behavioral intervention versus a strict educational approach; both arms of the intervention were presented over the internet. The main findings of the outcome study paralleled those of *in vivo* intervention studies, and confirm the superiority of behavioral treatments to straight dietary approaches. The following section is organized according to individual study hypotheses. The discussion that follows synthesizes the findings.

Study Hypotheses

Hypothesis 1. It was hypothesized that the adolescent participants in the behavioral condition would lose more weight at 6 months than participants in the control condition. This hypothesis was confirmed; participants in the behavioral condition lost a larger percentage of body fat as measured by DEXA. This finding is in harmony with previous weight loss studies showing the superiority of behavioral treatments in initiating greater behavior changes necessary to promote weight loss. Further, this finding contributes to the accumulating research showing the usefulness of computer-based media in promoting health behaviors. The main finding corroborates previous internet-based obesity research with adults, and supports the applicability of an internet-based treatment in promoting weight loss among adolescents.

Hypothesis 2. It was hypothesized that for adolescents, program adherence (as measured by website hits) would mediate the effect of experimental condition on weight loss. This hypothesis was not supported. Previous research has indicated that session

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attendance in face-to-face interventions is significantly related to successful treatment outcome (Wadden et al., 1990). Further, completion of behavioral prescriptions (such as self-monitoring of food intake) has been shown to be associated with weight loss (Israel, Silverman, & Solotar, 1988). The current study showed that the computer-based analogue for attendance, defined as website hits, was not significantly related to weight loss. However, within the behavioral group, several adherence measures indicated that the completion of behavioral prescriptions was significantly related to weight loss. For example, submission of weight graphs and scores on weekly quizzes were associated with weight loss among adolescents. Taken as a whole, the pattern of relationships among adherence measures within the behavioral group shows that website hits may have been a misleading measure of adherence, as it was unrelated to quiz measures, other adherence measures, and changes in adiposity. A potential explanation for this observation may be that that the adolescents were not visiting the content areas of the website (i.e., they may have been visiting the "communication" or chat areas of the website more frequently than the didactic areas). In fact, website hits was negatively correlated with average quiz grades, which lends some credibility to this explanation.

Hypothesis 3. It was hypothesized that for adolescents, dietary self-efficacy indices measured at baseline would mediate the effect of experimental group on weight loss at 6 months. Previous research has shown that among adults, dietary self-efficacy is related to successful weight loss (Clark et al., 1991). It was hypothesized that among adolescents, dietary self-efficacy would influence treatment outcome, such that those participants with greater confidence in their ability to change dietary habits would be more successful in the program. This finding was not confirmed, and parallels the

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findings of Martin, O'Neil, and Binks (2002) who found that self-efficacy as measured by a brief questionnaire was unrelated to weight loss. These researchers suggested that participants may overestimate their ability to practice healthful behaviors when initiating a weight loss program. Further, it was hypothesized that successful weight loss would lead to improvements in dietary self-efficacy over the course of the study. Although the adolescent participants did show improvements in dietary self-efficacy over the course of the study, these improvements were not related to weight loss. This supports the research of Parcel et al. (1989) who found that a nutrition education program for children improved dietary self-efficacy. It may be that dietary knowledge alone, rather than changes in behavior, serves to increase dietary self-efficacy.

Hypothesis 4. It was hypothesized that parental adherence would mediate the effect of experimental condition on weight loss for the adolescent participants. This hypothesis was not supported; parental adherence measures were not significantly correlated with weight loss for adolescents. However, parent adherence measures were correlated with adolescent adherence measures, indicating that parent's behavior likely influenced that of the adolescent. Indeed, social learning theory would predict that parental modeling of specific behaviors would increase the likelihood of the adolescent performing the desired behaviors.

Hypothesis 5. Compared to adolescents in the control group, it was hypothesized that adolescents in the behavioral condition would demonstrate more improvements in exercise and eating attitudes and behaviors as measured by subscales of the Weight Loss Behavior Scale and the dietary recalls. It was further hypothesized that changes in dietary and exercise behaviors would mediate the effect of experimental condition on

weight loss at 6 months. This hypothesis was partially confirmed; adolescents in the

behavioral group reported a greater decrease in fat intake as measured by the FFQ. The

behavioral and control groups did not differ on other dietary outcome measures. Exercise

and dietary changes did not significantly mediate the effect of experimental group on

weight loss. Overall, participants in both conditions showed improvements on several

indices of dietary intake and exercise. In general, it seems that even a straight

educational approach may be enough to lead to self-reported improvements in dietary

intake and exercise habits. However, these habits led to more significant weight

reductions among the participants in the behavioral condition. Even though several

dietary change indices did not statistically differ across the groups, there was a trend

toward greater improvements among adolescents in the behavioral group.

Hypothesis 6. It was hypothesized that depression would be associated with poor

adherence, such that participants with higher levels of depressive symptoms would be

less likely to adhere to the program requirements. This hypothesis was supported for

both adolescents and parents, indicating that psychological difficulties may interfere with

treatment for weight loss. Indeed, this supports previous research showing that depressive

features interfere with weight loss for adults. The current finding implies that weight loss

studies would be more effective with the incorporation of components to address topics

such as emotional eating, cognitive restructuring, and global self-esteem. This need is

made more pronounced in light of various research showing that compared to normal-

weight children, obese children are more likely to suffer from depressive symptoms

(Israel & Shapiro, 1985).

Hypothesis 7. It was hypothesized that parental weight loss would be influenced by experimental condition. Further, it was hypothesized that the effect of experimental condition on parent weight loss would be mediated by adherence, changes in dietary and exercise habits, and psychological variables. These expectations were confirmed. Parents in the behavioral group lost more weight than those in the control group, and this effect was mediated by changes in fat intake. This finding again confirms the superiority of behavioral treatments for weight loss when compared to straight educational approaches. Behavioral interventions are more likely to induce behavior change (i.e., changes in dietary intake) which ultimately result in greater changes in adiposity. Further, the current finding supports the accumulating research showing that computers and the internet are an effective medium for promoting behavior change.

Hypothesis 8. The hypothesis that computer anxiety would influence adherence and ultimately treatment outcome was not supported. No significant relationships were observed between computer anxiety and adherence measures or changes in adiposity. A potential explanation is that the measure of computer anxiety, the Computer Anxiety Index (Simonson et al., 1987), may have been outdated. The CAIN was first published and validated 15 years ago, and may not adequately capture the construct of computer anxiety in today's "computer generation." Indeed, a comparison of the mean anxiety scores of the validation sample of the CAIN and the participants in the current study indicated that the HIP-Teens adolescents and parents were significantly less anxious and more computer-savvy than the participants in the validation sample. There was very little variability in computer anxiety among the HIP-Teens participants, with over 90% of the adolescents and parents scoring below the mean of the CAIN validation sample.

CONCLUSION

The primary finding of this study was consistent with previous weight loss studies showing the superiority of behavioral interventions to straight educational approaches. This study was the first to use an internet-based approach to promote weight loss among adolescents and their parents. As the primary finding parallels the findings of *in vivo* weight loss studies, results indicate that the internet may be an effective means to transmit information and facilitate behavior change among adolescents. The current study extends the accumulating literature on the effectiveness of computers as either a means or supplement to behavioral health interventions. To date, only one published study has reported the effectiveness of an internet-based program in treating weight loss. Tate et al. (2001) reported that an internet-based behavioral intervention was superior to an internet-based educational approach in treating adult obesity. In a test of the effectiveness of the internet in promoting weight maintenance following a weight loss program, Harvey-Berino et al. (2002) found that the internet was not as effective as face-to-face treatment in preventing weight re-gain. The current study confirms the effectiveness of an internet-based behavioral weight loss program in a family-based intervention. However, as in the Tate et al. and Harvey-Berino et al. studies, the treatment effects achieved through this internet-based program were not as large as those generally reported in face-to-face behavioral interventions (Goldfried, Raynor, & Epstein, 2002; Jelalian & Saelens, 1999). As such, although the results were statistically significant, their clinical significance is less clear.

