The Impact of Over the Counter (OTC) Weight Loss Product Television Advertisements on the Consumption of OTC Weight Loss Products and Other Diet- Related Behaviors

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ABSTRACT

This study examines the impact of over-the-counter (OTC) weight loss product television advertisements on health-related behavior. To measure potential exposure to television advertisements, I matched survey data on television viewing habits and health-related behaviors to data on television advertisements. I find evidence that exposure to OTC weight loss product ads increases the likelihood of use for such a product in women, and increases the likelihood of diet and exercise for both men and women. Though increased use of OTC weight loss products with little record of efficacy and no record for safety is troublesome, the positive spillover effects from the advertising complicates a possible new regulatory strategy for the Federal Trade Commission.

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TABLE OF CONTENTS **PAGE**

I. Introduction

As the prevalence of overweight and obesity in Americans continues to rise (Ogden et al. 2006), people are starting to worry about the impact of excess body weight. Overweight and obesity affect internal organs, blood pressure (Grundy 2004), and the pocketbook (Durden, Huse, Ben-Joeseph et al. 2008). Since the costs (both health and financial) are difficult to bear, Americans are looking at different ways to lose weight. Some choose diet and exercise while others choose over-the counter (OTC) weight loss products. OTC weight loss products do not have a proven record of efficacy or safety (Allison et al. 2001), yet Americans still spend billions of dollars on these products each year (Cleland, Gross, Koss, et al. 2002). Why would consumers choose products that are expensive and have no proven efficacy? The answer lies in the products' advertising. The Federal Trade Commission (FTC) has looked into the advertising (print, television, and internet) of OTC weight loss products and has found a large proportion of them to be deceptive. These ads promise "get thin quick" remedies (Cleland, Gross, Koss, et al. 2002) without lifestyle behavioral changes such as diet and exercise.

While advertising is a profit-motivated activity of firms, it can have positive externalities for public health by increasing awareness of obesity, its negative health impacts, as well as the positive benefits of weight loss. Awareness can lead to use of the product and/or other behavior changes such diet and exercise—which have positive health benefits. This research examines the impact of OTC weight loss product television ads on the consumption of an OTC weight loss product and other weight reducing health behaviors such as diet and exercise to determine both direct and indirect effects of the advertising.

In this analysis, I seek to determine the effects of OTC weight loss product television ads on diet-related behaviors. I employ OLS regression techniques to determine the demographic and television characteristics manufacturers use to target their ads to their potential customers. Then, controlling for such targeting effects, I regress advertising exposure on the use of an OTC weight loss product, starting a diet, and exercising.

II. Background

Incidence of Obesity

Overweight and obesity are leading health crises facing America today. Overweight is classified as a body mass index (BMI) of 25 kg/m^2 to 30 kg/m^2 while obesity is classified as having a BMI of greater than or equal to 30 kg/m^2 (Parikh, Penica, Wang, et al. 2007). As of 2007, sixty percent of adults in the United States were overweight or obese (Kaiser Family Foundation 2008).

The incidence of obesity varies by demographic characteristics. Obesity affects 17.1% of children and 32.2% of adults (Ogden et al. 2006). The rate of overweight and obesity increases until age 60, then starts to decline (U.S. Surgeon General 2001). Men are more likely than women to be overweight (63% vs. 47%) and non-Hispanic blacks have the highest incidence of overweight (66%) (CDC 2004). Mexican American men have a higher rate of overweight and obesity than their non-Hispanic counterparts (65% vs. 61%). A recent study by the Kaiser Family Foundation (2008) found that African Americans have the highest rate of overweight and obesity (68.9%) and Asian/Pacific Islanders have the lowest (37.7%). In terms of income, regardless of ethnicity, women who are in lower socioeconomic groups are 50% more likely to be obese than those in higher socioeconomic groups (U.S. Surgeon General 2001).

The prevalence of overweight and obesity has been growing for the past 20 years in the United States. Overweight and obesity have doubled among adults and tripled among children (Ogden et al. 2006). The Centers for Disease Control (CDC) found that the average U.S. adult weighs 24 more pounds than the average adult in 1960 (2004). One study conducted by Parikh, Pencina, Wang, et al. (2007) used data from a 5 decade

Framingham Heart Study to examine the trends of overweight and obesity. They found that among men in their nationally representative sample, overweight increased from 21.8% to 35.2% and obesity increased from 5.8% to 14.8% between the 1950s and the 1990s. Among women, they found that overweight increased from 15% to 33.1% and obesity increased from 3.9% to 14%. In conclusion, they found that overweight has doubled and obesity has tripled in the past 50 years.

Obesity and Morbidity

Obesity is the main cause of 300,000 deaths in America every year (Mokdad et al. 2001) and is one of the leading causes of preventable death (Mokdad et al. 2004). Additionally, the risk of death increases as weight increases. A small weight excess of 10 to 20 pounds can significantly increase the risk of death, especially for the middle aged. Compared to people with a healthy weight, obese people (BMI$\geq$30 kg/m^2) have a 50 to 100% larger risk of early death (U.S. Surgeon General 2001).

Besides the increase in the risk of premature death, overweight and obesity increase the risk of morbidity. Obesity creates a greater risk of diabetes, hypertension, and hyperlipdemia. More than 80% of people with diabetes are overweight or obese and obese people are twice as likely to have high blood pressure. The risk of heart disease is increased in overweight and obese people. In addition, obesity is associated with higher levels of "bad cholesterol" and lower levels of "good cholesterol" (U.S. Surgeon General 2001). Evidence suggests that the risk of these conditions can be significantly reduced with modest weight loss (Foster et al. 1997; Grundy 2004; Bray 2004).

Overweight and obesity can also increase the risk of cancer. Women who have gained more than 20 pounds from age 18 to middle age have twice the risk of developing

breast cancer (U.S. Surgeon General 2001). Overweight and obesity have also been shown to increase the risk of colon, gall bladder, prostate, and kidney cancer (U.S. Surgeon General 2001). A handbook on cancer prevention estimates that obesity could account for 25 to 30 percent of colon, breast, endometrial, kidney, and esophageal cancers (Vainio and Bianchini 2002).

Costs of Obesity

In addition to the health effects listed above, there are significant financial costs of obesity. A regression analysis using the Medical Expenditure Panel Survey (or MEPS) data found that in 1998 obesity-related medical expenditures reached 9.1% of all U.S. medical expenditures. In addition, this study found that obesity-related health expenditures ranged from $75 to $80 billion in 2003. Up to one half of these costs are financed by Medicare and Medicaid (Finkelstein et al. 2003).

Direct costs due to overweight and obesity include extra preventive care, diagnostic tests, and treatment services. Obesity is the cause of a 36% increase in inpatient and outpatient spending, and has also been blamed for a 77% increase in medication spending (Strum 2002). Indirect costs of overweight and obesity are also significant. Indirect costs refer to wages lost because of absenteeism (illness or disability) and future wages that are lost because of early death (U.S. Surgeon General 2001).

The costs of overweight and obesity can also be seen at the individual level. An overweight person will spend approximately $125 more per year and an obese person will spend approximately $395 more per year for inpatient and ambulatory care (Strum 2002). Another study found that that annual direct medical costs were $147.11 higher for overweight people, $712.34 higher for obese people, and $1977.43 higher for severely

obese people (BMI>35 kg/m^2) (Durden 2008).

One study, using MEPS data, estimated the differences in per-capita health spending in 1987 and 2001 by weight. The authors found that in 1987 there was a 15.2% difference in health spending between healthy weight and obese people. In 2001, this gap had risen to 37%. They also found that the rise in obese peoples' health spending was mostly attributed to increased spending for treating diabetes, hyperlipidemia, and heart disease (Thorpe, Florence, Howard et al. 2004). Another study found that from age 20 to age 50 obese people have significantly higher health expenditures than their non-obese counterparts but that healthy weight people tend to have higher lifetime health expenditures because they live longer (Baal et al. 2007). It has also been shown that over the course of a lifetime, the personal costs of treating obesity are high and will deplete the resources from an already strained health care system (Finkelstein et al. 2008).

Government Response to Overweight and Obesity Epidemic

In response to the significant health and financial effects of the overweight and obesity epidemic the U.S. Department of Health and Human Services (HHS) launched a program, *Healthy People 2010*. This large scale government initiative was started in 2000 in order to set goals for better public health in 10 years (launch year was 2000). The HHS identified 28 "focus areas" in which they could improve public health. One of these focus areas was reducing overweight and obesity. After looking at the high morbidity and the direct and indirect costs associated with overweight/obesity the HHS concluded the prevalence of overweight and obesity should be one of the leading health indicators for *Healthy People 2010.* The stated goal of the project was reducing overweight and obesity to 15% of adults and 5% of children by 2010. Specifically, the HHS had specific goals in

reducing overweight and obesity among African Americans and Hispanics (who have higher rates of overweight and obesity). In order to do this, the HHS devised a series of public awareness campaigns about the effects of overweight, obesity, diet, and exercise. They also launched different programs trying to improve nutrition and make exercise opportunities more accessible to the public (United States Department of Health and Human Services 2000).

A mid-decade review of the program found that there has been no movement towards the overall goal of reducing overweight and obesity. In fact, the mid-course review found that the U.S. population had moved further away from the goals stated in the original *Healthy People 2010.* Overweight and obesity had increased among African Americans and Hispanics, which are the demographic groups that the HHS had specifically targeted (United States Department of Health and Human Services 2005).

Medical Opinions on Healthy Weight Loss Levels

Medical experts have come to a broad consensus on healthy ways to lose weight. The FTC recommends that overweight and obese people should reduce their caloric intake by 500 to 1,000 calories a day in order to achieve a healthy weight loss of 1 lb per week (Cleland, Gross, Koss et al. 2002). A study by Weinsier, Wilson, and Lee (1995) looked at the risk of gallstone formation during weight loss. They found that in order to keep this risk low, heavy individuals should not exceed a weight loss of 3.3 lbs/week. Another study puts the maximum healthy weight loss at 1 lb/week (Drewnewski and Petersmarck 1990). Different government agencies have agreed with these guidelines, saying that safe weight loss falls between .5-2 lbs/week (U.S. Congress, Department of Agriculture, Department of Health and Human Services 2002).

Efficacy of Diet and Exercise

Medical research has repeatedly shown that the most effective method of losing weight is a combination of reduced caloric intake (diet) and exercise. A meta-analysis of available research by Miller, Koceja, and Hamilton (1997) compared subjects across studies to determine the most effective methods of weight loss. Using an ANOVA analysis they looked at the mean levels of weight loss for all participants and how the mean weight loss differs by method. They found mean weight loss (after one year) for diet, exercise, and diet and exercise programs at 10.7kg, 2.9kg, and 11 kg, respectively. Miller et al. concluded that the current weight loss research shows that while diet and exercise are each effective separately, they have their greatest effect when used in combination. An experiment with sedentary women found weight loss significantly correlated with the level of physical activity. The authors of this study recommend exercise of 150 minutes a week for sedentary adults in conjunction with a diet (Jakicic et al. 2003). Based on a comprehensive review of diet and exercise research, the National Heart, Lung, and Blood Institute (NHLBI) recommends a reduced calorie diet and an increased physical activity program to reduce weight in overweight and obese individuals (NHLBI 2001).

Research has also shown that diet and exercise are the best methods available for keeping weight off in the long term. The National Weight Control Registry provides data about different weight loss strategies and how often they succeed. Members of this registry who were able to keep the weight off engaged in long term strategies. They kept exercising (mean=1 hr/day), ate a reduced calorie and low fat diet, and kept their diet and exercise habits consistent from weekday to weekend (Wing and Phelan 2005).

Prevalence of Diet and Exercise

Individuals have heard the advice from the medical community and many choose diet and exercise as their preferred method for weight loss. Over 25% of people report trying to control their diet in the past 12 months (NCS 2008). Another study using the National Health Interview Survey found that 24% of men and 38% of women were trying to lose weight. The study found that the most prevalent methods of weight loss among these respondents were eating reduced calorie diets (58% men, 63% women); eating low fat diets (49% men, 56% women); and increased physical activity (54% men, 52% women) (Kruger, Galuska, Serdula, et al. 2004). Using a random digit dialer, a study by Levy and Heaton found similar results to Kruger et al. with 62% of men and 71% of women trying to lose weight using diet and exercise as part of their overall weight loss strategy (Levy and Heaton 1993). An additional phone survey found that 54% of respondents had lost 10% of their maximum weight in their lifetime with half of these cases being the result of diet and exercise (McGuire, Wing, and Hill 1999). A study by Serdula, Collins, Williamson et al. (1999) found a lower prevalence of diet and exercise. Their study found that only 21.5% of men and 19.4% of women who were attempting to lose weight used the method of a reduced calorie diet and 150 minutes of exercise/week. Approximately 80% of people in this study were using methods such as diet, exercise, ineffective amounts of exercise, and products to aid in weight loss.

In addition to looking at rates of diet and exercise, some studies found a sizeable percentage of respondents using over the counter (OTC) weight loss pills in order to aid in weight loss. Kruger et al. found that only 2% of men and 3% of women chose diet pills as their preferred method of weight loss (Kruger 2004). In contrast, Levy and Heaton

(1993) found a higher level of diet pill use, 7% of men and 14% of women. In summary, diet and exercise remain the main strategies among Americans trying to lose weight (Kruger et al. 2004; Levy and Heaton 1993; McGuire et al. 1999; Serdula 1999) and the market for OTC products is estimated at between 2% and 15% of the consumers who are trying to lose weight.

Market for Weight Loss Products

Marketdata Inc. published a detailed review of the weight loss market in 2007. They projected a 6% annual growth rate for the entire market and estimated that the entire weight loss market would reach $68.7 billion in 2010. Their analysis was concerned with the entire weight loss market (including exercise programs, diet shakes, Jenny Craig/Weight Watchers, etc.), not just OTC weight loss products (Marketdata Inc. 2007). In their report, Cleland, Gross, Koss et al. (2002) found the weight-loss supplement market (OTC products) to total about $4.6 billion in 1999.

Several studies have been done to determine who is using OTC weight loss products. Pillitteri, Shiffman, Rohay, et al. (2008) found that of people who had made weight loss attempts, 33.9% reported using an OTC weight loss product at some time. This use was much higher among women than men and much higher among young people. In addition, the authors found that many consumers had misconceptions about the products in that they thought that they were evaluated for efficacy and safety by the FDA. A similar phone study by Weiss et al. (2006) found that 12% of respondents trying to lose weight have used a nonprescription product to aid in weight loss.

Efficacy of Weight Loss Products

Although OTC weight loss products have flooded the market, these products have little proven efficacy and many have yet to be scientifically evaluated (Williamson and Bowman 2001). In contrast to the scientifically proven "diet and exercise" method, OTC weight loss products do not promote significant long-term weight loss. In addition, many have been pulled from the market because of safety concerns.