Overall, the results confirmed that the internet may an effective means to transmit nutritional information to promote healthier dietary outcomes. Both treatment groups

showed improvements in self-reported eating behaviors and attitudes toward healthy eating from baseline to 6 months. Further, the behavioral intervention was more successful in changing these behaviors among both adolescents and parents, as evinced by significantly greater reductions in fat intake over the course of the study. However, given the rather modest changes in adiposity compared to face-to-face interventions, the internet may be best utilized in the context of preventing weight gain. For example, the internet may be an effective supplement to school- or community-based programs for the prevention of weight gain and/or the promotion of other health behaviors.

This study also investigated potential mediating variables in the relationship between experimental group and weight loss. Conceptually, mediator variables are those that are related to both the independent variable and outcome variable, and at least partially explain the relationship between the two (Baron & Kenny, 1986). Although mediator variables are not necessary (or sufficient) to observe the treatment effect, they are meaningful from a theoretical standpoint in that they explain a mechanism through which the independent variable influences the outcome variable. Criteria for testing mediation are: 1) A significant relationship must be observed between the independent and outcome variable, 2) A third variable (the proposed mediator variable) must be significantly related to both the independent variable and the outcome variable, and 3) When the effect of the mediator variable is statistically controlled, the effect of the independent variable on the outcome variable is attenuated. The findings of the current study met these criteria. For adolescent weight loss, variables relating to family climate (i.e., parents' satisfaction with life and family satisfaction) emerged as significant mediators. This finding may be interpreted to mean that that the family context had a

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powerful influence on treatment effectiveness. Indeed, previous research has indicated that parental family life satisfaction was related to weight loss for children, such that the interventions were most successful in families in which parents were satisfied (Barbarin & Tirado, 1985). These authors concluded that family climate variables had the potential to impede or accent child weight loss efforts. In addition, mothers' psychological well-being has been shown to be related to health behaviors among children (Florian & Elad, 1998; Favaro & Santonastaso, 1995). From a global viewpoint, family climate (like most environments) would influence the physical and psychological health of children. Further, from a family systems approach, the family environment would be a powerful determinant in any family member's attempted behavior change within a home. Previous research has shown that parental attitude and expectations of success significantly impact weight loss efforts for children (Uzark, Becker, Dielman, & Rocchini, 1987; Uzark, Becker, Dielman, Rocchini, & Katch, 1988; Wilson, & Ampey-Thornhill, 2001).

The influence of family setting is also observed in the interrelationships of adherence measures within the behavioral group. Social learning theory would predict that parents would model healthy eating and exercise habits, as well as program adherence, and that these changes would lead to similar behavior patterns among adolescents. Indeed, results showed that adolescent adherence measures were associated with parent adherence measures, implying that parents may have been powerful agents of change within the family. Further, adolescent changes in dietary habits as measured by calorie and fat intake were strongly associated with parent changes in dietary intake. These findings support previous research showing that parental modeling of dietary practices is a powerful determinant of children's eating behaviors (Golan & Weizman,

2001). In addition, a parent's willingness to change eating habits has been shown to influence effective weight loss for children (Uzark et al., 1987). On a more global level, the relationships between adherence measures, dietary intake, and weight loss may indicate that the parents' behaviors and investment in the program significantly influenced outcome for adolescents.

The current study has several limitations. At various points throughout the study, technical problems interfered with program transmission. For example, for various reasons it was necessary to change internet carriers as well as the server mid-way through the study. This resulted in disrupted service for some participants, who were at various points in the program due to different starting dates, and prohibited them from accessing the program website. Although case managers maintained contact via phone during this period, the uniformity of the intervention was compromised.

An additional limitation is that the most valuable measures of adherence were collected only from participants in the behavioral group. Although a tally of website hits was gathered from the control participants, the straight frequency of hits index was shown to be a misleading variable when compared to other adherence measures (e.g., average quiz scores). As it was not possible to track participants' movement throughout the website, it is not possible to distinguish whether participants were reading educational material versus spending time in the communication areas.

A potentially useful index of adherence would have been the frequency of website hits over the course of time. As it was necessary to switch software due to upgrades with the Blackboard® system, data for the first 4 months of the study were combined. Although this did not compromise the integrity of the data for the first 6 months when

analyzed in sum, it would have been informative to have looked at the pattern of log-ins over the course of the first six months. For example, it may have been the case that participants' adherence dropped off after the initial few months of participation. Such knowledge would have implications for how to modify the frequency of face-to-face sessions in a manner to most effectively supplement internet-based interventions.

The primary contribution of this study is the identification of variables that may either enhance or impede weight loss programs for obese adolescents. Previous research on weight loss for children and adolescents highlighted the importance of including family members to achieve optimal treatment gains. As parents can serve as both authority figures and role models in changing health behaviors, inclusion of a parent in treatment will optimize effects. In addition, the extent of inclusion will likely influence treatment success. For example, including a parent as a participant will likely yield greater results than merely eliciting emotional support. The current study extended the literature on families and weight loss in that it identified non-specific family variables as important mediators of treatment effectiveness. That parents' level of family and life satisfaction emerged as the primary mediators of experimental group on weight loss speaks to the saliency of family climate in treatment interventions for adolescents. Clinical and psychology has long acknowledged the impact of home environment on psychological and physical well-being. The most effective treatments for children and adults are those that view the individual as operating within a system, and address problematic aspects of the home. Future weight loss interventions should adopt this holistic view and incorporate components to address family climate.

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Full Approval by IRB Received   _____

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Title of Study: Internet-Based Obesity Prevention for African-American Girls

What you should know about a research study

- We give you this consent form so that you may read about the purpose, risks and benefits of this research study.
- The main goal of research studies is to gain knowledge that may help future patients.
- You have the right to refuse to take part, or agree to take part now and change your mind later on.
- Please review this consent form carefully and ask any questions before you make a decision.
- Your participation is voluntary.
- By signing this consent form, you agree to participate in the study as it is described.

Parents, as you read this consent form, please understand that your daughter is the research participant and that you have a role as a "support person." Therefore, the consent form is written as if it is directed at your child. We ask you to read the consent form as your child's legal guardian.

1- Who is doing the study?
Investigator Information:

Principal Investigator: Donald A. Williamson, Ph.D.
(225) 388-1500

Medical Investigator: Donna Ryan, M.D.
(225) 765-2514
24-hr. Emergency Phone Nos.:
(225) 763-2672 (Weekdays 8:00a.m.-5:00 p.m.)
(225) 765-4644 (After 5:00 p.m. and Weekends)

Co-Investigators: Donna Ryan, M.D., David Harsha, Ph.D

Dr. Donald Williamson directs this study, which is under the medical supervision of Dr. Donna Ryan. We expect about 60 adolescent girls plus their parents will be in this study. The study will take place over a period of approximately three years. Your expected time in this study will be two years. This research project is a part of a research program studying prevention of weight problems in African-American girls.

2- Where is the study being conducted?
This study is taking place in Baton Rouge, LA.

3- What is the purpose of this study?
This study is designed to test two different approaches for the prevention of weight problems in African-American girls.

4- Who is eligible to participate in the study? Who is ineligible?
You are eligible to participate in the study if:
- You are an African-American girl who has reached puberty
- Are between the ages of 11 to 15 years old
- Are overweight, as defined by a body mass index above the 85th percentile for your age
- At least one of your parents is significantly overweight as defined by a body mass index greater than 30
- One of your parents who is overweight is willing to participate in this obesity prevention study with you
- Your family willing to apply a coupon worth $750 from the Pennington Center to purchase a computer to be used in this study, unless you already own a computer that meets the specifications for use in this study.
- If you use the $750 coupon, your family is willing to apply approximately $400 out-of-pocket expenses toward the purchase of the computer that will be used in the study
- Your family home has electricity and at least one telephone line.

 You will not be able to participate in the study if:
- You or your parents have insulin dependent diabetes, an eating disorder, a significant mental health problem, or a serious health problem that might make it dangerous for you to participate in the study
- You or your mother is pregnant
- There are other problems that might interfere with your ability to successfully participate in the study

5- What will happen to you if you take part in the study?
If you participate in the study:
- You and one or more of your parents shall be invited to join one of two programs that are designed to help you lose weight as you grow older. The two approaches for preventing weight problems are being compared in this study. In both approaches, you will attend counseling sessions with your parent(s) during four one hour sessions during the first 12 weeks of the program.
- You will also attend at least four additional counseling sessions over the two year program, spaced at months 6, 12, 18, and 24. These counseling sessions will focus upon healthy eating habits, nutrition, and physical activity. In these sessions, you will

meet with the counselor and one or more of your parents will be with you in the counseling sessions. In both approaches, you will learn to use the internet to learn about healthy eating and exercise so that you and your parent(s) can attempt to lose weight. One approach will use nutrition education, e.g., lessons about healthy eating, good nutrition, and exercise. The other approach will use nutrition education and behavior modification, e.g., special instructions to help you change unhealthy eating and exercise habits. Both approaches are designed to help you lose weight and to prevent weight gain in the future. Both approaches will allow you to have special access to a website developed by the Pennington Biomedical Research Center for this project.