Phenylpropanolamine (PPA) was the chemical compound favored by OTC product manufacturers prior to 2000. This product was believed to increase metabolism by increasing blood pressure and heart rate. Products such as Dexatrim and Acutrim used this compound in their products. Peer reviewed randomized controlled studies have pointed to the dubious efficacy of PPA in promoting long-term weight loss. Greenway (1992) performed a detailed meta-analysis on all of the parallel double-blind studies testing the effects of PPA and concluded that PPA did provide small, significant amounts of weight loss when compared to a placebo. Greenway cautioned about the small sample size in most of these studies and the fact that large scaled studies on PPA had yet to be attempted. The studies all pointed to only short-term weight loss and no published studies credited PPA with successful long-term weight loss. Alger, Larson, Boyce et al. (1993) tested the effects of PPA on energy expenditure and weight loss in overweight women. Although they found slightly more weight loss in the group taking PPA (-5 kg over 7 weeks) when compared to the placebo group (-3 kg over 7 weeks) they found no significant difference in energy expenditures. The authors recognize that this study cannot provide conclusive evidence in favor of PPA because of the small sample (n=18).

Due to research linking an increased risk of hemorrhagic stroke in patients taking products containing PPA, in November 2000 the FDA asked drug manufacturers to voluntarily withdraw PPA containing products from the market until large scale research could be performed on its safety. In 2005, the FDA proposed a rule to ban PPA and put out a public health advisory. The risk of hemorrhagic stroke was significant and the FDA recommended that consumers not use any products that have PPA (FDA 2005).

Since PPA was no longer an option, many manufacturers turned to ephedra to stimulate weight loss. This product stimulated weight loss in a similar fashion to PPA by speeding up the metabolism, and could also be used as an appetite suppressant. Many products, such as Xenadrine and Ultimate Orange used ephedra as a main ingredient.

Boozer, Daly, and Homel (2002) conducted a 6-month randomized, double-blind placebo controlled trial of ephedra. They found that ephedra did produce modest weight loss and reduction in body fat when compared to a placebo. Shekelle, Hardy, and Morton (2003) provided a more detailed meta-analysis of all research studies evaluating the efficacy and safety of ephedra. They found that ephedra did promote modest weight loss of about .9 kg/month more than a placebo. None of the studies in the meta-analysis lasted for more than 6 months so there was no evidence for the long-term efficacy of ephedra. The studies reviewed in the meta-analysis also pointed to an increased risk of psychiatric, autonomic, gastrointestinal symptoms, and an increased risk of heart palpitations in ephedra patients.

After a review of medial evidence the FDA found an increased risk of stroke and death in consumers using ephedra. In addition, they reported that the harmful effects of ephedra worsened when combined with caffeine (another common ingredient in OTC

weight loss products). In response to the danger posed by ephedra, the FDA banned ephedra in 2004. After a lengthy appeals process, the Court of Appeals ruled in favor of the FDA and left the ban in place (FDA 2006).

After the ban of ephedra, several manufacturers turned to citrus aurantium, a product very chemically similar to ephedra. Many commonly recognized products, such as Trimspa, Metabolife, and Xenadrine, use this ingredient. It is also the active ingredient in many supplements that have "ephedra free" on the label.

Bent et al. (2003) performed a meta-analysis of available research concerning the efficacy of citrus aurantium. This study showed no statistically significant benefit for weight loss and provided no information regarding the safety of this "bitter orange." Another study by Dwyer et al. (2005) concluded citrus aurantium has not been shown to promote weight loss in any available research.

The most extensive analysis of the safety and efficacy of OTC weight loss products was conducted by Allison, Fontaine, Heshka et al. (2001). They identified 18 "alternative" methods or products that have been claimed to reduce fat and promote weight loss. They looked at peer-reviewed research examining the weight loss efficacy of methods such as acupuncture, aromatherapy, hypnosis, subliminal suggestions; ingredients such as bladderwrack, chitosan, chromium, conjugated linoleic acid, dehydroepiandrosterone, garcinia cambogia, germander, ma huang (ephedra), ß-hydroxy-ß –methylbutyrate, platago, pyruvate, St. John's wort, sunflower; and thigh creams. After this extensive review, the authors concluded that there was no significant evidence that any of these common weight loss methods, ingredients, or products induced significant long-term weight loss. None of these products had more than two randomized double-

blind placebo controlled studies and all weight loss as a result of the product was modest at best. In addition, the authors said that none of the studies have shown proven long-term safety associated with a method, ingredient, or product (Allison et al. 2001).

III. Regulatory Background

Safety Regulation

In 1994, Congress passed the Dietary Supplement Health and Education Act (DSHEA). This law placed dietary supplements into a different class of regulation from prescription drugs. This category includes vitamins, minerals, herbs, amino acids, a concentrate, or a metabolite. No pre-market approval by the FDA is needed for the sale of dietary supplements and they are not evaluated by the FDA for efficacy or safety prior to sale. In effect, the DSHEA treats the regulation of OTC weight loss supplements in the same way it would treat a food (Cleland, Gross, Koss, & Muoio 2002). The text of the DSHEA that discuses this classification of dietary supplements can be found in Appendix 1 (21 U.S.C. 321).

The FDA can still ban a dietary supplement once it is determined to be unsafe. This reactionary power can only be exercised once the product is already on the market and determined to be unsafe. As mentioned earlier, the FDA did ban the use of PPA and ephedra because of safety concerns (FDA 2005; FDA 2006). However, this reactionary power of the FDA can negatively affect consumer health by exposing them to harmful and undisclosed side effects (Baron 2004).

Advertising Regulation

Although the FDA has the power to pull an unsafe product from the market, the FTC is in charge of regulating OTC weight loss advertising. The FTC Act (15 U.S.C. §41-58) makes false advertising illegal and the FTC has a right to bring suit against a company for false advertisements (§52 and 54). Although the threat of a suit by the FTC was thought to be enough of a deterrent, Rotfeld (2003) notes that false advertising is still

rampant in the market, and that there are far too many companies producing these false claims in advertising for the FTC strategy of bringing lawsuits to be effective. He argues for a policy of strict liability against the disseminators (media vehicles such as magazine publishers and television network owners). Galloway echoes Rotfeld's concerns and calls for suits against media vehicles stating that the FTC has depended on self-regulation by the industry which has proved dismal (Galloway 2003).

The DSHEA requires that advertisements for OTC weight loss products (dietary supplements) not claim that they can treat or cure a disease (such as obesity) (21 U.S.C. 321). Lewis argues that the companies have maneuvered around the DSHEA and have made health-outcome claims in their ads. The manufacturers are able to do this by placing disclaimers in their ads that say "this product has not been shown to treat or cure any disease" or "product has not been evaluated by the Food and Drug Administration." These disclaimers tend to be the bottom of the screen in television ads and voiced over in very fast speech (Lewis 2001).

The FTC responded with a set of industry guidelines for weight loss product advertising (2003). An FTC report identified seven "red flag" claims that should not appear in OTC weight loss ads:

1- Product causes weight loss of two pounds or more a week for a month or more without dieting or exercising
2- Product causes substantial weight loss no matter what or how much the consumer eats
3- Product causes permanent weight loss (even when the consumer stops using the product)

4- Product blocks the absorption of fat or calories to enable consumers to lose substantial weight
5- Product safely enables consumers to lose more than three pounds per week for more than four weeks
6- Product causes substantial weight loss for all users
7- Product causes substantial weight loss by wearing it on the body or rubbing it into the skin

In addition to the above mentioned claims the FTC provided detailed rules and examples for what constituted a "red flag" violation. Preliminary research has shown that the initiative has significantly reduced the prevalence of "red flag" violations in print advertising since the rules were presented to the magazine publishers (Avery, Cawley, Eisenberg 2008).

IV. OTC Weight Loss Product Advertising

Content of OTC Weight Loss Product Ads

The FTC convened a conference in 2002 to address this problem in OTC weight loss advertising. In conjunction with the conference, Cleland, Gross, Koss et al. released a comprehensive review of deception in OTC weight loss ads. They collected a sample of 300 advertisements across print media, television, and the Internet. After a detailed content analysis, they found that many of the ads included exaggerated, unsubstantiated, or false claims. They understood some claims to be false because the scientific community had ruled that there was no possible way for a supplement to do what the ads claimed. For example, current scientific knowledge suggests that dietary supplements are unable to block the absorption of fat into the system—yet many ads claim that their products do just that.

Cleland, Gross, Koss et al. (2002) found the following to be the most common marketing techniques used in the 300 weight-loss advertisements they studied:

- Consumer testimonials/Before and after photos rarely portrayed realistic weight loss goals, and images were often distorted. They found that the average weight losses claimed (more than 76 percent of the sample claimed weight loss above 70 pounds) were simply not achievable for the products advertised.
- Rapid weight loss claims that were obviously false, e.g., greater than 8-10 pounds per week.
- Claiming no diet or exercise needed with the product to lose weight, i.e., that results can be achieved without reducing caloric intake or increasing physical activity, with some ads even claiming that you can eat as much as you want and still lose weight.
- Claims of long term weight loss that are clearly untrue, e.g., "take it off and keep it off."
- Claims to be clinically proven or doctor-approved, with most ads failing to provide consumers with sufficient information to allow them to verify the advertisers' representations.
- Claims of 'safe' and 'natural' weight loss, with many of the ads failing to include active ingredients in the product and evidence of safety.

Cleland et al. also compared differences in marketing techniques from 1992 to 2001. The found that the number of unique ads for OTC weight loss products had increased three fold, the frequency of OTC weight loss product ad appearances had doubled, and the proportion of supplement ads to other, more efficacious products (such as Weight Watchers, Jenny Craig, or Nutrisystem), had significantly increased. In addition, in 2001 ads were significantly more likely to include dramatic testimonials, before/after photos, promise permanent weight loss, guarantee weight loss success, claim that weight loss can be achieved without diet and exercise, claim that results can be achieved quickly, claim that the product is all natural, and make explicit or implied claims that the product is safe.

Appalled by the sheer number of ads with deceptive claims (40% for certain, probably closer to 55%), Cleland, Gross, Koss et al. made recommendations to the FTC for a concrete set of advertising standards for the industry. They based their recommendations on a set of claims that appeared in ads and were known to be false. They recommended that the FTC employ a more "heavy hand" when it comes to enforcement against deceptive advertising.

Effects of Advertising on the Consumer- Individual Level

Very little research has been done on the effect of over-the-counter product advertisements on the consumer—and even less on the effect of television OTC ads. A study by Avery, Kenkel, Lillard, and Mathios (2007) examined the effect of OTC smoking cessation print ads on smoking cessation behavior using a rigorous model that accounted for potential targeting effects by the advertisers. They analyzed the impact of ad exposure at the individual level and were able to conclude that exposure to OTC

smoking cessation print ads significantly increased the likelihood of a consumer quitting smoking. A study by Avery, Simon, and Eisenberg (2008) used the same individual-level data to examine the impact of Rx antidepressant print ads on the use of an antidepressant. Controlling for various demographic characteristics as well as reading intensity, they found that exposure to antidepressant magazine ads has a significant impact on the likelihood of antidepressant use. This same study also examined Rx antidepressant television ads, but found no significant effects.

In summary, research that has examined the individual level impact of OTC and Rx print ads has found significant effects on product use, but no evidence for the effect of television advertising suggesting the effects may be different. A study by Barlow and Wogalter (1992) evaluated the differences in print and television media's ability to convey message warnings. The authors looked at warnings in alcohol advertisements. By using a randomized experiment, they found that participants exposed to print ads were able to retain more detailed information when compared to the group exposed to television advertisements. The authors suggested that reading a print advertisement is a much more active process than watching a television advertisement. They concluded that consumers tend to be doing other things when watching television and thus pay less attention to the advertisements. Another potential factor limiting the efficacy of television advertising is the increasing prevalence of "zapping" through the commercials. When an advertisement comes on, the consumer can channel surf, grab a snack, read the newspaper, or fast forward through the commercial if they have Tivo or a Digital Video Recording (DVR). Using a survey of "zappers" and "nonzappers" Tse and Lee (2001) found that nonzappers had significantly higher brand recall ads at the end of the program

(in between programs) were more effective because the end of a show has the least "zapping" potential since consumers are getting ready to watch the next program. In summary, although research has shown significant effects of Rx and OTC product advertising in print media (Avery et al. 2007; Avery et al. 2008) it is hard to extrapolate this information to television advertisements because of the differences in media impact and characteristic (Barlow and Wogalter 1992; Tse & Lee 2001).

Effects of Advertising- Market Level

Direct to consumer advertising has been thought to increase drugs sales. This is in line with Bagwell's economic theory of advertising (2005), because the ads would not be on the air if they did not increase drug manufacturers' profits. A study by Rosenthal et al. (2003) looked at how changes in DTC advertising and detailing affected drug sales. The study found a .10 demand elasticity, or on average a 10% increase in DTC advertising resulted in a 1% increase of sales. However, increased sales did not directly correspond to the product, but to the class of drugs. In other words, a 10% increase in all cholesterol DTC advertising resulted in a 1% increase in all prescription cholesterol product sales. This study did not find that increased DTC advertising increased a particular brand's relative market share.

Other studies have examined the return on investments (ROIs) for DTC advertising. Gascoigne and Busbice studied 64 different drugs and found for every $1 of DTC advertising the companies would get $2.20 in increased sales (Gascoigne and Busbice 2006). Another study examined the effects of DTC advertising in specific brands (49 drugs). They found that 90% of the drugs had a positive ROI for their DTC advertising. In addition, they found that 70% of the drugs had a ROI of more than $1.50

for each $1 of advertising and 35% of drugs had an ROI of more than $2.50 for each $1 of advertising (IMS Management Consulting 2004).

A study by Donahue et al. (2004) examined the effect of DTC antidepressant advertising on increased prescriptions. They used market-level data to look at the level of prescriptions when DTC antidepressant advertising was high and the level of prescriptions when DTC antidepressant advertising was low. They found that individuals who are diagnosed when DTC antidepressant advertising was high had a 32% higher relative odds of starting treatment with the drug as opposed to those who were diagnosed when DTC antidepressant advertising was low (Donohue et al. 2004).

In summary, market-level analysis has shown that the DTC advertising has a significant effect on market sales. OTC weight loss advertising is likely to have a larger effect because the advertising level is higher and there is no need to obtain a prescription from a physician. Still, this market-level analysis was unable to examine the effects of television advertising on individual consumers, relying instead on the assumption that all people who live in the same area view the same advertisements.

V. Research Objectives

Research indicates that obesity is widespread and increasing in America (U.S. Surgeon General 2001; Ogden et al. 2006) and harmful to public health (Finkelstein et al. 2003; Strum et al. 2002; Mokdad et al. 2001; Mokdad et al. 2004). The market has responded to this epidemic by producing hundreds of OTC weight loss products that have little to no proven efficacy (Allison et al. 2001). A large proportion of the advertising for these products remains deceptive (Cleland, Gross, Koss, et al. 2002), despite FTC attempts to guide self-regulation by the industry (FTC 2003). The question remaining is whether this advertising is harmful to consumers and the degree to which television advertisements for these products encourages product use.