- You will only participate in one approach. You will have a 50% chance (1 out of two) of being invited to participate in either of the prevention approaches.
- You cannot choose the approach in which you will participate. The researchers will make that decision based upon chance selection for each participant.

Once you have decided to be in the research study:

- You and your parents will visit the Pennington Biomedical Research Center on five occasions over a two year period to be given a medical examination and to be interviewed about your eating and exercise habits.

- You will be asked to complete questionnaires related to your health and health habits. You will learn to complete these questionnaires using your computer at home using the special website. Each of the assessment sessions at the Pennington Center should last about two and one half hours. Completion of the questionnaires on your computer should require about one hour for you and one hour for your parent(s).

- After, completing the first assessment session, you will then begin participation in the prevention program and this participation will last for two years. Most of your participation in the program will take place using the internet from your home.

- You will be required to attend at least eight counseling sessions and to complete five assessment sessions.

- We hope that we will be able to make participation in the study as convenient as possible for you and your parents, but it will be very important for you to attend these counseling and assessment sessions.

- You will not be asked to take any medications or drugs while you are in the study.

6- What are the possible risks and discomforts?
There are some risks associated with dieting to lose or maintain body weight. Research has found that a small percentage of children and adolescents who attempt dieting develop concerns about body size and some develop an eating disorder. Also, there is a slightly increased risk for cigarette smoking and alcohol and drug abuse among adolescents who diet. In this study, these effects of dieting will be checked at each assessment and if these problems are noted, we will help you with them and if you need extra help, we will refer you to another agency.

7- What are the possible benefits?
We cannot promise any benefits from your being in the study. However, possible benefits include the prevention of weight gain and/or weight loss in persons who need to

lose body weight for improved health. Parents who are overweight may also lose weight during the study. Also, you may learn useful information related to healthy eating and physical activity and you may learn information about your health. By participating in the study, you may help medical scientists learn about effective approaches for preventing obesity in African-American girls. Finally, you will acquire a computer, that will be owned by your family, you will learn to use this computer and you will learn to use the internet.

8- If you do not want to take part in the study, are there other choices?

.You have the choice at any time not to participate in this research study. If you choose to not participate in this study, other alternative therapy approaches that you might try are various types of reduced calorie diets, very-low-calorie diets, and medications that aid weight loss.

9- If you have any questions or problems, whom can you call?

If you have any questions about your rights as a research volunteer, you should call the Institutional Review Board Office at 225/763-2693 or Dr. Donna Ryan, at 225/763-2514. If you have any questions about the research study, contact Dr. Donald Williamson at (225) 388-1500. If you think you have a research-related injury or medical illness, you should call Dr. Williamson at (225) 388-1500 during regular working hours. After working hours and on weekends you should call the answering service at 225/765-4644. The on-call physician will respond to your call.

10- What information will be kept private?

Every effort will be made to maintain the confidentiality of your study records. However, someone from the Food and Drug Administration, the National Institutes of Health or the Pennington Biomedical Research Center may inspect and/or copy the medical records related to the study. Results of the study may be published; however, we will keep your name and other identifying information private. Other than as set forth above, your identity will remain confidential unless disclosure of your identity is required by law.

11- Can your taking part in the study end early?

Dr. Williamson or the National Institutes of Health can withdraw you from the study for any reason or for no reason. You may withdraw from the study at any time without penalty. Possible reasons for withdrawal include lack of cooperation with the study requirements. The sponsor of the study may end the study early.

12- What if information becomes available that might affect your decision to stay in the study?

During the course of this study there may be new findings from this or other research which may affect your willingness to continue participation. Information concerning any such new findings will be provided to you.

13- What charges will you have to pay?

 If you agree to participate in the study and elect to purchase a computer from COMPUSA using the $750 coupon from the Pennington Center, you will need to spend $400 or more to purchase a computer. You can only use this coupon to purchase a computer from COMPUSA. If you prefer, to pay this money in installments, over a 6 to 12 month period, COMPUSA has agreed to set up installment payments if you have a

good credit rating. If your computer requires repairs or service, you may have to pay additional money for these repairs.

14- What payment will you receive?

If you agree to take part in the research project, we will pay your parent(s) $30 for completion of each assessment at 6, 12, 18, and 24 months. Children will receive a small gift for completing each of these assessments. Parents, if you are or have been an employee of LSU within the current calendar year, the normal employee payroll deductions will be withheld from these payments to you. You will not be paid for completion of the first assessment. Once you have agreed to participate in the study, you will receive a coupon for $750 that can be used to purchase a computer from COMPUSA. You will need to use approximately $400 of your family's money to purchase the computer, unless you already own a suitable computer that could be used to access the Pennington Center website. If you agree to participate in the study, the research team will help you set up the computer in your home and you will receive free access to the internet as long as you are actively participating in the study. If you do not follow the prescribed program, this free internet access will be terminated, however. If you have minor computer problems, the research team will be able to help you solve them. However, if you experience serious problems, you will be responsible to work with the team to solve those problems. For example, you may have to bring the computer for service or repair at a COMPUSA retail outlet in Baton Rouge, LA.

15- Will you be compensated for a study-related injury or medical illness?

No. The Pennington Center is a research facility and does not provide medical care. In the event of injury or medical illness resulting from the research procedures in which you participate, you will be referred to a treatment facility. No form of compensation for medical treatment is available. Medical treatment may be provided at your expense or at the expense of your health care insurer (e.g., Medicare, Medicaid, Blue Cross-Blue Shield, etc.) which may or may not provide coverage.

16- Signatures

The study has been discussed with me and all my questions have been answered. I understand that additional questions regarding the study should be directed to the study investigators. I agree with the terms above and acknowledge that I have been given a copy of the consent form.

_____   _____
Signature of Parent Volunteer   Date
_____
Social Security No. of Parent Volunteer

_____   _____
Signature of second Parent Volunteer   Date

_____
Social Security No. of second Parent Volunteer
_____   _____
Signature of Person Administering Informed Consent   Date

_____   _____
Donald Williamson, Ph.D   Date.
Principal Investigator

_____   _____
Donna Ryan, M.D.   Date
Medical Investigator

The study volunteer is a child and I certify that I am his/her legal guardian.