Although significant impacts of advertising on product use have been found for ads in print media (Avery, Cawley, Eisenberg 2008), these findings can not be directly extrapolated to television advertisements (Barlow and Wogalter 1992; Tse & Lee 2001). Therefore, this study will fill a gap in the existing literature and assess the effect of OTC weight loss product advertisements in the media of television on the individual's decision to consume OTC weight loss products.

In order to examine the impact of level exposure to OTC television weight loss ads on consumption of weight loss products and postulate spillover effects it is necessary to control for characteristics of consumers that would be used by marketers in their advertising targeting efforts. The individual-level data used in this study are the same data used by marketers for their media planning decisions. The first step in this analysis, therefore, is to determine the measurable census characteristics that could be expected to result in greater exposure to OTC weight loss product advertising. The same

characteristics are then controlled for in examining the impact of level of advertising exposure on product purchase and spillover effects.

Controlling for the characteristics of individuals used by marketers in their targeting behavior the following two questions are addressed:

1. Do these ads make the consumer more likely to purchase an OTC weight loss product?
2. Do these ads have positive spillover effects such as increased probability of starting a diet, exercising, or both?

For question one, I hypothesize that these ads will significantly increase the likelihood of product purchase by the consumer. As stated by Bagwell (2005), firms are profit maximizing rational actors that will increase their advertising budget only if sales will likely increase.

For question two, I hypothesize that these ads will have a significant spillover effects on other obesity related behaviors such as diet and exercise. If a consumer is inundated with these advertisements, they will be thinking about weight loss more. Many consumers know that the right method of weight loss is diet and exercise, even if they continue their search for a "quick fix" product. However, I expect an indirect effect to be smaller than the direct effect of product use.

VI. Methods

Description of Data

Television Data- TNS Media Intelligence

Data provided by TNS included OTC weight loss ads that appeared on television from 1999-2004. Only data from 2001-2004 were used to match the individual-level described in the following section. The data provided ad information from network television, cable, and local spot markets. From 1999-2001 the TNS data cover local spot ads for the largest 75 designated marketing areas (DMAs); from 2002 - 2004 the TNS data cover the largest 100 DMAs. The TNS data represent all national network and national cable ads, and includes all local ads that aired on network television. The dataset does not include local cable ads.

The TNS data provide information on the exact time and date of airing each product ad. I sorted the ads by product name and kept only ads for OTC weight loss pills. I did not include diet shakes, exercise programs, or diet programs (Weight Watchers, Jenny Craig, etc). The data was limited to ads for pills because the individual-level data asked respondents if they had purchased an OTC weight loss pill.

Individual Level Data- Simmons National Consumer Survey

The National Consumer Survey (NCS) is a nationally representative repeated cross-sectional survey, where the sample for each wave is an independently drawn multi-stage stratified probability sample. The NCS is a marketing survey that asks consumers about their television viewing habits as well as various health related outcomes (using an OTC weight loss product, starting a diet, exercising, or both). I used data from eight survey waves that were administered between 2001 and 2004.

The NCS provide data on the specific television viewing habits of respondents. Specifically, the NCS asked respondents how often they watch certain shows, separating by network and syndication status.[1] The NCS data also provide detailed demographic data regarding age, race, gender, education, household income, Census region, marital status, and employment characteristics. These variables provided important exposure controls in the analysis.

Measures

Outcomes

The three main outcome measures used in the analysis are whether the respondents have used an over-the-counter weight loss pill in the past 12 months, have been controlling their diet in the past 12 months, and whether the respondent exercises at least once a week The last two measures are used to create a variable that equals one if the respondent reported both controlling their diet in the past 12 months and exercising at least once a week.

Advertising Exposure Effects

To estimate consumers' potential exposure of OTC weight loss television ads, I matched TNS ads from shows that respondents reported viewing regularly to ads that have appeared on those programs. The NCS asks respondents about over 400 television shows and how often they watch them. In order to match the ads, I took the number of ads that appeared on that show one year prior to their survey date and multiplied it by how often they reported watching that show. Then I summed across all the television

[1] For example, the NCS asks viewing behavior for Simpsons repeats (shown daily) and viewing behavior for new Simpsons episodes (aired weekly).

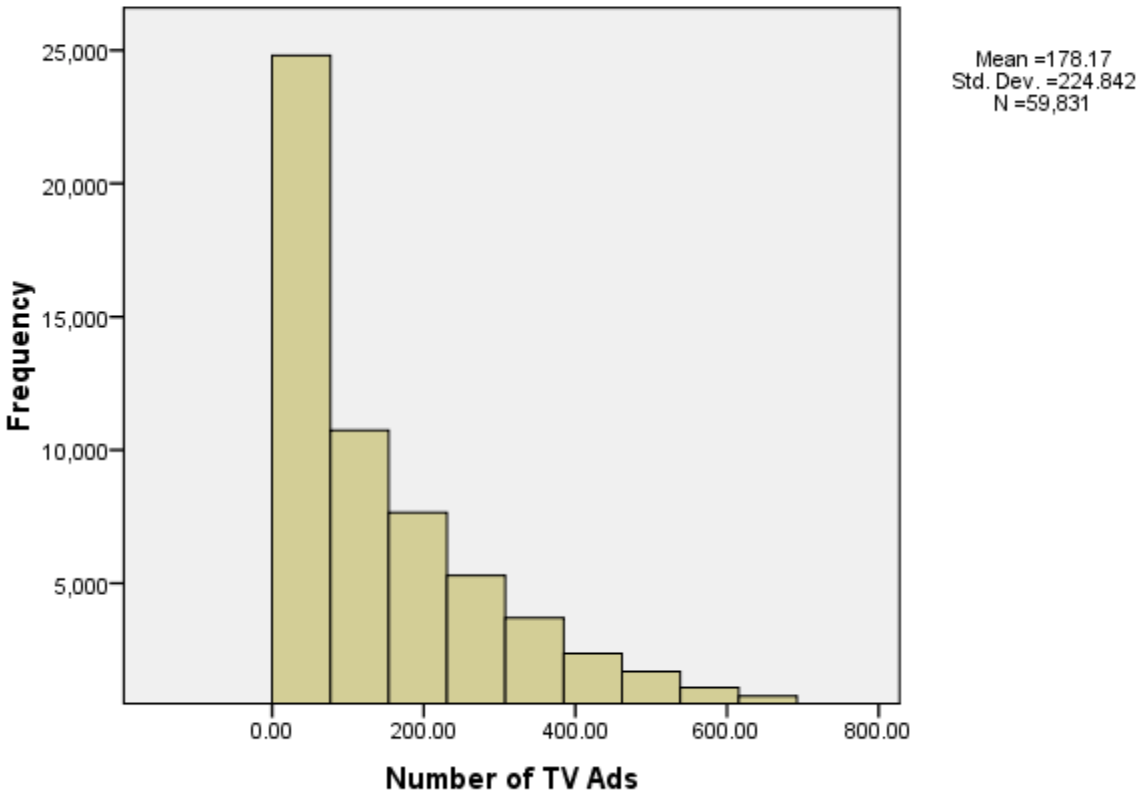
shows the respondent reported watching in the past 12 months to get their potential exposure to OTC weight loss television ads for the past 12 months. This 12 month period is consistent with Bagwell's economic theory of advertising. Based on his analysis, he concludes the staying power of an advertisement to be about 9 months (2005). Survey waves in the NCS allow for 6 or 12 month exposure windows, so the 12 month window was chosen for this study. This 12 month ad exposure window is consistent with similar measures used in the analysis of individual-level data (Avery et al. 2007; Avery et. al 2008). In addition, this 12 month window corresponds with the respondents' answers to questions regarding their diet pill use, diet and exercise behavior obtained form the NCS data.

Although this method of matching ads was fairly straightforward for national ads, in order to match local or spot ads, the DMA of the NCS respondent has to be known. Since the DMA can only be identified for certain respondents in the NCS data (see DMA matching process used in Avery, Lillard, Mathios & Kenkel 2008), the sample is limited to respondents for whom a DMA of residence can be identified (N=59,831). Limiting the sample in this way doesn't have an appreciable impact on the analysis because the sub sample is very similar to the full sample of NCS respondents (Appendix 2).

To summarize, the ad exposure measures how often a respondent watches a television show, multiplied by the number of ads that have appeared on that show in the 12 months prior to the survey date, summed across all television shows that the respondent reports watching. The exposure variable ranges from 0 to 5,535 ads with a mean of 178 ads and a standard deviation of 225 ads. The variable is heavily left skewed with ten percent of respondents seeing zero advertisements (see Figure One). The mass of

the distribution occurs close to zero, with a few respondents exposed to very large numbers of ads. Due to the highly skewed nature of the variable entering it into the model as a continuous variable would not capture the exposure level effects very well. For this

Figure 1: Number of TV Ads



reason the exposure measure was separated into three dummy variables. No ad exposure, low ad exposure between 1 and 178 ads (the mean number of ads), and high ad exposure greater than 178 ads[2].

[2] Alternative specifications were used with exposure estimated as a continuous measure (number of ads) and natural log of the number of ads. Although these measures produced sign coefficients, they were close to 0. In addition, an alternative specification was used with the median number of ads (109) as the exposure cut off but it was not significantly different in sign or magnitude from the model using the mean number of ads.

Exposure is not a perfect measure to analyze the effects of advertising on the consumer. We do not know if the consumer actually watched the ads that they were exposed to or if they paid any attention to them. However, the exposure measure represents a vast improvement over market level analysis that assumes all consumers who live in the same area see the same advertisements, regardless of which television shows they watch.

Demographic and Media Behavior Variables

The set of demographic variables used in the analysis are gender, age, race/ethnicity, education, income, marital status, family size, employment status, and census region. Table 5 provides information on how each of these variables were coded for the analysis. In addition to demographic variables, measures were created to capture the television viewing habits of individuals. People watch different amounts of television and different types of shows and will therefore be exposed to different amounts of advertising. The first measure was the average number of hours spent viewing television in the average week. The mean number of hours spent watching television captures the variance in ad exposure based on the hours of television watched. Next, a set of dummy variables was created for type of television show represented in the data. The television categories placed each of the television shows into a category based on their content--this set of television program dummies is described in table 4. Since marketers know the characteristics of individuals who watch different types of television shows, these program variables will capture variance in exposure to OTC weight loss product ads accounted for by the types of program an individual watches.

Since the NCS is a repeated cross sectional survey drawn during different time periods between 2001-2004, a set of wave dummies was created to indicate the time period the respondent was surveyed.

Regression Analysis

The first model was estimated to examine how level of ad exposure varies by demographic characteristics of respondents. The model is:

$$\text{Number of Ads} = \alpha + \delta D_i + \sigma TC_i + \varphi H_i + \mu W_i + \varepsilon_i \quad (1)$$

Where:

D = vector of demographic control variables

TC = vector of program control variables

H = control for television viewing intensity

W = NCS wave dummies

ε = idiosyncratic error term.

The models for diet-related behavior are:

$$\text{Prob}(P_i) = \alpha + \beta TV_i + \delta D_i + \sigma TC_i + \varphi H_i + \mu W_i + \varepsilon_i \quad (2)$$

$$\text{Prob}(DI_i) = \alpha + \beta TV_i + \delta D_i + \sigma TC_i + \varphi H_i + \mu W_i + \varepsilon_i \quad (3)$$

$$\text{Prob}(E_i) = \alpha + \beta TV_i + \delta D_i + \sigma TC_i + \varphi H_i + \mu W_i + \varepsilon_i \quad (4)$$

$$\text{Prob}(DE_i) = \alpha + \beta TV_i + \delta D_i + \sigma TC_i + \varphi H_i + \mu W_i + \varepsilon_i \quad (5)$$

Where:

P = a dummy variable for whether the individual (i) uses an OTC weight loss pill

DI = a dummy variable for whether the individual (i) is dieting

E = a dummy variable for whether the individual (i) exercises

DE = a dummy variable for whether the individual (i) is dieting and exercises

TV = television advertising exposure of individuals

D = vector of demographic control variables

TC = controls for types of programs watched

H = control for television viewing intensity

W = NCS wave dummies

ε = idiosyncratic error term.

Models (2) through (5) were estimated as logits. A logit model is appropriate for binary dependent variables since it was a logistic cumulative probability distribution that produces probabilities between 0 and 1. While a probit would assume the outcome measure to be normally distributed between 0 and 1, logits will account for the skewed nature of the outcome measures. This is the most appropriate estimation method to use, as all of the dependent variables are binary (Stock and Watson 2007). Since the literature suggests such gender disparities in overweight, obesity, prevalence of diet, exercise, and OTC weight loss products, men and women experience the epidemic of overweight and obesity in completely different ways. In order to look at gender in separate ways, each model was run twice, once for men and once for women.[3]

[3] A combined model of men and women was also estimated. Although this model produced significant effects, the divergent effects from separate models provided a more thorough examination of the research questions.

VII. Results

Characteristics of OTC Weight Loss Ad Airings

Table 1: Number of Ads by Year, 2000-2004

Year	Freq.	Percent	Percent Change
2000	132,794	15.21	
2001	176,131	20.18	32.63
2002	201,003	23.03	14.12
2003	182,044	20.86	-9.43
2004	180,876	20.72	-0.64
TOTAL	872,848	100.00	

Table 2: Number of Ads by Day of Airing, 2000-2004

Day of Week	Freq.	Percent
Sunday	84,333	9.66
Monday	143,730	16.47
Tuesday	139,235	15.95
Wednesday	130,062	14.90
Thursday	145,164	16.63
Friday	143,165	16.40
Saturday	87,159	9.99
TOTAL	872,848	100.00

Table 3: Number of Ads by Month of Airing, 2000-2004

Month	Freq.	Percent
January	120,962	13.86
February	64,781	7.42
March	84,995	9.74
April	126,269	14.47
May	103,875	11.90
June	97,481	11.17
July	59,487	6.82
August	89,290	10.23
September	43,703	5.01
October	42,425	4.86
November	12,596	1.44
December	26,984	3.09
TOTAL	872,848	100

A total of 872,848 OTC weight loss product ads appeared during the sample period (table 1). The number of ads increase steadily from 2000 to 2002 and then decrease back to 2001 levels for 2003 and 2004. As seen in table 2, the timing of these ads differs by both day of airing and month of airing. The majority of these ads appeared Monday to Friday (80.35%). This concentration of weekday ads is most likely to the drop off in television audience during the weekends. A larger number of ads are aired in January (~13.86%) when people are likely to resolve to lose weight as part of their New Year's resolutions. In addition, the number of ads is high during the months leading up to the summer when people are trying to lose weight for the summer season (April~14.5%; May ~12%; June~11%). The number of ads is lower during the holiday months when less people are thinking about losing weight (November ~1%; December~3%).

Table 4 examines ads by television program categories. Morning news programs contain the largest number of OTC weight loss ads (~22%) followed by day-time talk

shows (~16%). Daytime talk shows tend to be more heavily viewed by women. OTC weight loss product ads are seldom seen during cartoons (.08%) and history/biography shows (.06%).

Table 4: Number of Ads by Television Category, 2000-2004

Category	**Freq.**	**Percent**	**Ads/Hour**
Morning news program	188,514	21.6	5.38
Day time talk show	136,178	15.6	3.89
Other Category[2]	89,495	10.25	2.55
Sitcoms	77,965	8.93	2.23
Daytime soap operas	67,131	7.69	1.92
Court TV programs[1]	44,381	5.08	1.27
Dramas	42,009	4.81	1.20
Reality Shows	41,542	4.76	1.19
Quiz/competitive show (day or evening)	41,255	4.73	1.18
Movie reruns/made for TV movies	33,231	3.81	0.95
Celebrity News Programs	29,027	3.33	0.83
Late night talk show	20,870	2.39	0.60
Sports	16,028	1.84	0.46
Cooking/Home shows	10,039	1.15	0.29
Variety/Music programs	9,951	1.14	0.28
Science Fiction Programs	7,455	0.85	0.21
Magazine programs[3]	7,228	0.83	0.21
Evening/late night new programs	4,515	0.52	0.13
Political Analysis/Discussion Program	2,715	0.31	0.08
Health and Fitness Programs	727	0.08	0.02
Nature/Wildlife	704	0.08	0.02
Cartoons	673	0.08	0.02
History/Biography	560	0.06	0.02
Awards Shows[4]	371	0.04	0.01
Medical programs	284	0.03	0.01
TOTAL	872,848	100	1.00

[1]Example: Judge Judy

[2]The "other" category is made up of difficult to categorize program. Despite best efforts to determine the category of these programs, they were not able to be categorized. Programs in this category had abbreviated names such as "SHOW" or "REAL" and could not be classified.

[3]Example: 20/20, Dateline, etc.

[4]Example: Oscars, music awards, etc.

Table 5: Distribution of NCS Respondents by Demographic Characteristic

	Freq.	Percent
Gender:		
Male	26,806	44.80
Female	33,025	55.20
Age:		
18-24	6,027	10.07
25-34	9,118	15.24
35-44	12,415	20.75
45-54	12,535	20.95
55+	19,736	32.99
Race:		
White	43,202	72.21
Black	3,941	6.59
Hispanic	9,792	16.37
Other	2,896	4.84
Education:		
Less than HS	7,343	12.27
HS Grad	16,063	26.85
Some College	16,601	27.75
College Grad	19,552	32.68
Income:		
< $32,500	8,076	13.50
$32,501 - $55,000	10,636	17.78
$55,001 - $87,500	13,599	22.73
$87,501 - $125,000	19,426	32.47
> $125,001	8,094	13.53
Married Status:		
Single	11,409	19.07
Married	38,858	64.95
Divorce/Seperated/Widowed	9,040	15.11
Size of Family:		
1	5,476	9.15
2	19,820	33.13
3	11,719	19.59
4	11,359	18.99
5+	5,905	9.87
Employment Status:		
Not Employed	20,874	34.89
Employed	38,957	65.11
Census Region:		
Northeast	14,984	25.04
South	16,781	28.05
Midwest	15,112	25.26
West	12,954	21.65
Total	59,831	100.00

Description of NCS Sample

Table 5 reports the description of NCS sample. Approximately 55% of the sample is female and 45% male. Eighteen-to-twenty four year olds are underrepresented in the sample relative to the U.S. Population (9.5% for both males and female), while the +55 age group is overrepresented in the sample (34.6% for both males and females) (U.S. Census Bureau 2007). Whites are overrepresented while blacks and Hispanics are underrepresented. This might indicate that the results of this analysis will be more indicative of how advertising affects older white Americans rather than Americans as a whole. However, the analysis controls for all of these demographic charactertiscs which will help mitigate the affects of using a sample with older and white respondents overrepresented.

The average number of persons in the respondent's household is 3.25. The majority of the sample is married (64.95%) and the sample is almost evenly split by Census region with the outliers being the South (28.05%) and the West (21.65%).

Higher educated and higher income people are also overrepresented. College graduates make up 32.68% of the sample while non-college grads make up 67% (less than HS 12.27%; HS graduate 26.85%; some college 27.75%). Approximately 45% of the sample makes more than $87,501 and only 14% make less than $32,500. Employed individuals make up 65.11% of the sample.

There are several ad exposure disparities by demographic group (table six). Approximately 61% of men are in the middle exposure group (0<ad exposure<=178) while only 49% of women are in that bracket. This is a significant difference with a chi-square statistic of 906.9 and p<.001. Over 40% of women are in the high exposure group

and only 27% of men are in the high exposure group (>178 ad exposure) (significantly different with $p<.001$). As for race, the most black respondents report being in the highest exposure group (51.26%) and Hispanics have 50.91% in the low exposure group with about 25% in each of the zero exposure and high exposure groups. There are slight disparities in education with 40.87% of HS graduates in the high exposure bracket and only 31.34% of people without HS degrees and 31.23% of college graduates in the high exposure brackets. Those three education brackets are significantly different with a $p<.001$. There was also a disparity when it came to the size of the family. The mean family size of a respondent with 0 ad exposure was 4.2 while the mean family size of a respondent with high ad exposure was 3.04 (significantly different with $p<.001$). This could be because as the size of the family increases, there are more people to take care of and less time to watch television.

Table 6: Number of NCS Respondents by Ad Exposure Bracket

	No Ad Exposure		0 to the Mean (178) Ad Exposure		Greater than the Mean (178) Ad Exposure	
	Freq	Percent	Freq	Percent	Freq	Percent
Gender:						
Male	2,868	10.70	16,522	61.64	7,416	27.67
Female	2,583	7.82	16,286	49.31	14,156	42.86
Age:						
18-24	759	12.59	3,304	54.82	1,964	32.59
25-34	1,249	13.70	4,803	52.68	3,066	33.63
35-44	1,214	9.78	7,068	56.93	4,133	33.29
45-54	1,044	8.33	7,092	56.58	4,399	35.09
55+	1,185	6.00	10,541	53.41	8,010	40.59
Race:						
White	2,357	5.46	24,452	56.60	16,393	37.95
Black	229	5.81	1,692	42.93	2,020	51.26
Hispanic	2,461	25.13	4,985	50.91	2,346	23.96
Other	404	13.95	1,679	57.98	813	28.07
Education:						
Less than HS	1,551	21.12	3,491	47.54	2,301	31.34
HS Grad	1,297	8.07	8,201	51.06	6,565	40.87
Some College	1,020	6.14	9,021	54.34	6,560	39.52
College Grad	1,456	7.45	11,990	61.32	6,106	31.23
Income:						
< $32,500	1,203	14.90	3,770	46.68	3,103	38.42
$32,501 - $55,000	1,099	10.33	5,505	51.76	4,032	37.91
$55,001 - $87,500	1,141	8.39	7,332	53.92	5,126	37.69
$87,501 - $125,000	1,402	7.22	11,286	58.10	6,738	34.69
> $125,001	606	7.49	4,915	60.72	2,573	31.79
Married Status:						
Single	1,236	10.83	6,071	53.21	4,102	35.95
Married	3,467	8.92	22,015	56.66	13,376	34.42
Divorce/Separated/Widowed	637	7.05	4,472	49.47	3,931	43.48
Size of Family:						
1	310	.52	2,722	4.55	2,444	4.08
2	1,004	1.68	11,154	18.64	7,662	12.81
3	934	1.56	6,509	10.88	4,276	7.15
4	1,118	1.87	6,426	10.74	3,815	6.38
5+	796	1.33	3,175	5.31	1,934	3.23
Employment Status:						
Not Employed	1,608	7.70	10,290	49.30	8,976	43.00
Employed	3,843	9.86	22,518	57.80	12,596	32.33
Census Region:						
Northeast	1,165	7.77	7,850	52.39	5,969	39.84
South	1,576	9.39	9,566	57.00	5,639	33.60
Midwest	1,090	7.21	8,388	55.51	5,634	37.28
West	1,620	12.51	7,004	54.07	4,330	33.43
Total	5,451	9.11	32,808	54.83	21,572	36.05

Ad exposure does not differ as much with all demographic groups. Age is one of these categories with about 10% of each age group in the no exposure bracket, about 55% of each age group in the middle exposure bracket, and about 35% of each age group in the high exposure bracket. Similar breakdowns are found in income, marital status, and Census region.

Table 7 reports the rate of OTC weight loss pill use (past 12 months), dieting (past 12 months), and exercising (at least once a week) by demographic group. Approximately 5% of females report using an OTC weight loss pill while only about 2% of men do. This falls in the middle of the range of pill use that other studies have found (Levy et al. 2004; Kruger et al. 2003). The difference between gender and pill use is significantly different with the chi square statistic of 400.2 and $p<.001$. Many more women (31.94%) report controlling their diet in the past 12 months than do men (significantly different with $p<.001$). A significantly higher percentage of women than men report exercising ($p<.001$). The different age groups have significantly different rates of OTC weight loss pill use (chi-square statistic of 218.3 and $p<.001$). Dieting increases with age (18-24: 16.51%; >55: 28.69%) and exercising once a week decreases with age (18-24: 64.13%; >55: 49.25%). Dieting and exercising are both significantly different between age brackets with p values of less than <.001. While the use of an OTC weight loss pill remains relatively constant with education and income, the rates of diet and exercise increase with education and income (both significantly different with $p<.001$).

There are not huge disparities in all demographic groups. Rates of OTC pill use, diet status, and exercise routine do not differ much across race groups. These rates are also fairly constant among the employed/not employed, with about 3% of each group

using an OTC weight loss pill, about 25% of each group dieting, and about 55% of each group exercising once a week. The exception is the other race group. About 2% of the other race respondents report using an OTC weight loss pill, 18% report dieting and 57% report exercising. Similar trends can be seen across Census region. OTC weight loss pill use is similar for single and divorced/separated/widowed individuals (about 4% for each group). Diet status and rate of exercise are both significantly different among marital status groups ($p<.001$ for both).

Table 7: Proportion of NCS Respondents by Health Outcome

	Used an OTC Pill in the Past 12 Months		Controlled Diet in the Past 12 Months		Exercise at Least Once a Week	
	Freq	Percent	Freq	Percent	Freq	Percent
Gender:						
Male	445	1.66	4,967	18.53	13,766	51.35
Female	1,515	4.59	10,548	31.94	19,819	60.01
Age:						
18-24	241	4.00	995	16.51	3,865	64.13
25-34	400	4.39	2,022	22.18	5,479	60.09
35-44	486	3.91	3,147	25.35	7,372	59.38
45-54	407	3.25	3,688	29.42	7,149	57.03
55+	426	2.16	5,663	28.69	9,720	49.25
Race:						
White	1,388	3.21	11,776	27.26	23,416	54.20
Black	139	3.53	916	23.24	2,152	54.61
Hispanic	382	3.90	2,287	23.36	5,208	53.19
Other	51	1.76	536	18.51	1,648	56.91
Education:						
Less than HS	252	3.43	1,483	20.20	2,912	39.66
HS Grad	535	3.33	3,857	24.01	7,428	46.24
Some College	642	3.87	4,511	27.17	9,798	59.02
College Grad	520	2.66	5,596	28.62	13,353	68.29
Income:						
< $32,500	269	3.33	1,947	24.11	3,590	44.45
$32,501 - $55,000	332	3.12	2,590	24.35	5,326	50.08
$55,001 - $87,500	520	3.82	3,535	25.99	7,439	54.70
$87,501 - $125,000	583	3.00	5,068	26.09	11,817	60.83
> $125,001	256	3.16	2,375	29.34	5,413	66.88
Married Status:						
Single	431	3.78	2,368	20.76	6,932	60.76
Married	1,160	2.99	10,425	26.83	22,085	56.84
Divorce/Separated/Widowed	342	3.78	2,552	28.23	4,293	47.49
Size of Family:						
1	180	3.29	1,566	28.60	2,823	51.55
2	532	2.68	5,508	27.79	11,169	56.35
3	414	3.53	2,952	25.19	6,641	56.67
4	420	3.70	2,896	25.50	6,718	59.14
5+	414	3.61	2,593	22.63	6,234	54.41
Employment Status:						
Not Employed	597	2.86	5,505	26.37	10,877	52.11
Employed	1,363	3.50	10,010	25.69	22,708	58.29
Census Region:						
Northeast	448	2.99	3932	26.24	8169	54.52
South	580	3.46	4465	26.61	9433	56.21
Midwest	481	3.18	3,835	25.38	8,394	55.55
West	451	3.48	3,283	25.34	7,589	58.58
Total	1,960	3.28	15,515	25.93	33,585	56.13

Table 8: OLS: Number of OTC weight loss product television ads exposed to

	Coef.	Std. Err.	P>z
Gender (vs. male):			
Female	18.1402	1.4093	0.000
Age (vs. 55+):			
18-24	-1.2957	3.2650	0.691
25-34	5.6861	2.4599	0.021
35-44	5.0100	2.1623	0.021
45-54	0.6379	2.0312	0.753
Race (vs. white):			
Black	39.3920	2.7814	0.000
Hispanic	-4.0190	2.1845	0.066
Other	3.1332	3.1324	0.317
Education (vs. HS Degree)			
Less Than HS	-1.7615	2.3229	0.448
Some College	-13.5877	1.7955	0.000
4 Year College Degree	-20.1447	1.8347	0.000
Income (vs. <$32,500):			
$32,501 -$55,000	-7.2488	2.4011	0.003
$55,001 - $87,500	-9.8421	2.3889	0.000
$87,501 - $125,000	-8.7944	2.4055	0.000
> $125,001	-7.8964	2.8728	0.006
Marital Status (vs. married):			
Single	7.2958	2.1284	0.001
Divorced/Separated/Widowed	7.9541	1.9750	0.000
Family Size:			
Number of Individuals in Household	1.5378	0.4607	0.001
Employment Status (vs. unemployed):			
Employed	-5.1766	1.5865	0.001
Cenus Region (vs. Northeast):			
Midwest	-16.5108	1.8483	0.000
South	-25.9159	1.8047	0.000
West	-12.5382	1.9536	0.000
R-squared	0.4992		
Observations	59,831		
Television Category Dummies	included		
Television Viewing Intensity	included		
Simmons Wave Dummies	included		

Regression Analysis

Model 1: Targeting Model

In order to see how advertisers target advertising towards different groups, an OLS model was run to look at who is exposed to these ads (Table Eight). Women are exposed to, on average, about 18 more ads than men. African American respondents are exposed to about 39 more ads than white respondents and Hispanic respondents are exposed to about 4 fewer ads than white respondents. There are also large education disparities with those who have some college being exposed to about 14 fewer ads and those who have graduated college have are exposed to about 20 fewer ads than those who have a high school degree. There is no significant difference between those who have a high school degree and those who do not. It seems that marketers believe college graduates will be more skeptical of these ads and thus they target fewer ads to them but no difference between highs school graduates and drop outs. All income groups are exposed to 7 to ten fewer ads than those who make less than $32,500. Single and divorced/separated/widowed people are both exposed to about 7 more ads than those who are married and with each additional household member ad exposure increased by 1.5. In addition, all geographic areas are exposed to fewer ads than those who live in the North East. In summary, marketers appear to target women, African Americas, those with less education and income, non-married people, and those in the North East.