_____   _____   _____
Legal Guardian Name   Legal Guardian's Signature   Date

_____   _____   _____
Child's Name & Age   Child's Signature   Date

APPENDIX B: WEBSITE CONTENT

Behavioral Condition

Welcome to HIP-Teens
Week 1 - Self-Monitoring of Food Intake
Week 2 - Goal Setting for Food Pyramid
Week 3 - Introduction to Monitoring of Physical Activity
Week 4 - Getting Ready to Exercise and Learning How to Stretch
Week 5 - Serving Sizes
Week 6 - Behavioral Contracting
Week 7 - Goal Setting
Week 8 - Increase in Physical Activity
Week 9 - The Importance of Exercise: The Eating and Exercise Equation
Week 10 - Problem Solving
Week 11 - Learn about Healthy Food
Week 12 - Check up of Your Progress
Week 13 - Increased Exercise and Nutrient Density
Week 14 - Learning about Nutrition Labels
Week 15 - Healthy Snacks
Week 16 - Finding our way through the grocery store
Week 17 - Increase in Physical Activity
Week 18 - Check-up of Your Progress
Week 19 - Getting Help from Your Family: Improving Communication Skills
Week 20 - Having trouble getting support? Use problem-solving skills to figure out why
Week 21 - Communication Skills with Difficult Friends
Week 22 - Teach a relative or friend about the Food Guide Pyramid
Week 23 - Finding a New Sport on the Internet
Week 24 - Check up of Your Progress
Week 25 - Being Assertive and ?Learning How To Say No?
Week 27 - Restaurant Eating: Making Healthy Choices
Week 28 - Applying Our Assertiveness Skills to Eating in Social Situations
Week 29 - Applying Assertiveness Skills to School Lunches
Week 30 - Check up of Progress
Week 31 - Planning Ahead: Preparing Healthy Lunches
Week 32 - Television Monitoring
Week 33 - Problem Solving and Television Watching
Week 34 - Taking up a new hobby rather than watching TV
Week 35 - Using problem-solving skills to figure out what you will need to start your new hobby!
Week 36 - How are you doing? Let's perform a check-up of your progress! A review of level of exercise, food monitoring consistency, and television watching.
Week 37 – Let's Review Nutrient Density: The Myth about Good vs. Bad Foods
Week 38 - Planning Our Favorite Foods into our Meal plans
Week 39 - Making Healthier Versions of Our Favorite Foods
Week 40 - Finding Healthy Recipes on the Internet
Week 41 - The Power of Television Commercials: Getting America to eat lots of unhealthy foods!
Week 42 - Let's Perform a Check-up on Your Progress?
Week 43 - Self-esteem. What is it and how do you get some?
Week 44 - Physical Appearance
Week 45 - Creating a Balanced You: Creating Diverse Interests Within Yourself
Week 46 - Respecting Body Size Diversity. Understanding the components of physical appearance
Week 49 – Introduction to Relapse Prevention
Week 50 – Kick Some Lapse
Week 51 - The ABC's – Using Problem-Solving to Prevent Lapses
Week 52 - Coping with Lapses

Control Condition

Lesson 1 - Welcome and Let's Start
Lesson 2 - Start Moving!
Lesson 3 - An Introduction to the Food Guide Pyramid and Healthy Eating
Lesson 4 - The Food Guide Pyramid Under a Magnifying Glass
Lesson 5 - How Much am I Supposed to Eat? More on Serving Sizes
Lesson 6 - Ready for a Quiz? Let's Test Your Knowledge on Serving Sizes
Lesson 7 - Are You Still Moving? More on Physical Activity
Lesson 8 - Understanding Food Labels
Lesson 9 - Carbohydrates: Fueling Up
Lesson 10 - Is Protein only for Muscles?
Lesson 11 - So What's the Big Deal About Fat?
Lesson 12 - Watch Out for Those Hidden Calories!!
Lesson 13 - Nutrition in the Fast Lane
Lesson 14 - Healthy Selections at Fast Food Restaurants and Alternatives to Fast Foods
Lesson 15 - Shopping for Healthy Meals
Lesson 16 - A Review of the Food Label
Lesson 17 - Low Calorie Cooking and Food Preparation
Lesson 18 - Low Fat Cooking for the Holidays
Lesson 19 - Healthy Recipes on the Internet
Lesson 20 - Tips for Increasing Fruits and Vegetables in Your Diet
Lesson 21 - Tips on Preparing Fruits and Vegetables the Healthy Way!
Lesson 23 - Remember the 5-A-Day Program!
Lesson 24 - A Review of Carbohydrates, Protein and Fat
Lesson 25 - Are You Still Moving?
Lesson 26 - Shape Up America!

APPENDIX C: QUESTIONNAIRES

Child Dietary Self-Efficacy Scale (CDSS)

	Not Sure	A little Sure	Very Sure
1.How sure are you that you can eat food without adding salt?			
2. How sure are you that you can eat fresh or frozen vegetables instead of canned vegetables?			
3. How sure are you that you can ask your parents for popcorn without salt or butter?			
4 How sure are you that you can ask for lettuce and tomato instead of pickles on your hamburger?			
5.How sure are you that you can drink low-fat white milk instead of regular white milk?			
6 How sure are your that you can eat cereal instead of a donut?			
7 How sure are you that you can eat fresh fruit instead of a candy bar?			
8. How sure are you that you can eat toast with margarine instead of real butter?			
9. How sure are you that you can take off and not eat the skin of your chicken?			
10. How sure are you that you can ask for frozen yogurt instead of ice cream?			
11. How sure are you that you can ask your parents to buy bread sticks instead of salted crackers?			
12. How sure are you that you can eat a baked potato instead of french fries?			
13. How sure are you that you can drink fruit juice instead of a soft drink (soda pop)?			
14.How sure are you that you can eat cooked vegetables without adding real butter to them?			
15. How sure are you that you can eat a salad from the salad bar at a fast food restaurant instead of ordering a hamburger and fries?			

Weight Loss Behavior Scale (WLBS)

Scale 1: Concern with Dieting and Weight

	Always				Never
1. When I lose weight I reward myself with nonfood items.	( )	( )	( )	( )	( )
2. After I break my diet by eating something fattening, eat less to make up for it.	( )	( )	( )	( )	( )
3. I am preoccupied with thoughts of my weight and shape.	( )	( )	( )	( )	( )
4. I eat whenever I want without worrying about gaining weight. (R)	( )	( )	( )	( )	( )
5. I am embarrassed about the amount of food I can eat.	( )	( )	( )	( )	( )
6. To control my weight, I purposely eat less than I want.	( )	( )	( )	( )	( )
7. I am not worried about gaining weight and becoming fat. (R)	( )	( )	( )	( )	( )

Scale 2: Exercise

	Always				Never
1. I engage in physical activity for my health.	( )	( )	( )	( )	( )
2. Exercise is important for physical and mental health.	( )	( )	( )	( )	( )
3. I believe that a person can be healthy without exercising regularly. (R)	( )	( )	( )	( )	( )
4. I exercise at least three times per week.	( )	( )	( )	( )	( )
5. To control my weight, I engage in physical activity at a reasonable level.	( )	( )	( )	( )	( )
6. After exercising for a reasonable length of time, I feel refreshed.	( )	( )	( )	( )	( )
7. I avoid engaging in sporting or other physical activity for exercise. (R)	( )	( )	( )	( )	( )

Scale 3: Overeating

	Always				Never
1. I eat less than most people would in a similar situation. (R)	( )	( )	( )	( )	( )
2. I eat much more than the average person because I constantly snack on foods throughout the day.	( )	( )	( )	( )	( )
3. leave food on my plate. (R)	( )	( )	( )	( )	( )
4. I love food too much to watch what I eat.	( )	( )	( )	( )	( )
5. I rapidly eat a large amount of food in a short	( )	( )	( )	( )	( )

period of time.

6. When I smell delicious food I feel hungry even ( )   ( )   ( )   ( )   ( )
   if I have just eaten.
7. Some foods taste so good that I eat more even ( )   ( )   ( )   ( )   ( )
   when I am no longer hungry.

Scale 4: Avoidance of Fattening Foods and Sweets

	Always				Never
1. I avoid eating fried foods.	( )	( )	( )	( )	( )
2. I avoid using butter on my food.	( )	( )	( )	( )	( )
3. I eat dessert. (R)	( )	( )	( )	( )	( )
4. I enjoy eating sweets. (R)	( )	( )	( )	( )	( )
5. I avoid buying ready-to-eat foods (e.g. cookies, crackers).	( )	( )	( )	( )	( )
6. I avoid eating junk food.	( )	( )	( )	( )	( )
7. I buy foods that I like regardless of their fat and calorie content. (R)	( )	( )	( )	( )	( )

Scale 5: Emotional Eating

	Always				Never
1. When I am frustrated, I eat more than I usually do.	( )	( )	( )	( )	( )
2. I eat less when I am mad at someone. (R)	( )	( )	( )	( )	( )
3. I tend to eat when I am angry.	( )	( )	( )	( )	( )
4. I overeat when I am depressed.	( )	( )	( )	( )	( )
5. I eat more when I have relationship problems.	( )	( )	( )	( )	( )
6. I find it difficult to eat when I am anxious. (R)	( )	( )	( )	( )	( )
7. When I am under a lot of stress, eat less than usual. (R)	( )	( )	( )	( )	( )

PBRC Food Frequency Questionnaire

This form asks about your usual food intake.
It takes about 30 minutes to complete. Please follow these instructions:
- Answer each question as best you can – estimate if you aren't sure.
- Use only a No. 2 pencil or black ink pen.
- Be certain to completely blacken in each of your answers, and erase (if in pencil) completely if you make any changes.