Table 9: Logit: Respondent reports using a diet pill in the past 12 months

	Female				Male			
	Coef.	Odds ratio	Std. Err.	P>z	Coef.	Odds ratio	Std. Err.	P>z
TV Ad Exposure (vs. 0 exposure):								
1 to mean number (178) of OTC weight loss ads	0.2682	1.3076	0.1591	0.092	-0.1869	0.8295	0.2337	0.424
>mean number (178) of OTC weight loss ads	0.5262	1.6924	0.1774	0.003	-0.1259	0.8817	0.2756	0.648
Age (vs. 55+):								
18-24	0.7023	2.0185	0.1296	0.000	-0.2070	0.8130	0.2520	0.411
25-34	0.7350	2.0855	0.1027	0.000	0.4114	1.5089	0.1762	0.020
35-44	0.6853	1.9844	0.0930	0.000	0.0968	1.1016	0.1635	0.554
45-54	0.4632	1.5892	0.0905	0.000	0.0399	1.0407	0.1560	0.798
Race (vs. white):								
Black	-0.1688	0.8446	0.1099	0.124	0.0041	1.0041	0.2047	0.984
Hispanic	0.0164	1.0165	0.0839	0.845	0.0403	1.0411	0.1493	0.787
Other	-0.7484	0.4731	0.1768	0.000	-0.2389	0.7875	0.2646	0.367
Education (vs. HS Degree)								
Less Than HS	0.1135	1.1201	0.0956	0.235	0.1913	1.2108	0.1590	0.229
Some College	0.0413	1.0422	0.0700	0.555	0.1982	1.2192	0.1296	0.126
4 Year College Degree	-0.1284	0.8795	0.0775	0.097	-0.2199	0.8026	0.1435	0.125
Income (vs. <$32,500):								
$32,501 - $55,000	-0.0360	0.9647	0.0983	0.715	-0.0381	0.9626	0.1805	0.833
$55,001 - $87,500	0.2380	1.2687	0.0947	0.012	0.0462	1.0473	0.1759	0.793
$87,501 - $125,000	-0.0243	0.9760	0.0992	0.806	-0.0228	0.9775	0.1784	0.898
> $125,001	0.1527	1.1649	0.1174	0.193	0.0883	1.0923	0.2150	0.681
Marital Status (vs. married):								
Single	-0.0584	0.9433	0.0833	0.483	0.0573	1.0590	0.1452	0.693
Divorced/Separated/Widowed	0.2319	1.2610	0.0756	0.002	0.2127	1.2371	0.1576	0.177
Family Size:								
Number of Individuals in Household	0.0072	1.0073	0.0180	0.688	-0.0722	0.9304	0.0345	0.037
Employment Status (vs. unemployed):								
Employed	0.2462	1.2791	0.0631	0.000	0.2744	1.3158	0.1362	0.044
Census Region (vs. Northeast):								
Midwest	0.1407	1.1511	0.0779	0.071	-0.2417	0.7853	0.1404	0.085
South	0.1979	1.2188	0.0753	0.009	-0.1117	0.8943	0.1320	0.397
West	0.2170	1.2424	0.0813	0.008	0.0069	1.0069	0.1397	0.961
Pseudo R-squared		0.0478				0.0416		
Observations		33,025				26,806		
Television Category Dummies		included				included		
Television Viewing Intensity		included				included		
Simmons Wave Dummies		included				included		

Table 10: Logit: Respondent reports controlling their diet in the past 12 months

	Female				Male			
	Coef.	Odds ratio	Std. Err.	P>z	Coef.	Odds ratio	Std. Err.	P>z
TV Ad Exposure (vs. 0 exposure):								
1 to mean number (178) of OTC weight loss ads	0.0807	1.0841	0.0631	0.201	0.1095	1.1157	0.0752	0.146
>mean number (178) of OTC weight loss ads	0.1570	1.1699	0.0728	0.031	0.1926	1.2124	0.0900	0.032
Age (vs. 55+):								
18-24	-0.6012	0.5481	0.0640	0.000	-0.9340	0.3930	0.0937	0.000
25-34	-0.2892	0.7488	0.0466	0.000	-0.6002	0.5487	0.0652	0.000
35-44	-0.1401	0.8693	0.0406	0.001	-0.3548	0.7013	0.0539	0.000
45-54	0.0164	1.0165	0.0373	0.660	-0.1392	0.8701	0.0486	0.004
Race (vs. white):								
Black	-0.2270	0.7969	0.0525	0.000	-0.0888	0.9150	0.0747	0.234
Hispanic	-0.1542	0.8571	0.0416	0.000	0.0339	1.0345	0.0547	0.535
Other	-0.4903	0.6124	0.0651	0.000	-0.2995	0.7412	0.0860	0.000
Education (vs. HS Degree)								
Less Than HS	-0.1556	0.8559	0.0469	0.001	-0.0109	0.9891	0.0605	0.857
Some College	0.1980	1.2190	0.0332	0.000	0.2451	1.2778	0.0472	0.000
4 Year College Degree	0.2378	1.2685	0.0345	0.000	0.3425	1.4085	0.0466	0.000
Income (vs. <$32,500):								
$32,501 - $55,000	0.0795	1.0827	0.0445	0.074	-0.0857	0.9179	0.0647	0.185
$55,001 - $87,500	0.2089	1.2323	0.0445	0.000	-0.0083	0.9918	0.0632	0.896
$87,501 - $125,000	0.2026	1.2246	0.0453	0.000	0.0343	1.0349	0.0634	0.588
> $125,001	0.3577	1.4300	0.0538	0.000	0.2135	1.2380	0.0733	0.004
Marital Status (vs. married):								
Single	-0.0378	0.9629	0.0408	0.354	-0.0867	0.9169	0.0564	0.124
Divorced/Separated/Widowed	-0.0586	0.9431	0.0343	0.087	-0.0020	0.9980	0.0560	0.971
Family Size:								
Number of Individuals in Household	-0.0349	0.9657	0.0089	0.000	-0.0441	0.9569	0.0121	0.000
Employment Status (vs. unemployed):								
Employed	0.1315	1.1405	0.0284	0.000	0.0385	1.0392	0.0439	0.381
Census Region (vs. Northeast):								
Midwest	-0.0602	0.9416	0.0347	0.083	0.0144	1.0145	0.0463	0.756
South	0.0008	1.0008	0.0337	0.982	0.0506	1.0519	0.0450	0.261
West	0.0407	1.0415	0.0366	0.267	-0.0125	0.9876	0.0492	0.800
Pseudo R-squared		0.0533				0.0631		
Observations		33,025				26,806		
Television Category Dummies		included				included		
Television Viewing Intensity		included				included		
Simmons Wave Dummies		included				included		

Table 11: Logit: Respondent reports exercising at least once a week

	Female				Male			
	Coef.	Odds ratio	Std. Err.	P>z	Coef.	Odds ratio	Std. Err.	P>z
TV Ad Exposure (vs. 0 exposure):								
1 to mean number (178) of OTC weight loss ads	0.1951	1.2155	0.0550	0.000	0.1540	1.2565	0.0530	0.004
>mean number (178) of OTC weight loss ads	0.1713	1.1868	0.0647	0.008	0.1338	1.1432	0.0661	0.043
Age (vs. 55+):								
18-24	0.3137	1.3684	0.0566	0.000	0.3200	1.3771	0.0642	0.000
25-34	0.1912	1.2107	0.0429	0.000	0.1740	1.1900	0.0487	0.000
35-44	0.2255	1.2529	0.0378	0.000	0.1328	1.1420	0.0424	0.002
45-54	0.0947	1.0993	0.0354	0.007	-0.0441	0.9568	0.0397	0.266
Race (vs. white):								
Black	-0.2860	0.7513	0.0474	0.000	-0.2326	0.7925	0.0558	0.000
Hispanic	-0.1072	0.8983	0.0382	0.005	0.0739	1.0767	0.0421	0.079
Other	-0.2294	0.7950	0.0551	0.000	-0.1487	0.8618	0.0598	0.013
Education (vs. HS Degree)								
Less Than HS	-0.2900	0.7482	0.0419	0.000	-0.1470	0.8633	0.0440	0.001
Some College	0.3095	1.3627	0.0303	0.000	0.3187	1.3753	0.0350	0.000
4 Year College Degree	0.6121	1.8442	0.0319	0.000	0.7262	2.0673	0.0357	0.000
Income (vs. <$32,500):								
$32,501 - $55,000	0.0814	1.0848	0.0401	0.043	0.0491	1.0504	0.0491	0.317
$55,001 - $87,500	0.1374	1.1473	0.0404	0.001	0.1200	1.1275	0.0483	0.013
$87,501 - $125,000	0.2129	1.2372	0.0410	0.000	0.1458	1.1570	0.0483	0.003
> $125,001	0.3490	1.4177	0.0497	0.000	0.3352	1.3982	0.0572	0.000
Marital Status (vs. married):								
Single	0.0505	1.0517	0.0374	0.178	0.0455	1.0466	0.0413	0.270
Divorced/Separated/Widowed	-0.1594	0.8526	0.0317	0.000	0.0102	1.0103	0.0445	0.818
Family Size:								
Number of Individuals in Household	-0.0688	0.9335	0.0081	0.000	-0.0574	0.9443	0.0089	0.000
Employment Status (vs. unemployed):								
Employed	-0.1108	0.8951	0.0262	0.000	-0.0908	0.9132	0.0340	0.008
Census Region (vs. Northeast):								
Midwest	0.0603	1.0621	0.0321	0.061	0.0147	1.0148	0.0357	0.680
South	-0.0165	0.9837	0.0313	0.599	-0.0518	0.9495	0.0351	0.140
West	0.1450	1.1560	0.0340	0.000	0.1409	1.1513	0.0378	0.000
Pseudo R-squared		0.0394				0.0372		
Observations		33,025				26,806		
Television Category Dummies		included				included		
Television Viewing Intensity		included				included		
Simmons Wave Dummies		included				included		

Table 12: Logit: Respondent reports controlling their diet in the past 12 months and exercising at least once a week

	Female				Male			
	Coef.	Odds ratio	Std. Err.	P>z	Coef.	Odds ratio	Std. Err.	P>z
TV Ad Exposure (vs. 0 exposure):								
1 to mean number (178) of OTC weight loss ads	0.1634	1.1775	0.0777	0.035	0.1988	1.2199	0.0966	0.040
>mean number (178) of OTC weight loss ads	0.2289	1.2572	0.0884	0.010	0.3009	1.3511	0.1130	0.008
Age (vs. 55+):								
18-24	-0.2699	0.7635	0.0752	0.000	-0.8277	0.4370	0.1156	0.000
25-34	-0.1017	0.9033	0.0547	0.063	-0.4503	0.6374	0.0781	0.000
35-44	0.0248	1.0251	0.0475	0.601	-0.3194	0.7266	0.0652	0.000
45-54	0.0706	1.0732	0.0436	0.105	-0.1656	0.8474	0.0584	0.005
Race (vs. white):								
Black	-0.3357	0.7148	0.0652	0.000	-0.1895	0.8273	0.0952	0.047
Hispanic	-0.1922	0.8251	0.0497	0.000	0.0450	1.0460	0.0671	0.502
Other	-0.4516	0.6366	0.0759	0.000	-0.3453	0.7080	0.1047	0.001
Education (vs. HS Degree)								
Less Than HS	-0.3123	0.7318	0.0624	0.000	-0.1226	0.8846	0.0822	0.136
Some College	0.3015	1.3519	0.0394	0.000	0.4243	1.5284	0.0588	0.000
4 Year College Degree	0.4395	1.5520	0.0402	0.000	0.6029	1.8274	0.0574	0.000
Income (vs. <$32,500):								
$32,501 - $55,000	0.1578	1.1709	0.0558	0.005	-0.0794	0.9237	0.0832	0.340
$55,001 - $87,500	0.3405	1.4056	0.0549	0.000	0.0745	1.0773	0.0798	0.351
$87,501 - $125,000	0.3863	1.4715	0.0556	0.000	0.1711	1.1866	0.0797	0.032
> $125,001	0.5593	1.7495	0.0640	0.000	0.3445	1.4112	0.0902	0.000
Marital Status (vs. married):								
Single	0.0208	1.0210	0.0474	0.661	-0.0373	0.9634	0.0683	0.585
Divorced/Separated/Widowed	-0.1042	0.9011	0.0411	0.011	0.0192	1.0194	0.0678	0.777
Family Size:								
Number of Individuals in Household	-0.0662	0.9360	0.0109	0.000	-0.0613	0.9405	0.0151	0.000
Employment Status (vs. unemployed):								
Employed	0.0389	1.0396	0.0333	0.243	-0.0248	0.9755	0.0528	0.639
Census Region (vs. Northeast):								
Midwest	-0.0407	0.9601	0.0405	0.315	0.0485	1.0497	0.0554	0.381
South	-0.0390	0.9617	0.0394	0.322	-0.0009	0.9991	0.0543	0.986
West	0.0796	1.0828	0.0424	0.061	0.0043	1.0043	0.0590	0.942
Pseudo R-squared		0.0513				0.0617		
Observations		33,025				26,806		
Television Category Dummies		included				included		
Television Viewing Intensity		included				included		
Simmons Wave Dummies		included				included		

Analysis of Ad Exposure

Model 2: Respondent reports using OTC weight loss pill

Controlling for all of the targeting controls identified in model one, large effects of ad exposure can be seen in the female model (Table Nine). Females are 31% (p=.092) more likely to use an OTC weight loss pill if they are exposed to between 1 to 178 ads (the mean) and 69% (p=.003) more likely to use such a product if they see greater than 178 ads. There are no such significant effects for men (low exposure- p=.424; high exposure- p=.648). The differences between the male and female coefficients are significantly different (p<.001) which is suggestive of gender differences in the impact of these advertisements.

Model 3: Respondent reports controlling diet

In addition to predicting use of an OTC weight loss product, ad exposure also impacts the respondents' diet status when targeting controls are included. In this model, as shown in Table Ten, only high ad exposure (>178) predicted that the respondent was controlling their diet in the past 12 months. Females were 17% more likely to control their diet if they had been exposed to more than 178 ads (p=.031) while men were 21% more likely to control their diet if they had been exposed to more than 178 ads. Just like model two, the high exposure coefficient between males and females was significantly different.

Model 4: Respondent reports exercising at least once a week

Unlike use of an OTC weight control product and diet status, there are few gender differences when it comes to exercising once a week, as seen in Table Eleven (when all other targeting effects are controlled for). Low ad exposure (1 to 178 ads) makes females

22% more likely to exercise once a week and males 25% more likely. High ad exposure (more than 178 ads) has a smaller effect; 19% for females and 14% for males (significantly different at $p<.001$).

Model 5: Respondent reports controlling diet in the past 12 months and exercising at least once a week

Just as ad exposure affected diet and exercise routines in males and females differently, the effect of ad exposure on the combination of diet and exercise also differs by gender (Table Twelve). When exposure is between 1 and 178 ads, females are 18% more likely to diet and exercise while males are slightly more likely (22%). Large amounts of ad exposure (>178) make females 26% more likely to use diet and exercise in conjunction while males are even more inclined (35%). This reaffirms the positive spill over effects of ad exposure. Both men and women are significantly more likely to use the expert recommended diet and exercise (in conjunction) when exposed to advertising for OTC weight loss product advertising (both low and high ad exposure). The coefficients were significantly different for males and females ($p<.001$) which suggests that the spillover effects affect males more than females.

Table 13: Summary Regression Table

	Pills Odds ratio				Diet Odds ratio			
TV Ad Exposure (vs. 0 exposure):	Female		Male		Female		Male	
1 to mean number (178) of OTC weight loss ads	1.3076	**	0.8295		1.0841		1.1157	
>mean number (178) of OTC weight loss ads	1.6924	***	0.8817		1.1699	**	1.2124	**

	Exercise Odds ratio				Diet and exercise Odds ratio			
TV Ad Exposure (vs. 0 exposure):	Female		Male		Female		Male	
1 to mean number (178) of OTC weight loss ads	1.2155	***	1.2565	***	1.1775	**	1.2199	**
>mean number (178) of OTC weight loss ads	1.1868	***	1.1432	**	1.2572	***	1.3511	***

* significant < 10%; ** significant < 5%; *** significant < 1%

Summary

In summary, ad exposure is very predictive of all five outcomes measured (table 13). Women with high ad exposure are 76% more likely to use all three of the methods. Females with low ad exposure are 30% and 22% more likely to use OTC weight loss products and exercise once a week, respectively. Alternatively, men with low ad exposure are only more likely to exercise once a week (17%). High ad exposure is significantly predictive of use of an OTC weight loss product, starting a diet, and exercising once a week for women. High ad exposure is significantly predictive for only starting a diet and exercising once a week when it comes to men. Lastly, ad exposure is significantly predictive of using diet in conjunction with exercise for both men and women with both low and high ad exposure. Males and females are affected significantly differently by exposure to these ads.

The models used in this analysis use a very robust design in determining the effect of advertising exposure on the consumer. Separating the sample by gender allows the analysis to look at men and women differently, which is warranted by the different levels of overweight and obesity by gender. The demographic controls mimic those used by marketers in their targeting behavior. The television controls (viewing intensity and television categories) help isolate the effect of the advertising on the consumer by controlling for the variance associated with viewing different types of television programs (categories) or viewing television frequently (the viewing intensity variable).

VIII. Discussion and Conclusions

As evidenced by their report in 2002 and their set of industry guidelines released in 2003, the FTC is concerned about the impact of claims made in OTC weight loss product advertising on the consumer. A large percent of Americans are overweight and obese (Ogden et al. 2006) and medical experts are in agreement that the best method for reducing body mass is a reduced calorie diet in combination with regular physical activity (Miller et al. 1997). Despite the proven efficacy of reduced caloric intake combined with increased physical activity, the market has responded to the obesity epidemic with a plethora of OTC weight loss products promising quick and easy results, but these products have little proven efficacy and no demonstrated record of safety.

In this study I investigate the question whether weight loss ads are effective in encouraging consumers' use of commercial weight loss products and, furthermore, if these ads might be raising awareness about obesity and its consequences that could possibly have positive spillover effects by encouraging consumers to engage in other obesity-reduction behaviors such as diet and exercise. The individual-level data set used in this analysis (NCS) is the same commercial data used by marketers in their ad targeting and media planning behavior. The data provide detailed information on the consumers' demographic characteristics, their media (TV) watching behavior, and their product purchases. Marketers use these data to define and target their ad campaigns. By using these identical commercial data I have the same information that marketers use in their targeting behavior. I'm able to control for variables in the analysis that would account for greater or lesser exposure to weight loss ads based purely on target market characteristics. I examine whether greater exposure to these weight loss ads is correlated

with greater use of weight loss products and other obesity-reduction behaviors such as diet and exercise.

In the first regression I examine the characteristics of marketers' targeting behavior by regressing demographic characteristics of the consumer and characteristics of their media watching behavior on number of weight loss ads to which they are exposed. Result indicate that females are exposed to 18 more OTC weight loss television ads on average than males, and that controlling for amount of televisions watched and type of shows viewed, black respondents are exposed to, on average, 40 more ads than white respondents. Although there were other significant effects none of them were as striking as the effects of gender and race.

Based on results from the first regression and previous research reported in the front section of this thesis, it became clear that not only are obesity rates significantly different in the male and female population, but so are their respective exposure to weight loss ads and their obesity-related behavior, indicating that the underlying relationship of interest in the subsequent regressions also might be different. For this reason I decided to split the data into a male and female sample for the subsequent regressions.

In the models examining the impact of exposure to weight loss ads on the consumption of weight loss product results indicate that, controlling for targeting effects and amount of television viewed, exposure to both low and high levels of weight loss ads is correlated with an increased likelihood of using an OTC weight loss pill for women, but not for men, and in increased likelihood of both men and women starting a diet, exercising once a week, or doing both. These results are suggestive of possible positive spillover effects of OTC weight loss product ads on other diet-related behavior of

consumers. Avery et al. (2007) found similar positive spillover effects of commercial advertising. They found that OTC smoking cessation print advertisements increased the likelihood of all types of quitting behavior, including attempts without the use of the advertised product.

One possible explanation for these results is that these ads are having a 'wake-up' effect on consumers, reminding them of the consequences of obesity or rewards for weight loss, regardless of the method used to attain that reduced weight. Since results indicate that women rather than men are more likely to respond to these ads by taking a pill it could be that there is a social stigma surrounding the use of weight loss products by men, that men are simply less likely to use market-based interventions related to their health, or that men resort to self controllable methods of weight loss. Other research supports these hypotheses. Research has found that men are less likely to visit a doctor then women (Williams 2003), but more likely than women to engage in leisure time physical activity (Adler et al. 1993). On the other hand, women who are balancing work and family priorities might be more susceptible to the promises offered in OTC weight loss ads of a quick fix to the problem of overweight, or the easier self-control method of reducing calories rather than the more time consuming activity of scheduling workout time at the gym.

In summary, results of the analyses reported above indicate a significant correlation between commercial OTC weight loss product television advertising exposure and weight-reducing behaviors of consumers. While every attempt was made to control for factors known to be used by marketers in their media targeting behavior, the impact of these effects can't be totally ruled out as an alternative explanation for the results of this

study. Future research should more fully examine targeting and how ad exposure differs across demographic groups.

A public policy concern still remains regarding the reported deceptiveness of OTC weight loss product advertising and the lack of evidence on the efficacy of most of these products. Products purchased that do not deliver on their promised effects represent significant consumer welfare loss and inefficiency in the market. Cleland, Gross, Koss et al. (2002) concluded that OTC weight loss advertising was extremely deceptive and suggested that greater market regulation be implemented in this industry. While this study did not examine the content and level of deceptiveness of OTC weight loss product ads, results do indicate that a blanket ban on these ads by the FTC could possibly eliminate the positive spillover effects of encouraging other weight loss behaviors. Future research in this areas is needed to examine the level of deceptiveness in television weight loss advertisements, and how different levels of deception impact diet-related behaviors. It might also be beneficial to examine deceptiveness by brand which could streamline regulatory efforts to control deception. Further research also should examine the combined impact of print and television weigh loss advertising on these same weight loss behaviors since marketing research has indicated that these two types of media tend to have a synergistic impact (Confer 1992; Confer and McGlathery 1991; Naik and Raman 2003; Smith 1991).

Like any analysis, this study was not without its limitations. The first limitation was the exposure measure itself. Although the ad-matching algorithm uses television show viewing frequency to approximate probabilities of ad exposure, there is no way to know that respondents actually watched the ads they were exposed to. It is possible that

they were engaging in another activity during the commercial break or simply not paying attention. With the rise of TiVo and DVR, respondents could have "zapped" through these ads. Secondly, the ad matching algorithm assumes that respondents correctly recall which shows they watch and how often. In a list of over 400 shows, the ability to accurately recall viewing behavior could come into question. A second limitation in this study is the issue of targeting. The demographic characteristics and television viewing variables were used to control for targeting effects, but it is possible that some still exist and that the results found in this study are the result of targeting and not the hypothesized effects.

Dealing with a complex problem like the overweight and obesity epidemic is going to take complex solutions. As schools ban fast food from cafeterias and health insurance companies give credits for those who join gyms, innovative solutions to the overweight and obesity epidemic are rising. Although OTC weight loss products do not have a proven record of safety and efficacy, their advertising may be helping consumers "wake-up" and chose healthy methods to achieve their weight loss goals.

IX. References

Allison, David B., Kevin R. Fontaine, Stanley Heshka, Janet L. Mentore, and Steven B. Heymsfield. 2001. Alternative treatments for weight loss: A critical review. *Critical Reviews in Food Science and Nutrition,* 41(1): 1-28.

Adler, N.E., Boyce, T., Chesney, M.A., Folkman, S. 1993. Socioeconomic inequalities in health: no easy solution. *Journal of the American Medical Association,* 269: 3140-3145.

Alger, S., Larkson, K., Boyce, V.L., Seagle, H., Fontwieille, A.M., Ferraro, R.T., Rising, R., Ravussin, E. 1993. Effect of phenylpropanolamine on energy expenditure and weight loss in overweight women. *American Journal of Clinical Nutrition,* 57(2): 120-126.

Anderson, J. W., Konz, E. C., Frederich, R. C., & Wood, C. L. 2001. Long-term weight loss maintenance: A meta-analysis of U.S. studies. *American Journal of Clinical Nutrition*, 74: 79-84.

Avery, R.J, Cawley, J., Eisenberg, M.D. 2008. Fueling false hopes? The impact of false and misleading claims in print advertising on Use of over-the-counter weight loss products. Working paper, Department of Policy Analysis and Management, Cornell University, Ithaca, NY 14853.

Avery, Rosemary J., Donald S. Kenkel, Dean Lillard and Alan D. Mathios. 2007. Public profits and public health: does advertising smoking cessation products encourage smokers to quit? *Journal of Political Economy,* 115(3): 447-481.

Avery, R.J, Simon, K., Eisenberg, M.D. 2008. The impact of DTC print and television advertising on antidepressant Use. Working paper, Department of Policy Analysis and Management, Cornell University, Ithaca, NY 14853.

Baal, P.H., Polder, J.J., Ardine, G., Hoogenveen, R.T., Feenstra, T.L., Boshuizen, H.C., Engelfriet, P.M., Brouwer, B.F. 2007. Lifetime medical costs of obesity: prevention no cure for increasing health expenditure. *PLoS Medicine,* 5(2): 242-249.

Bagwell, Kyle. 2005. "The Economic Analysis of Advertising." Online paper (AugU.S.t), Columbia Univ., Dept. Econ. http://www.columbia.edu/%7Ekwb8/adchapterPost082605.pdf.

Barlow, T., Wogalter, M.S. 1993. Alcoholic beverage warnings in magazine and television advertisements. *Journal of Consumer Research,* 20: 147-155.

Baron, M. 2004. Fighting obesity: Over the counter weight loss supplements. *Health Care Food & Nutrition Focus*, 21(12): 5-7.

Bent, S., Tidet, T.N., Odden, M.C., Shlipak, M.G. 2003. The relative safety of ephedra compared with other herbal products. *Annals of Internal Medicine,* 138: 468-471.

Bray, G.A. 2004. Medical consequences of obesity. *Journal of Clinical Endrocrinology and Metoblism,* 89(6): 2583-9.

Blanck, H.H., Khan, L.K., Serdula, M.K. 2001. *JAMA: Journal of the American Medical Association*, 286(8): 930-35.

Boozer, C.N., Daly, P.A., Homel, P. 2002. Herbal ephedra/caffeine for weight loss: a 6-month randomized safety and efficacy trial. *International Journal of Obesity and Related Metabolic Disorders,* 26: 593-604.

Centers for Disease Control. 2004. Prevalence of overweight and obesity among adults: United States, 1999-2002. U.S. Department of Health and Human Services. http://www.cdc.gov/nchs/pressroom/04facts/obesity.htm

Confer, Marian G. 1992. The Media Multiplier: Nine Studies Conducted in Seven Countries. *Journal of Advertising Research*, 32(1): RC-1 – RC-10.

Confer, Marian G. and Donald McGlathery. 1991. The Research Study: The Advertising Impact of Magazines in Conjunction With Television. *Journal of Advertising Research*, 31(1): RC-2 – RC-5.

Cleland, R. L., Gross, W. C., Koss, L. D., Daynard, M., & Muoio. K. M. 2002. *Weight-loss advertising: An analysis of current trends*. A report of the staff of the Federal Trade Commission. Washington D.C.: Federal Trade Commission. Available at http://www.exercisecertification.com/articles/Nutrition%20Articles/weightloss.pdf

Donohue, Julie M. and Ernst R. Berndt. 2004. "Effects of Direct-to-consumer Advertising on Medication Choice: The Case of Antidepressants," *Journal of Public Policy and Marketing*, 23(2): 115-27.

Drewnewski, A., Petersmarck, K.A. 1990. Toward safe weight loss: recommendations for adults weight loss programs in Michigan: final report/task force to establish weight loss guidelines. East Lansing, MI: Michigan Health Council.

Durden, E.D., Huse, D.M., Ben-Joeseph, R., Chu, B. 2008. Economic costs of obesity to self-insured employers. *Journal of Occupational Environmental Medicine,* 50(9): 991-997.

Dwyer, J.T., Allison, D.B., Coates, P.M. 2005. Dietary supplements in weight reduction. *Journal of American Dietetic Association,* 105: S80-S86.

Federal Trade Commission. 2003. *Dietary supplements: An advertising guide for industry.* Available at http://www.ftc.gov/bcp/conline/pubs/bU.S.pubs/dietsupp.shtm

Finkelstein, E.A., Trogdonk, J.G., Brown, D.S., et al. 2008. The lifetime medical cost burden of overweight and obesity: implications for obesity prevention. *Obesity,* 16: 1843-48.

Finkelstein, E.A., Fiebelkorn, I.C., Wang, G. 2003. National medical spending attributable to overweight and obesity: how much, and who's paying? *Health Affairs,* W3-219.

Food and Drug Administration. 2005. Information page on phenylpropanolamine (PPA). http://www.fda.gov/cder/drug/infopage/ppa/default.htm

Food and Drug Administration. 2006. Sales of supplements containing ephedrine alkaloids (ephedra) prohibited. http://www.fda.gov/oc/initiatives/ephedra/february2004/

Foster, G. D., Wadden, T. A., Vogt, R. A., & Brewer, G. 1997. What is reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *Journal of Counseling and Clinical Psychology*, 65(1): 79-85.

Gahart, Martin T., Louise M. Duhamel, Anne Dievler, and Roseanne Price. 2003. Examining the FDA's oversight of direct-to-consumer advertising. *Health Affairs* (Jan-Jun): W3_120.

Galloway, Chester S. 2003. The first amendment and FTC weight-loss advertising regulation. *The Journal of Consumer Affairs* 37, (2) (Winter): 413.

Gascoigne, David, and J. Busbice. 2006. "DTC ROI: The Latest Findings," Paper presented at the DTC National Conference, Washington, D.C., April 26, 2006.