Incorrect Marks:	⊏ ⊠ ⊠
Correct Mark:	■

1. SOCIAL SECURITY NUMBER

0	☐	☐	☐	☐	☐	☐	☐	☐	☐
1	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	☐	☐	☐	☐	☐	☐	☐	☐	☐
4	☐	☐	☐	☐	☐	☐	☐	☐	☐
5	☐	☐	☐	☐	☐	☐	☐	☐	☐
6	☐	☐	☐	☐	☐	☐	☐	☐	☐
7	☐	☐	☐	☐	☐	☐	☐	☐	☐
8	☐	☐	☐	☐	☐	☐	☐	☐	☐
9	☐	☐	☐	☐	☐	☐	☐	☐	☐

2. SEX

- ☐ Male
- ☐ Female

3. AGE

- ☐ Less than 20
- ☐ 20 – 29
- ☐ 30 – 39
- ☐ 40 – 49
- ☐ 50 – 59
- ☐ 60 – 69
- ☐ 70 +

4. TODAY'S DATE

Month	DAY		YEAR
☐ January			
☐ February			
☐ March			
☐ April	0 ☐	0 ☐	1998 ☐
☐ May	1 ☐	1 ☐	1999 ☐
☐ June	2 ☐	2 ☐	2000 ☐
☐ July	3 ☐	3 ☐	2001 ☐
☐ August		4 ☐	2002 ☐
☐ September		5 ☐	2003 ☐
☐ October		6 ☐	2004 ☐
☐ November		7 ☐	2005 ☐
☐ December		8 ☐	2006 ☐
		9 ☐	2007 ☐

5. WEIGHT

	pounds		
0	☐	☐	☐
1	☐	☐	☐
2	☐	☐	☐
3	☐	☐	☐
4	☐	☐	☐
5	☐	☐	☐
6	☐	☐	☐
7	☐	☐	☐
8	☐	☐	☐
9	☐	☐	☐

6. HEIGHT

	ft	in
0	☐	☐
1	☐	☐
2	☐	☐
3	☐	☐
4	☐	☐
5	☐	☐
6	☐	☐
7	☐	☐
8		☐
9		☐
10		☐
11		☐

7. Do you **smoke cigarettes** now?
   ☐ No
   ☐ Yes   If YES, on the average, about how many cigarettes a day do you smoke now?
      ☐ 1-5   ☐ 6-14   ☐ 15-24   ☐ 25-34   ☐ 35 or more

8. About how many times have you gone on a **diet to lose weight**?
   ☐ Never   ☐ 1-2   ☐ 3-5   ☐ 6-8   ☐ 9-11   ☐ 12 or more

9. During the past year have you taken any **vitamins** or **minerals**?
   ☐ No   ☐ Yes, fairly regularly ⟶   ☐ Yes, but not regularly
   If YES, what do you take regularly?

Vitamin Type	Number of Tablets								For How Many Years?				
	None	1-3 per week	4-6 per week	1 per day	2 per day	3 per day	4 per day	5+ per day	Less than 1 Yr.	1-2 Yrs.	3-5 Yrs.	6-9 Yrs.	10+ Yrs.
Multiple Vitamins													
Stress-tabs type	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Therapeutic, Theragran type	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
One-a-day type	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other Vitamins													
Vitamin A	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vitamin E	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Calcium or Tums	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vitamin C	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

10. If you take Vitamin E or Vitamin C :
    How many units per **Vitamin E tablet**?   ☐ 100   ☐ 200   ☐ 400   ☐ 1000   ☐ Don't know
    How many milligrams per **Vitamin C tablet**?   ☐ 100   ☐ 250   ☐ 500   ☐ 1000   ☐ Don't Know

11. Do you regularly take **pills** containing any of these nutrients?
    ☐ No or Don't know   ☐ Iron   ☐ Beta-carotene

    ☐ Zinc   ☐ Selenium   ☐ _____

12. What kinds of fat do you *usually* use in **cooking** (to fry, stir-fry, or sauté)? Mark only one or two.
    ☐ Don't know / Don't cook   ☐ Lard, fatback, baconfat   ☐ Pam or no oil   ☐ Crisco

    ☐ Stick Margarine   ☐ Butter   ☐ Soft tub margarine   ☐ Oil

    ☐ ½ butter, ½ margarine   ☐ Low calorie margarine

13. What kinds of fat do you *usually* add to **vegetables, potatoes**, etc.? Mark only one or two.

☐ Don't add fat   ☐ Lard, fatback, baconfat   ☐ Low calorie margarine

☐ Stick margarine   ☐ Soft tub margarine   ☐ ⅓ butter, ⅓ margarine

☐ Butter   ☐ Whipped butter   ☐ Crisco

14. **If** you eat the following foods, how often do you eat a **low-fat** or **non-fat** version of the food?

Cheese	☐ Always low-fat	☐ Sometimes	☐ Rarely low-fat
Ice Cream / Yogurt	☐ Always low-fat	☐ Sometimes	☐ Rarely low-fat
Salad Dressing	☐ Always low-fat	☐ Sometimes	☐ Rarely low-fat

15.

	Seldom / Never	Sometimes	Often / Always
a. How often do you add **salt** to your food?	☐	☐	☐
b. How often do you add **pepper** to your food?	☐	☐	☐
c. How often do you eat the **skin on chicken**?	☐	☐	☐
d. How often do you eat the **fat on meat**?	☐	☐	☐

16. About how often do you eat the following foods from **restaurants** or **carryouts**?
Remember to think about all meals (breakfast, lunch, dinner or snacks).

Restaurant Food	Number Of Visits Last Year						
	Never in past year	1-4 times in past year	5-11 times in past year	1-3 times a month	Once a week	2-4 times a week	Almost every day
Fried Chicken	☐	☐	☐	☐	☐	☐	☐
Burgers	☐	☐	☐	☐	☐	☐	☐
Pizza	☐	☐	☐	☐	☐	☐	☐
Chinese food	☐	☐	☐	☐	☐	☐	☐
Mexican food	☐	☐	☐	☐	☐	☐	☐
Fried fish	☐	☐	☐	☐	☐	☐	☐

17. This section is about your *usual* eating habits over the past year.

First: Mark the column to show how often, on the average, you ate the food during the past year. Please **be careful** of which column you mark your answer.

Second: Mark whether your usual serving size is small, medium or large. Please **do not omit** serving size, unless you **never** eat that particular food.

Additional Comments:
- Please **do not skip** any foods. If you never eat a food, mark "Never or less than once a month".
- A small serving is about one-half the medium serving size shown, or less.
- A large serving is about one-and-a-half times the medium serving size show, or more.

Sample: This person ate a medium serving of rice about twice a month and never ate squash.

Type Of Food	How Often									How Much			
	Never or <1 per mo.	1 per mo.	2-3 per mo.	1 per week	2 per week	3-4 per week	5-6 per week	1 per day	2+ per day	Medium Serving	Your Serving Size		
											S	M	L
Rice	☐	☐	■	☐	☐	☐	☐	☐	☐	½ cup	☐	■	☐
Winter squash, baked squash	■	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐

Type Of Food	How Often									How Much			
	Never or <1 per mo.	1 per mo.	2-3 per mo.	1 per week	2 per week	3-4 per week	5-6 per week	1 per day	2+ per day	Medium Serving	Your Serving Size		
											S	M	L
Section 1. FRUITS AND JUICES													
EXAMPLE: Apples, etc.	☐	☐	☐	■	☐	☐	☐	☐	☐	1 medium or ½ cup	☐	■	☐
1. Apples, applesauce, pears	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium or ½ cup	☐	☐	☐
2. Bananas	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium	☐	☐	☐
3. Peaches, apricots (fresh or canned)	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium or ½ cup	☐	☐	☐
4. Cantaloupe (in season)	☐	☐	☐	☐	☐	☐	☐	☐	☐	¼ medium	☐	☐	☐
5. Cantaloupe (rest of year)	☐	☐	☐	☐	☐	☐	☐	☐	☐	¼ medium	☐	☐	☐
6. Watermelon (in season)	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 slice	☐	☐	☐
7. Strawberries (in season)	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
8. Oranges	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium	☐	☐	☐

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| Type Of Food | How Often | | | | | | | | | How Much | | | |
| | Never or <1 per mo. | 1 per mo. | 2-3 per mo. | 1 per week | 2 per week | 3-4 per week | 5-6 per week | 1 per day | 2+ per day | Medium Serving | Your Serving Size | | |
											S	M	L
9. Grapefruit	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ medium	☐	☐	☐
10. Orange juice or grapefruit juice	☐	☐	☐	☐	☐	☐	☐	☐	☐	6 oz. glass	☐	☐	☐
11. Fruit drinks with added vitamin C, such as Hi-C	☐	☐	☐	☐	☐	☐	☐	☐	☐	6 oz. glass	☐	☐	☐
12. Any other fruit, including berries, fruit cocktail, grapes, etc.	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
Section 2. BREAKFAST FOODS													
1. High fiber, bran or granola cereals, shredded wheat	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐
2. Highly fortified cereals, such as Total, Just Right or Product 19	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐
3. Other cold cereals, such as corn flakes, Rice Krispies	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐
4. Cooked cereal, or grits	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐
5. Milk on cereal	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
6. Sugar added to cereal	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 tsp.	☐	☐	☐
7. Eggs	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 egg = Sm. 2 egg = Md.	☐	☐	☐
8. Bacon	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices	☐	☐	☐
9. Sausage	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 patties or links	☐	☐	☐
Section 3. VEGETABLES													
1. String beans, green beans	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
2. Peas	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
3. Chili with beans	☐	☐	☐	☐	☐	☐	☐	☐	☐	¾ cup	☐	☐	☐
4. Other beans such as baked beans, pintos, kidney, limas, and lentils	☐	☐	☐	☐	☐	☐	☐	☐	☐	¾ cup	☐	☐	☐
5. Corn	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
6. Winter squash/baked squash	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐

Type Of Food	How Often									How Much			
	Never or <1 per mo.	1 per mo.	2-3 per mo.	1 per week	2 per week	3-4 per week	5-6 per week	1 per day	2+ per day	Medium Serving	Your Serving Size		
											S	M	L
7. Tomatoes, tomato juice	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 med. or 6 oz. glass	☐	☐	☐
8. Red chili sauce, taco sauce	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 tbsp.	☐	☐	☐
9. Broccoli	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
10. Cauliflower or Brussels sprouts	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
11. Spinach (raw)	☐	☐	☐	☐	☐	☐	☐	☐	☐	¾ cup	☐	☐	☐
12. Spinach (cooked)	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
13. Mustard greens, turnip greens, collards	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
14. Cole slaw, cabbage, sauerkraut	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
15. Carrots, or mixed vegetables containing carrots	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
16. Green salad	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐
17. Regular salad dressing & mayonnaise, including on sandwiches or potato salad, etc.	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 tbsp.	☐	☐	☐
18. French fries and fried potatoes	☐	☐	☐	☐	☐	☐	☐	☐	☐	¾ cup	☐	☐	☐
19. Sweet potatoes, yams	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
20. Other potatoes, including boiled, baked, mashed & potato salad	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium or ½ cup	☐	☐	☐
21. Rice	☐	☐	☐	☐	☐	☐	☐	☐	☐	¾ cup	☐	☐	☐
22. Any other vegetable, including cooked onions, summer squash, etc.	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
23. Butter, margarine or other fat added to vegetables, potatoes, etc.	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 pats	☐	☐	☐
Section 4. MEAT, FISH, POULTRY, LUNCH ITEMS													
1. Hamburgers, cheeseburgers, meatloaf, beef burritos, tacos	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium or 4 oz.	☐	☐	☐
2. Beef, (steaks, roasts, etc., including sandwiches)	☐	☐	☐	☐	☐	☐	☐	☐	☐	4 oz.	☐	☐	☐
3. Beef stew or pot pie with carrots or other vegetables	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 cup	☐	☐	☐

Type Of Food	How Often									How Much			
	Never or <1 per mo.	1 per mo.	2-3 per mo.	1 per week	2 per week	3-4 per week	5-6 per week	1 per day	2+ per day	Medium Serving	Your Serving Size		
											S	M	L
4. Liver, including chicken livers	☐	☐	☐	☐	☐	☐	☐	☐	☐	4 oz.	☐	☐	☐
5. Pork, including chops, roasts	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 chops or 4 oz.	☐	☐	☐
6. Fried chicken	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 small or 1 large piece	☐	☐	☐
7. Chicken or turkey (roasted, stewed or broiled including on sandwiches)	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 small or 1 large piece	☐	☐	☐
8. Fried fish or fish sandwich	☐	☐	☐	☐	☐	☐	☐	☐	☐	4 oz. or 1 sandwich	☐	☐	☐
9. Tuna, tuna salad, tuna casserole	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
10. Oysters	☐	☐	☐	☐	☐	☐	☐	☐	☐	5 pieces, ¾ cup, or 3 oz	☐	☐	☐
11. Shell fish, (shrimp, crab, lobster, etc)	☐	☐	☐	☐	☐	☐	☐	☐	☐	5 pieces, ¾ cup, or 3 oz	☐	☐	☐
12. Other fish (broiled or baked)	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 pieces or 4 oz.	☐	☐	☐
13. Spaghetti, lasagna, other pasta with tomato sauce	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 cup	☐	☐	☐
14. Pizza	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices	☐	☐	☐
15. Mixed dishes with cheese (such as macaroni and cheese)	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 cup	☐	☐	☐
16. Liverwurst	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices	☐	☐	☐
17. Hot dogs	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 hot dogs	☐	☐	☐
18. Ham, bologna, salami and other lunch meats	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices or 2 oz.	☐	☐	☐
19. Vegetable and tomato soups, inc. vegetable beef, minestrone	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐
20. Other soups	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium bowl	☐	☐	☐

Section 5. BREADS, SNACKS, SPREADS

Type Of Food													
1. Biscuits, muffins (including fast foods)	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium piece	☐	☐	☐
2. White bread (incl. Sandwiches, bagels, burger rolls, french or italian bread)	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices	☐	☐	☐
3. Dark bread, such as wheat, rye, pumpernickel (incl. sandwiches)	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices	☐	☐	☐

Type Of Food	How Often									How Much			
	Never or <1 per mo.	1 per mo.	2-3 per mo.	1 per week	2 per week	3-4 per week	5-6 per week	1 per day	2+ per day	Medium Serving	Your Serving Size		
											S	M	L
4. Corn bread, corn muffins, corn tortillas	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium piece	☐	☐	☐
5. Salty snacks, such as potato chips, corn chips, popcorn	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 handfuls or 1 cup	☐	☐	☐
6. Peanuts, peanut butter	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 tbsp.	☐	☐	☐
7. Margarine on bread or rolls	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 pats	☐	☐	☐
8. Butter on bread or rolls	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 pats	☐	☐	☐
9. Gravies made with meat drippings, or white sauce	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 tbsp.	☐	☐	☐
Section 6. DAIRY PRODUCTS													
1. Cottage cheese	☐	☐	☐	☐	☐	☐	☐	☐	☐	½ cup	☐	☐	☐
2. Other cheeses and cheese products	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 slices or 2 oz.	☐	☐	☐
3. Flavored yogurt, frozen yogurt	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 cup	☐	☐	☐
Section 7. SWEETS													
1. Ice cream	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 scoop or ½ cup	☐	☐	☐
2. Doughnuts, cookies, cake, pastry	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 piece or 3 cookies	☐	☐	☐
3. Pumpkin pie, sweet potato pie	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium slice	☐	☐	☐
4. Other pies	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium slice	☐	☐	☐
5. Chocolate candy	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 small bar or 1 oz.	☐	☐	☐
6. Other candy, jelly, honey, brown sugar	☐	☐	☐	☐	☐	☐	☐	☐	☐	3 pieces or 1 tbsp.	☐	☐	☐