Greenway, F.L. 1992. Clinical studies with phenylpropanolamine: a meta-analysis. *American Journal of Clinical Nutrition,* 55(1 Supplement): S203-S205.

Grundy, S.M. 2004. Obesity, metabolic syndrome, and cardiovascular disease. *Journal of Clinical Endocrinology and Metabolism,* 89(6): 2595-600.

Hobbs, R., Broder, S., Pope, H., & Rowe, J. 2006. How adolescent girls interpret weight-loss advertising. *Health Education Research Theory and Practice*, 21(5): 719-730.

IMS Management Consulting. 2004. DTC at the Crossroads: A 'Direct' Hit...or Miss? *IMS Issues and Insights*, Sept. 23, 2004. http://www.imshealth.com/ims/portal/front/articleC/0,2777,6599_5266_58193110,00.html

Jakicic, J.M., Marcus, B.H., Gallagher, K.I., Napolitano, M., Lang, Wei. 2004. Effect of exercise duration and intensity on weight loss in overweight, sedentary women: randomized trail. *Obstetrical and Gynecological Survey,* 59(3): 204-206.

Kaiser Family Foundation. 2008. Overweight and obesity rates for adults by race/ethnicity, 2007. http://www.statehealthfacts.org/comparebar.jsp?cat=2&ind=91&typ=2&gsa=1

Kruger, J., Galuska, D., Serdula, M., Jones, D. 2004. Attempting to lose weight: specific practices among U.S. adults. *American Journal of Preventive Medicine,* 26(5): 402-406.

Levy, A.S., Heaton, A.W. 1993. Weight control practices of U.S. adults trying to lose weight. *Annals of Internal Medicine,* 119(7): 661-666.

Lewis, Christine J. 2001. Comment: Regulatory environment for dietary supplements and botanicals targeted to weight loss. *Critical Reviews in Food Science and Nutrition,* 41(1): 43-4.

Marketdata Enterprises. 2007. The U.S. weight loss and diet control market. Tampa, FL: Marketdata Enterprises.

Miller, W.C., Koceja, D.M., Hamilton, E.J. 1997. A meta-analysis of the past 25 years of weight loss research using diet, exercise or diet plus exercise intervention. *International Journal of Obesity,* 21: 941-947.

McGuire, M.T., Wing, R.R., Hill, J.O. 1999. The prevalence of weight loss maintenance among American adults. *International Journal of Obesity,* 23: 1314-1319.

Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., et al. 2003. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA: The Journal of the American Medical Association,* 289(1): 76-79.

Mokdad, A.H., Marks, J.S., Stroup, D.F, Gerberding, J.L. 2004. Actual causes of death in the United States, 2000. *JAMA: The Journal of the American Medical Association,* 291(10): 1238-45.

Naik, Prasad A. and Kalyan Raman. 2003. Understanding the Impact of Synergy in Multimedia Communications. *Journal of Marketing Research*, 40(4), 375-388.

National Consumer Survey [NCS] 2008. http://www.directionsmag.com/companies/Simmons_Market_Research_Bureau/

____. 2001. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. National Heart Lung and Blood Institute. http://www.nhlbi.nih.gov/guidelines/obesity/ob_home.htm

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. 2006. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA:The Journal of the American Medical Association, 295*(13): 1549-1555.

Parikh, N.I., Pencina, M.J., Wang, T.J, Lanier, K, J., Fox, C.S., D'Agostino, R.B., Vasan, R.S. 2007. Increasing trends in incidence of overweight and obesity over 5 decades. *American Journal of Medicine,* 120(3): 242-50.

Pillitteri, J.L., Shiffman, S., Rohay, J.M., Harkins, A.M., Burton, S.L., Wadden, T.A. 2008. Use of dietary supplements for weight loss in the U.S.: results of a national survey. *Obesity,* 16: 790-796.

Rosenthal, Meredith B., Ernst R. Berndt, Julie M. Donohue, Arnold M. Epstein and Richard G. Frank. 2003. "Demand Effects of Recent Changes in Prescription Drug Promotion," *NBER/Frontiers in Health Policy Research*, 6(1): 1-27.

Rotfeld, Herbert Jack. 2003. Desires versus the reality of self-regulation. *The Journal of Consumer Affairs,* 37, (2) (Winter): 424.

Serdula, M.K., Collins, E., Williamson, D.F., Anda, R.F., Pamuk, E., Byers, T.E. 1999. Weight control practices of U.S. adolescents and adults. *Annals of Internal Medicine,* 119(7): 667-671.

Shekelle, P.G., Hardy, M.L., Morton, S.C. 2003. Efficacy and safety of ephedra and ephedrine for weight loss and athletic performance: a meta-analysis. *Journal of the American Medical Association,* 289: 1537-1545.

Smith, Alan. 1991. More Effective Advertising by Integrating Magazines with Television. *Marketing and Research Today*, 19(2): 71-95.

Stock, J.H., Watson, M.W. 2007. *Introduction to Econometrics: Second Edition.* New York: Pearson Education, Inc.

Strum, R. 2002. The effects of obesity, smoking, and drinking on medical problems and costs. *Health Affairs,* 21(2): 245-250.

Studdert, David M. 2001. Alternative treatments for weight-loss: caveat emptor. *Critical Reviews in Food Science and Nutrition,* 41(1): 29-31.

Taylor, S.E., Klein, L.C., Lewis, B.P., Gruenewald, T.L., Gurung, R.A., Updegraff, J.A. 2000. Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychological Review,* 107: 411-429.

Thrope, K.E., Florence, C.S., Howard, D.H., Joski, P. 2004 The impact of obesity on rising medical spending. *Health Affairs,* 23: 480-487.

Tse, A.C., Lee, R.P. 2001. Zapping behavior during commercial breaks. *Journal of Advertising Research,* 41(3): 25-29.

United States Census Bureau. 2007. Obesity share by nation. *World Health Organization, United States Census Bureau, and American Demographics.*

United States Congress, Committee on Appropriations. Subcommittee on Agriculture, Rural Development, and Related Agencies. 2000. *Dietary Guidelines for Americans*. Washington, DC: U.S. Government Printing Office.

United States Department of Health and Human Services. 2000. *Healthy people 2010: Understanding and improving health.*

United States Department of Health and Human Services. 2005. *Healthy people 2010: Midcourse Review.*

United States Department of Health and Human Services. The Surgeon General's call to action to prevent and decrease overweight and obesity. [Rockville, MD]: U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General; [2001]. Available from: U.S. GPO, Washington.

Weinsier, R. L., Wilson, L. J., & Lee, J. 1995. Medically safe rate of weight loss for the treatment of obesity: A guideline based on risk of gallstone formation. *The American Journal of Medicine*, 98: 115-117

Weiss, E.C., Galuska, D.A., Khan, L.K., Serdula, M.K. 2006. Weight control practices among U.S. adults, 2001-2002. *American Journal of Preventive Medicine,* 31(1): 18-24.

Williamson, D. F., Bowman, B. 2001. Commentary on alternative treatments for weight loss. *Critical Reviews in Food Science and Nutrition,* 41(1): 39-40.

Williams, D.R. 2003. The health of men: structured inequalities and opportunities. *American Journal of Public Health,* 93(5): 724-731.

Wing, R.R., Phelan, S. 2005. Long term weight loss maintenance. *The American Journal of Clinical Nutrition,* 82, S222-S227.

Vainio H, Bianchini F. *IARC handbooks of cancer prevention. Volume 6: Weight control and physical activity.* Lyon, France: IARC Pre

X. Appendices

Appendix 1: 21 U.S.C. 321 §2-13

§2. Findings.

Congress finds that -

- (1) improving the health status of United States citizens ranks at the top of the national priorities of the Federal Government;
- (2) the importance of nutrition and the benefits of dietary supplements to health promotion and disease prevention have been documented increasingly in scientific studies;
- (3)(A) there is a link between the ingestion of certain nutrients or dietary supplements and the prevention of chronic diseases such as cancer, heart disease, and osteoporosis; and
- (B) clinical research has shown that several chronic diseases can be prevented simply with a healthful diet, such as a diet that is low in fat, saturated fat, cholesterol, and sodium, with a high proportion of plant-based foods;
- (4) healthful diets may mitigate the need for expensive medical procedures, such as coronary bypass surgery or angioplasty;
- (5) preventive health measures, including education, good nutrition, and appropriate use of safe nutritional supplements will limit the incidence of chronic diseases, and reduce long-term health care expenditures;
- (6)(A) promotion of good health and healthy lifestyles improves and extends lives while reducing health care expenditures; and
- (B) reduction in health care expenditures is of paramount importance to the future of the country and the economic well-being of the country;
- (7) there is a growing need for emphasis on the dissemination of information linking nutrition and long-term good health;
- (8) consumers should be empowered to make choices about preventive health care programs based on data from scientific studies of health benefits related to particular dietary supplements;
- (9) national surveys have revealed that almost 50 percent of the 260,000,000 Americans regularly consume dietary supplements of vitamins, minerals, or herbs as a means of improving their nutrition;
- (10) studies indicate that consumers are placing increased reliance on the use of nontraditional health care providers to avoid the excessive costs of traditional medical services and to obtain more holistic consideration of their needs;
- (11) the United States will spend over $1,000,000,000,000 on health care in 1994, which is about 12 percent of the Gross National Product of the United States, and this amount and percentage will continue to increase unless significant efforts are undertaken to reverse the increase;
- (12)(A) the nutritional supplement industry is an integral part of the economy of the United States;
- (B) the industry consistently projects a positive trade balance; and

- (C) the estimated 600 dietary supplement manufacturers in the United States produce approximately 4,000 products, with total annual sales of such products alone reaching at least $4,000,000,000;
- (13) although the Federal Government should take swift action against products that are unsafe or adulterated, the Federal Government should not take any actions to impose unreasonable regulatory barriers limiting or slowing the flow of safe products and accurate information to consumers;
- (14) dietary supplements are safe within a broad range of intake, and safety problems with the supplements are relatively rare; and
- (15)(A) legislative action that protects the right of access of consumers to safe dietary supplements is necessary in order to promote wellness; and
- (B) a rational Federal framework must be established to supersede the current ad hoc, patchwork regulatory policy on dietary supplements.

§3. Definitions.

- **(a) Definition of Certain Foods as Dietary Supplements.** Section 201 (21 U.S.C. 321) is amended by adding at the end the following:

  "(ff) The term "dietary supplement" -

  - "(1) means a product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients:
    - "(A) a vitamin;
    - "(B) a mineral;
    - "(C) an herb or other botanical;
    - "(D) an amino acid;
    - "(E) a dietary substance for use by man to supplement the diet by increasing the total dietary intake; or
    - "(F) a concentrate, metabolite, constituent, extract, or combination of any ingredient described in clause (A), (B), (C), (D), or (E);
  - "(2) means a product that -
    - "(A)(i) is intended for ingestion in a form described in section 411(c)(1)(B)(i); or
    - "(ii) complies with section 411(c)(1)(B)(ii);
    - "(B) is not represented for use as a conventional food or as a sole item of a meal or the diet; and
    - "(C) is labeled as a dietary supplement; and
  - "(3) does -
    - "(A) include an article that is approved as a new drug under section 505, certified as an antibiotic under section 507, or licensed as a biologic under section 351 of the Public Health Service Act (42 U.S.C. 262) and was, prior to such approval, certification, or license, marketed as a dietary supplement or as a food unless the Secretary has issued a regulation, after notice and comment, finding that the article, when used as or in a dietary supplement under the conditions of use and dosages set forth in the labeling for such dietary supplement, is unlawful under section 402(f); and
    - "(B) not include -

- "(i) an article that is approved as a new drug under section 505, certified as an antibiotic under section 507, or licensed as a biologic under section 351 of the Public Health Service Act (42 U.S.C. 262), or
- "(ii) an article authorized for investigation as a new drug, antibiotic, or biological for which substantial clinical investigations have been instituted and for which the existence of such investigations has been made public,

which was not before such approval, certification, licensing, or authorization marketed as a dietary supplement or as a food unless the Secretary, in the Secretary's discretion, has issued a regulation, after notice and comment, finding that the article would be lawful under this Act.

Except for purposes of section 201(g), a dietary supplement shall be deemed to be a food within the meaning of this Act.

- **(b) Exclusion from Definition of Food Additive.** Section 201(s) (21 U.S.C. 321(s)) is amended -
  - (1) by striking "or" at the end of subparagraph (4);
  - (2) by striking the period at the end of subparagraph (5) and inserting "; or"; and
  - (3) by adding at the end the following new subparagraph (6) "an ingredient described in paragraph (ff) in, or intended for use in, a dietary supplement.".
- **(c) Form of Ingestion.** Section 411(c)(1)(B) (21 U.S.C. 350(c)(1)(B)) is amended -
  - (1) in clause (i), by inserting "powder, softgel, gelcap," after "capsule,"; and
  - (2) in clause (ii), by striking "does not simulate and".

§4. Safety of Dietary Supplements and Burden of Proof on FDA.

Section 402 (21 U.S.C. 342) is amended by adding at the end the following:

- "(f)(1) If it is a dietary supplement or contains a dietary ingredient that -
  - "(A) presents a significant or unreasonable risk of illness or injury under -
    - "(i) conditions of use recommended or suggested in labeling, or
    - "(ii) if no conditions of use are suggested or recommended in the labeling, under ordinary conditions of use;
  - "(B) is a new dietary ingredient for which there is inadequate information to provide reasonable assurance that such ingredient does not present a significant or unreasonable risk of illness or injury;
  - "(C) the Secretary declares to pose an imminent hazard to public health or safety, except that the authority to make such declaration shall not be delegated and the Secretary shall promptly after such a declaration initiate a proceeding in accordance with sections 554 and 556 of title 5, United States Code, to affirm or withdraw the declaration; or
  - "(D) is or contains a dietary ingredient that renders it adulterated under paragraph (a)(1) under the conditions of use recommended or suggested in the labeling of such dietary supplement.

In any proceeding under this subparagraph, the United States shall bear the burden of proof on each element to show that a dietary supplement is adulterated. The court shall decide any issue under this paragraph on a de novo basis.

- (2) Before the Secretary may report to a United States attorney a violation of paragraph (1)(A) for a civil proceeding, the person against whom such proceeding would be initiated shall be given appropriate notice and the opportunity to present views, orally and in writing, at least 10 days before such notice, with regard to such proceeding.

§5. Dietary Supplement Claims.

Chapter IV (21 U.S.C. 341 et seq.) is amended by inserting after section 403A the following new section:

DIETARY SUPPLEMENT LABELING EXEMPTIONS

- "**Sec. 403B. (a) IN GENERAL.-** A publication, including an article, a chapter in a book, or an official abstract of a peer-reviewed scientific publication that appears in an article and was prepared by the author or the editors of the publication, which is reprinted in its entirety, shall not be defined as labeling when used in connection with the sale of a dietary supplement to consumers when it -
  - "(1) is not false or misleading;
  - "(2) does not promote a particular manufacturer or brand of a dietary supplement;
  - "(3) is displayed or presented, or is displayed or presented with other such items on the same subject matter, so as to present a balanced view of the available scientific information on a dietary supplement;
  - "(4) if displayed in an establishment, is physically separate from the dietary supplements; and
  - "(5) does not have appended to it any information by sticker or any other method.
- "**(b) APPLICATION. -** Subsection (a) shall not apply to or restrict a retailer or wholesaler of dietary supplements in any way whatsoever in the sale of books or other publications as a part of the business of such retailer or wholesaler.
- "**(c) BURDEN OF PROOF. -** In any proceeding brought under subsection (a), the burden of proof shall be on the United States to establish that an article or other such matter is false or misleading.".