Type Of Food	How Often									How Much			
	Never or <1 per mo.	1-3 per mo.	1 per week	2-4 per week	5-6 per week	1 per day	2-3 per day	4-5 per day	6+ per day	Medium Serving	Your Serving Size		
											S	M	L
Section 8. BEVERAGES (Please note that the categories for these columns are different.)													
1. Whole milk and beverages with whole milk (not incl. cereal)	☐	☐	☐	☐	☐	☐	☐	☐	☐	8 oz. glass	☐	☐	☐
2. 2% milk and beverages with 2% milk (not incl. cereal)	☐	☐	☐	☐	☐	☐	☐	☐	☐	8 oz. glass	☐	☐	☐
3. Skim milk, 1% milk or buttermilk (not incl. on cereal)	☐	☐	☐	☐	☐	☐	☐	☐	☐	8 oz. glass	☐	☐	☐
4. Regular soft drinks (not diet soda)	☐	☐	☐	☐	☐	☐	☐	☐	☐	12 oz. can or bottle	☐	☐	☐
5. Beer	☐	☐	☐	☐	☐	☐	☐	☐	☐	12 oz. can or bottle	☐	☐	☐
6. Wine or wine coolers	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium glass	☐	☐	☐
7. Liquor	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 shot	☐	☐	☐
8. Coffee, regular or decaf	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium cup	☐	☐	☐
9. Tea (hot or iced)	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 medium cup	☐	☐	☐
10. Lemon in tea	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 tsp.	☐	☐	☐
11. Non-dairy creamer on coffee or tea	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 tbsp.	☐	☐	☐
12. Cream (real) or half-and-half in coffee or tea	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 tbsp.	☐	☐	☐
13. Milk in coffee or tea	☐	☐	☐	☐	☐	☐	☐	☐	☐	1 tbsp.	☐	☐	☐
14. Sugar in coffee or tea	☐	☐	☐	☐	☐	☐	☐	☐	☐	2 tsp.	☐	☐	☐
15. Glasses of water	☐	☐	☐	☐	☐	☐	☐	☐	☐	8 oz. glass	☐	☐	☐

18.

Summary Questions	Average Use Last Year								
	<1 per week	1-2 per week	3-4 per week	5-6 per week	1 per day	1 ½ per day	2 per day	3 per day	4+ per day
a. How often do you use fat or oil in cooking?	☐	☐	☐	☐	☐	☐	☐	☐	☐
b. About how many servings of vegetables do you eat, not counting salad or potatoes?	☐	☐	☐	☐	☐	☐	☐	☐	☐
c. About how many servings of fruit do you eat, not counting juices?	☐	☐	☐	☐	☐	☐	☐	☐	☐
d. About how many servings of cold cereal do you eat?	☐	☐	☐	☐	☐	☐	☐	☐	☐

Children's Depression Inventory (CDI)

Kids sometimes have different feelings and ideas. This form lists the feelings and ideas in groups. From each group of three sentences, pick one sentence that describes you *best* for the past two weeks. After you pick a sentence from the first group, go on to the next group. There is no right answer or wrong answer. Just pick the sentence that best describes the way you have been recently. Select the box next to the sentence that you pick. Remember, pick out the sentences that describe you best in the PAST TWO WEEKS.

Item 1
! I am sad once in awhile
! I am sad many times.
! I am sad all the time.

Item2
! Nothing will ever work out for me.
! I am not sure if things will work out for me.
! Things will work out for me O.K.

Item 3
! I do most things O.K.
! I do many things wrong.
! I do everything wrong.

Item 4
! I have fun in many things.
! I have fun in some things.
! Nothing is fun at all.

Item 5
! I am bad all the time.
! I am bad many times.
! I am bad once in a while.

Item 6
! I think about bad things happening to me once in a while.
! I worry that bad things will happen to me.
! I am sure that terrible things will happen to me.

Item 7
! I hate myself.
! I do not like myself.
! I like myself.

Item 8
! All bad things are my fault.
! Many bad things are my fault.
! Bad things are not usually my fault.

Item 9
! I do not think about killing myself.
! I think about killing myself but I would not do it.
! I want to kill myself.

Item 10
! I feel like crying every day.
! I feel like crying many days.
! I feel like crying once in a while.

Item 11
! Things bother me all the time.
! Things bother me many times.
! Things bother me once in a while.

Item 12
! I like being with people.
! I do not like being with people many times.
! I do not want to be with people at all.

Item 13
! I cannot make up my mind about thing.
! It is hard to make up my mind about things.
! I make up my mind about things easily.

Item 14
! I look O.K.
! There are some bad things about my looks.
! I look ugly.

Item 15
! I have to push myself all the time to do my schoolwork.
! I have to push myself many times to do my schoolwork.
! Doing schoolwork is not a big problem.

Item 16
! I have trouble sleeping every night.
! I have trouble sleeping many nights.
! I sleep pretty well.

Item 17
! I am tired once in a while.
! I am tired many days.
! I am tired all the time.

Item 18
! Most days I do not feel like eating.
! Many days I do not feel like eating.
! I eat pretty well.

Item 19
! I do not worry about aches and pains.
! I worry about aches and pains many times.
! I worry about aches and pains all the time.

Item 20
! I do not feel alone.
! I feel alone many times
! I feel alone all the time.

Item 21
! I never have fun at school.
! I have fun at school only once in a while.
! I have fun at school many times.

Item 22
! I have plenty of friends.
! I have some friends but I wish I had more.
! I do not have any friends.

Item 23
! My schoolwork is alright.
! My schoolwork is not as good as before.
! I do very badly in subjects I used to be good in.

Item 24
! I can never be as good as other kids.
! I can be as good as other kids if I want to.
! I am just as good as other kids.

Item 25
! Nobody really loves me.
! I am not sure if anybody loves me.
! I am sure that somebody loves me.

Item 26
! I usually do what I am told.
! I do not do what lam told most times.
! I never do what I am told.

Item 27
! I get along with people.
! I get into fights many times.
! I get into fights all the time.

Satisfaction With Life Scale (SWLS)

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly Agree
1. In most ways my life is close to ideal.							
2. The conditions of my life are excellent.							
3. I am satisfied with my life.							
4. So far I have gotten the important things I want in life.							
5. If I could live my life over, I would change almost nothing.							

Rosenberg Self-Esteem Scale

Please record the appropriate answer per item, depending on whether you strongly agree, agree, disagree, or strongly disagree with it.

	Strongly agree	Agree	Disagree	Strongly Disagree
1. On the whole, I am satisfied with myself.				
2. At times I think I am no good at all.				
3. I feel that I have a number of good qualities.				
4. I am able to do things as well as most other people.				
5. I feel I do not have much to be proud of.				
6. I certainly feel useless at times.				
7. I feel that I'm a person of worth, at least on an equal plane with others.				
8. I wish I could have more respect for myself.				
9. All in all, I am inclined to feel that I am a failure.				
10. I take a positive attitude toward myself.				

Computer Anxiety Index (CAIN)

	Strongly agree	Agree	Slightly agree	Slightly disagree	Disagree	Strongly disagree
1. Having a computer available to me would improve my productivity.						
2. If I had to use a computer for some reason, it would probably save me some time and work.						
3. If I use a computer, I could get a better picture of facts and figures.						
4. Having a computer available would improve my general satisfaction.						
5. Having to use a computer would make my life less enjoyable.						
6. Having a computer available to me could make things easier for me.						
7. I feel very negative about computers in general.						
8. Having a computer available to me could make things more fun for me.						
9. If I had a computer at my disposal, I would try to get rid of it.						
10. I look forward to a time when computers are more widely used.						
11. I doubt if I ever use computers very much.						
12. I avoid using computers whenever I can.						
13. I enjoy using computers.						
14. I feel that there are too many computers around now.						
15. Computers are probably going to be an important part of my life.						
16. A computer could make learning fun.						
17. If I were to use a computer, I could get a lot of satisfaction from it.						
18. If I had to use a computer, it would probably be more trouble that it was worth.						
19. I am usually uncomfortable when I have to use computers.						
20. I sometimes get nervous just thinking about computers.						
21. I will probably never learn to use a computer.						
22. Computers are too complicated to be of much use to me.						
23. If I had to use a computer all the time, I would probably be very unhappy.						
24. I sometimes feel intimidated when I have to use a computer.						
25. I sometimes feel that computers are smarter than I am.						
26. I can think of many ways that I could use a computer.						

Eating Habits Confidence Questionnaire (Adults)

Below is a list of things people might do while trying to change their eating habits. Whether you are trying to change your eating habits or not, please rate how confident you are that you could *really motivate* yourself to do things like these consistently for at *least six months.* Please *circle one number for each item*.

How sure are you that you can do these things?	I know I cannot		Maybe I can		I know I can
1. Drink low or non-fat milk every day.	( )	( )	( )	( )	( )
2. Stick to low fat, low salt foods when dining with friends or co-workers.	( )	( )	( )	( )	( )
3. Cut down on gravies and cream sauces.	( )	( )	( )	( )	( )
4. Eat poultry and fish instead of red meat at dinner.	( )	( )	( )	( )	( )
5. Keep the salt shaker off the kitchen table.	( )	( )	( )	( )	( )
6. Stick to low fat, low salt foods when there is high fat, high salt food readily available at a party.	( )	( )	( )	( )	( )
7. Eat smaller portions of food at a party.	( )	( )	( )	( )	( )
8. Eat fruit or vegetables for a snack.	( )	( )	( )	( )	( )
9. Cook smaller portions so there are no leftovers.	( )	( )	( )	( )	( )
10. Stick to low fat, low salt foods when you feel depressed, bored, or tense.	( )	( )	( )	( )	( )
11. Eat fruit or drink fruit juice with breakfast.	( )	( )	( )	( )	( )
12. Avoid ordering red meat (beef, pork, ham, lamb) at a restaurant.	( )	( )	( )	( )	( )
13. Eat fruit or vegetables at every meal.	( )	( )	( )	( )	( )
14. Substitute low or non-fat milk for whole milk at breakfast.	( )	( )	( )	( )	( )
15. Eat salads for lunch.	( )	( )	( )	( )	( )
16. Eat smaller portions at dinner.	( )	( )	( )	( )	( )
17. Eat meatless (vegetarian) entrees for dinner.	( )	( )	( )	( )	( )
18. Stick to low fat, low salt foods when you are alone, and there is no one there to watch you.	( )	( )	( )	( )	( )
19. Eat unsalted peanuts, chips, crackers, and pretzels.	( )	( )	( )	( )	( )
20. Stick to low fat, low salt foods when the only snack close by is available from a vending machine.	( )	( )	( )	( )	( )
21. Drink fruit juice instead of soda.	( )	( )	( )	( )	( )
22. Eat unsalted, unbuttered popcorn.	( )	( )	( )	( )	( )
23. Avoid adding salt at the table.	( )	( )	( )	( )	( )
24. Eat more vegetables at restaurants.	( )	( )	( )	( )	( )
25. Eat lunch as your main meal of the day, rather than dinner.	( )	( )	( )	( )	( )
26. Eat yogurt, low fat cottage cheese or low fat cheese most days.	( )	( )	( )	( )	( )
27. Add less salt than the recipe calls for.	( )	( )	( )	( )	( )

Kansas Family Life Satisfaction Scale

	Extremely dissatisfied	Very dissatisfied	Somewhat dissatisfied	Mixed	Somewhat satisfied	Very satisfied	Extremely satisfied
1. How satisfied are you with your family life?	( )	( )	( )	( )	( )	( )	( )
2. How satisfied are you with your relationship with your spouse?	( )	( )	( )	( )	( )	( )	( )
3. How satisfied are you with your relationship with your child(ren)?	( )	( )	( )	( )	( )	( )	( )
4. How satisfied are you with your children's relationship with each other? (answer only if you have more than one child)	( )	( )	( )	( )	( )	( )	( )

Symptom Checklist - 90- R

Below is a list of problems people sometimes have. Please read each one carefully and blacken the box that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. Blacken the box for only one answer for each problem and do not skip any items. If you change your mind, erase your first mark carefully. Read the example before beginning, and if you have any questions please ask them now.

Example:

	How much were you distressed by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1.	Bodyaches					

	How much were you distressed by:	Not at all	A little	Moderately	Quite a bit	Extremely
1.	Headaches					
2.	Nervousness or shakiness inside					
3.	Repeated unpleasant thoughts that won't leave your mind					
4.	Faintness or dizziness					
5.	Loss of sexual interest or pleasure					
6.	Feeling critical of others					
7.	The idea that someone else can control your thoughts					
8.	Feeling others are to blame for most of your troubles					
9.	Trouble remembering things					
10.	Worried about sloppiness or carelessness					
11.	Feeling easily annoyed or irritated					
12.	Pains in heart or chest					
13.	Feeling afraid in open spaces or on the streets					
14.	Feeling low in energy or slowed down					

15.	Thoughts of ending your life					
16.	Hearing voices that other people do not hear					
17.	Trembling					
18.	Feeling that most people can not be trusted					
19.	Poor appetite					
20.	Crying easily					
21.	Feeling shy or uneasy with the opposite sex					
22.	Feeling of being trapped or caught					
23.	Suddenly scared for no reason					
24.	Temper outbursts that you could not control					
25.	Feeling afraid to go out of your house alone					
26.	Blaming yourself for things					
27.	Pains in lower back					
28.	Feeling blocked in getting things done					
29.	Feeling lonely					
30.	Feeling blue					
31.	Worrying too much about things					
32.	Feeling no interest in things					
33.	Feeling fearful					
34.	Your feelings being easily hurt					
35.	Other people being aware of your private thoughts					
36.	Feeling others do not understand you or are unsympathetic					
37.	Feeling that people are unfriendly or dislike you					
38.	Having to do things very slowly to insure correctness					

39.	Heart pounding or racing					
40.	Nausea or upset stomach					
41.	Feeling inferior to others					
42.	Soreness of your muscles					
43.	Feeling that you are watched or talked about by others					
44.	Trouble falling asleep					
45.	Having to check and double check what you do					
46.	Difficulty making decisions					
47.	Feeling afraid to travel on buses, subways, or trains					
48.	Trouble getting your breath					
49.	Hot or cold spells					
50.	Having to avoid certain things, places, or activities because they frighten you					
51.	Your mind going blank					
52.	Numbness or tingling in parts of your body					
53.	A lump in your throat					
54.	Feeling hopeless about the future					
55.	Trouble concentrating					
56.	Feeling weak in parts of your body					
57.	Feeling tense or keyed up					
58.	Heavy feelings in your arms or legs					
59.	Thoughts of death or dying					
60.	Overeating					
61.	Feeling uneasy when people are watching or talking about you.					
62.	Having thoughts that are not your own					

63.	Having urges to beat, injure, or hurt someone					
64.	Awakening early in the morning					
65.	Having to repeat the same actions such as touching, counting, or washing					
66.	Sleep that is restless or disturbed					
67.	Having urges to break or smash things					
68.	Having ideas or beliefs that others do not share					
69.	Feeling very self-conscious with others					
70.	Feeling uneasy in crowds, such as shopping or at a movie					
71.	Feeling everything is an effort					
72.	Spells of terror or panic					
73.	Feeling uncomfortable about eating or drinking in public					
74.	Getting into frequent arguments					
75.	Feeling nervous when you are left alone					
76.	Others not giving you proper credit for your achievement					
77.	Feeling lonely even when you are with people					
78.	Feeling so restless you couldn't sit still					
79.	Feelings of worthlessness					
80.	The feeling that something bad is going to happen to you					
81.	Shouting or throwing things					
82.	Feeling afraid you will faint in public					
83.	Feeling that people will take advantage of you if you let them					
84.	Having thoughts about sex that bother you a lot					
85.	The idea that you should be punished for your sins					
86.	Thoughts and images of a frightening nature					

87.	The idea that something serious is wrong with your body					
88.	Never feeling close to another person					
89.	Feeling of guilt					
90.	The idea that something is wrong with your mind					

VITA

Marney Ann White was born and raised in Virginia Beach, Virginia. She attended the University of Virginia, graduating in 1991 with the degree of Bachelor of Science in Commerce. Prior to pursuing a career in psychology, she worked in advertising. In 1998, under the direction of Pamela R. Gibson, Ph.D., she earned a Master of Arts degree in psychology from James Madison University. In August of 1998, she began the doctoral program in clinical psychology at Louisiana State University, where she was supervised by Dr. Donald A. Williamson, Ph.D. She is currently completing her pre-doctoral internship under Patrick M. O'Neil, Ph.D., at the Medical University of South Carolina. After graduating from Louisiana State University in August, 2003, she will begin a post-doctoral fellowship at the Yale University School of Medicine. Her research and clinical interests include eating disorders and obesity, with particular emphasis on sociocultural factors contributing to eating disturbances.