§6. Statements of Nutritional Support.

Section 403(r) (21 U.S.C. 343(r)) is amended by adding at the end the following:

- "(6) For purposes of paragraph (r)(1)(B), a statement for a dietary supplement may be made if -
  - "(A) the statement claims a benefit related to a classical nutrient deficiency disease and discloses the prevalence of such disease in the United States, describes the role of a nutrient or dietary ingredient intended to affect the structure or function in humans, characterizes the documented mechanism by which a nutrient or dietary ingredient acts to maintain such structure or function,

or describes general well-being from consumption of a nutrient or dietary ingredient,
- "(B) the manufacturer of the dietary supplement has substantiation that such statement is truthful and not misleading, and
- "(C) the statement contains, prominently displayed and in boldface type, the following: "This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.".

A statement under this subparagraph may not claim to diagnose, mitigate, treat, cure, or prevent a specific disease or class of diseases. If the manufacturer of a dietary supplement proposes to make a statement described in the first sentence of this subparagraph in the labeling of the dietary supplement, the manufacturer shall notify the Secretary no later than 30 days after the first marketing of the dietary supplement with such statement that such a statement is being made.".

§7. Dietary Supplement Ingredient Labeling and Nutrition Information Labeling.

- **(a) MISBRANDED SUPPLEMENTS. -** Section 403 (21 U.S.C. 343) is amended by adding at the end the following: "(s) If -
  - "(1) it is a dietary supplement; and
  - "(2)(A) the label or labeling of the supplement fails to list -
    - "(i) the name of each ingredient of the supplement that is described in section 201(ff); and
    - "(ii)(I) the quantity of each such ingredient; or
    - "(II) with respect to a proprietary blend of such ingredients, the total quantity of all ingredients in the blend;
  - "(B) the label or labeling of the dietary supplement fails to identify the product by using the term `dietary supplement', which term may be modified with the name of such an ingredient;
  - "(C) the supplement contains an ingredient described in section 201(ff)(1)(C), and the label or labeling of the supplement fails to identify any part of the plant from which the ingredient is derived;
  - "(D) the supplement -
    - "(i) is covered by the specifications of an official compendium;
    - "(ii) is represented as conforming to the specifications of an official compendium; and
    - "(iii) fails to so conform; or
  - "(E) the supplement -
    - "(i) is not covered by the specifications of an official compendium; and
    - "(ii)(I) fails to have the identity and strength that the supplement is represented to have; or
    - "(II) fails to meet the quality (including tablet or capsule disintegration), purity, or compositional specifications, based on validated assay or other appropriate methods, that the supplement is represented to meet.".
- **(b) Supplement Listing on Nutrition Labeling.** Section 403(q)(5)(F) (21 U.S.C. 343(q)(5)(F)) is amended to read as follows:

- "(F) A dietary supplement product (including a food to which section 411 applies) shall comply with the requirements of subparagraphs (1) and (2) in a manner which is appropriate for the product and which is specified in regulations of the Secretary which shall provide that -
  - "(i) nutrition information shall first list those dietary ingredients that are present in the product in a significant amount and for which a recommendation for daily consumption has been established by the Secretary, except that a dietary ingredient shall not be required to be listed if it is not present in a significant amount, and shall list any other dietary ingredient present and identified as having no such recommendation;
  - "(ii) the listing of dietary ingredients shall include the quantity of each such ingredient (or of a proprietary blend of such ingredients) per serving;
  - "(iii) the listing of dietary ingredients may include the source of a dietary ingredient; and
  - "(iv) the nutrition information shall immediately precede the ingredient information required under subclause (i), except that no ingredient identified pursuant to subclause (i) shall be required to be identified a second time.".

- **(c) Percentage Level Claims.** Section 403(r)(2) (21 U.S.C. 343(r)(2)) is amended by adding after clause (E) the following:
  - "(F) Subclause (i) clause (A) does not apply to a statement in the labeling of a dietary supplement that characterizes the percentage level of a dietary ingredient for which the Secretary has not established a reference daily intake, daily recommended value, or other recommendation for daily consumption.".
- **(d) Vitamins and Minerals.** Section 411(b)(2) (21 U.S.C. 350(b)(2)) is amended -
  - (1) by striking "vitamins or minerals" and inserting "dietary supplement ingredients described in section 201(ff)";
  - (2) by striking "(2)(A)" and inserting "(2)"; and
  - (3) by striking subparagraph (B).
- **(e) Effective Date.** Dietary supplements -
  - (1) may be labeled after the date of the enactment of this Act in accordance with the amendments made by this section, and
  - (2) shall be labeled after December 31, 1996, in accordance with such amendments.

§8. New Dietary Ingredients.

Chapter IV of the Federal Food, Drug, and Cosmetic Act is amended by adding at the end the following:

"NEW DIETARY INGREDIENTS

- "**SEC. 413. (a) IN GENERAL.-** A dietary supplement which contains a new dietary ingredient shall be deemed adulterated under section 402(f) unless it meets one of the following requirements:
  - "(1) The dietary supplement contains only dietary ingredients which have been present in the food supply as an article used for food in a form in which the food has not been chemically altered.

- "(2) There is a history of use or other evidence of safety establishing that the dietary ingredient when used under the conditions recommended or suggested in the labeling of the dietary supplement will reasonably be expected to be safe and, at least 75 days before being introduced or delivered for introduction into interstate commerce, the manufacturer or distributor of the dietary ingredient or dietary supplement provides the Secretary with information, including any citation to published articles, which is the basis on which the manufacturer or distributor has concluded that a dietary supplement containing such dietary ingredient will reasonably be expected to be safe.

The Secretary shall keep confidential any information provided under paragraph (2) for 90 days following its receipt. After the expiration of such 90 days, the Secretary shall place such information on public display, except matters in the information which are trade secrets or otherwise confidential, commercial information.

- "**(b) PETITION. -** Any person may file with the Secretary a petition proposing the issuance of an order prescribing the conditions under which a new dietary ingredient under its intended conditions of use will reasonably be expected to be safe. The Secretary shall make a decision on such petition within 180 days of the date the petition is filed with the Secretary. For purposes of chapter 7 of title 5, United States Code, the decision of the Secretary shall be considered final agency action.
- "**(c) DEFINITION. -** For purposes of this section, the term "new dietary ingredient" means a dietary ingredient that was not marketed in the United States before October 15, 1994 and does not include any dietary ingredient which was marketed in the United States before October 15, 1994.".

§9. Good Manufacturing Practices.

Section 402 (21 U.S.C. 342), as amended by section 4, is amended by adding at the end the following:

- "(g)(1) If it is a dietary supplement and it has been prepared, packed, or held under conditions that do not meet current good manufacturing practice regulations, including regulations requiring, when necessary, expiration date labeling, issued by the Secretary under subparagraph (2).
- "(2) The Secretary may by regulation prescribe good manufacturing practices for dietary supplements. Such regulations shall be modeled after current good manufacturing practice regulations for food and may not impose standards for which there is no current and generally available analytical methodology. No standard of current good manufacturing practice may be imposed unless such standard is included in a regulation promulgated after notice and opportunity for comment in accordance with chapter 5 of title 5, United States Code.".

§10. Conforming Amendments.

- **(a) SECTION 201 -** The last sentence of section 201(g)(1) (21 U.S.C. 321(g)(1)) is amended to read as follows: "A food or dietary supplement for which a claim, subject to sections 403(r)(1)(B) and 403(r)(3) or sections 403(r)(1)(B) and 403(r)(5)(D), is made in

accordance with the requirements of section 403(r) is not a drug solely because the label or the labeling contains such a claim. A food, dietary ingredient, or dietary supplement for which a truthful and not misleading statement is made in accordance with section 403(r)(6) is not a drug under clause (C) solely because the label or the labeling contains such a statement.".

- **(b) SECTION 301 -** Section 301 (21 U.S.C. 331) is amended by adding at the end the following: (u) The introduction or delivery for introduction into interstate commerce of a dietary supplement that is unsafe under section 413.".
- **(c) SECTION 403 -** Section 403 (21 U.S.C. 343), as amended by section 7, is amended by adding after paragraph (s) the following: "A dietary supplement shall not be deemed misbranded solely because its label or labeling contains directions or conditions of use or warnings.".

§11. Withdrawal of the Regulations and Notice.

The advance notice of proposed rulemaking concerning dietary supplements published in the Federal Register of June 18, 1993 (58 FR 33690-33700) is null and void and of no force or effect insofar as it applies to dietary supplements. The Secretary of Health and Human Services shall publish a notice in the Federal Register to revoke the item declared to be null and void and of no force or effect under subsection (a).

§12. Commission on Dietary Supplement Labels.

- **(a) ESTABLISHMENT. -** There shall be established as an independent agency within the executive branch a commission to be known as the Commission on Dietary Supplement Labels (hereafter in this section referred to as the "Commission").
- **(b) MEMBERSHIP. -**
    - (1) COMPOSITION. - The Commission shall be composed of 7 members who shall be appointed by the President.
    - (2) EXPERTISE REQUIREMENT. - The members of the Commission shall consist of individuals with expertise and experience in dietary supplements and in the manufacture, regulation, distribution, and use of such supplements. At least three of the members of the Commission shall be qualified by scientific training and experience to evaluate the benefits to health of the use of dietary supplements and one of such three members shall have experience in pharmacognosy, medical botany, traditional herbal medicine, or other related sciences. Members and staff of the Commission shall be without bias on the issue of dietary supplements.
- **(c) FUNCTIONS OF THE COMMISSION. -** The Commission shall conduct a study on, and provide recommendations for, the regulation of label claims and statements for dietary supplements, including the use of literature in connection with the sale of dietary supplements and procedures for the evaluation of such claims. In making such recommendations, the Commission shall evaluate how best to provide truthful, scientifically valid, and not misleading information to consumers so that such consumers may make informed and appropriate health care choices for themselves and their families.
- **(d) ADMINISTRATIVE POWERS OF THE COMMISSION. -**
    - (1) HEARINGS. - The Commission may hold hearings, sit and act at such times and places, take such testimony, and receive such evidence as the Commission considers advisable to carry out the purposes of this section.

- (2) INFORMATION FROM FEDERAL AGENCIES. - The Commission may secure directly from any Federal department or agency such information as the Commission considers necessary to carry out the provisions of this section.
- (3) AUTHORIZATION OF APPROPRIATIONS. - There are authorized to be appropriated such sums as may be necessary to carry out this section.

- **(e) REPORTS AND RECOMMENDATIONS. -**
  - (1) FINAL REPORT REQUIRED. - Not later than 24 months after the date of enactment of this Act, the Commission shall prepare and submit to the President and to the Congress a final report on the study required by this section.
  - (2) RECOMMENDATIONS. - The report described in paragraph (1) shall contain such recommendations, including recommendations for legislation, as the Commission deems appropriate.
  - (3) ACTION ON RECOMMENDATIONS. - Within 90 days of the issuance of the report under paragraph (1), the Secretary of Health and Human Services shall publish in the Federal Register a notice of any recommendation of Commission for changes in regulations of the Secretary for the regulation of dietary supplements and shall include in such notice a notice of proposed rulemaking on such changes together with an opportunity to present views on such changes. Such rulemaking shall be completed not later than 2 years after the date of the issuance of such report. If such rulemaking is not completed on or before the expiration of such 2 years, regulations of the Secretary published in 59 FR 395-426 on January 4, 1994, shall not be in effect.

§13. Office of Dietary Supplements.

- **(a) IN GENERAL. -** Title IV of the Public Health Service Act is amended by inserting after section 485B (42 U.S.C. 287c-3) the following:

" SUBPART 4--OFFICE OF DIETARY SUPPLEMENTS SEC. 485C. DIETARY SUPPLEMENTS.

- "**(a) ESTABLISHMENT. -** The Secretary shall establish an Office of Dietary Supplements within the National Institutes of Health.
- "**(b) PURPOSE. -** The purposes of the Office are -
  - "(1) to explore more fully the potential role of dietary supplements as a significant part of the efforts of the United States to improve health care; and
  - "(2) to promote scientific study of the benefits of dietary supplements in maintaining health and preventing chronic disease and other health-related conditions.
- "**(c) DUTIES. -** The Director of the Office of Dietary Supplements shall -
  - "(1) conduct and coordinate scientific research within the National Institutes of Health relating to dietary supplements and the extent to which the use of dietary supplements can limit or reduce the risk of diseases such as heart disease, cancer, birth defects, osteoporosis, cataracts, or prostatism;

        - "(2) collect and compile the results of scientific research relating to dietary supplements, including scientific data from foreign sources or the Office of Alternative Medicine;
        - "(3) serve as the principal advisor to the Secretary and to the Assistant Secretary for Health and provide advice to the Director of the National Institutes of Health, the Director of the Centers for Disease Control and Prevention, and the Commissioner of Food and Drugs on issues relating to dietary supplements including -
            - "(A) dietary intake regulations;
            - "(B) the safety of dietary supplements;
            - "(C) claims characterizing the relationship between -
                - "(i) dietary supplements; and
                - "(ii)(I) prevention of disease or other health-related conditions; and
                - "(II) maintenance of health; and
            - "(D) scientific issues arising in connection with the labeling and composition of dietary supplements;
        - "(4) compile a database of scientific research on dietary supplements and individual nutrients; and
        - "(5) coordinate funding relating to dietary supplements for the National Institutes of Health.
    - "**(d) DEFINITION. -** As used in this section, the term "dietary supplement" has the meaning given the term in section 201(ff) of the Federal Food, Drug, and Cosmetic Act.
    - "**(e) AUTHORIZATION OF APPROPRIATIONS. -** There are authorized to be appropriated to carry out this section $5,000,000 for fiscal year 1994 and such sums as may be necessary for each subsequent fiscal year.".
- **(b) CONFORMING AMENDMENT. -** Section 401(b)(2) of the Public Health Service Act (42 U.S.C. 281(b)(2)) is amended by adding at the end the following:
    - "(E) The Office of Dietary Supplements.".

Appendix 2

Number of NCS Respondents by Demographic Characteristic: Comparison of Full Sample and Sample used in this analysis

		Freq	Percent	Freq	Percent
Gender:					
	Male	26,806	44.80	38,086	44.71
	Female	33,025	55.20	47,102	55.29
Age:					
	18-24	6,027	10.07	8,912	9.62
	25-34	9,118	15.24	12,370	14.52
	35-44	12,415	20.75	17,294	20.30
	45-54	12,535	20.95	17,920	21.04
	55+	19,736	32.99	29,412	34.53
Race:					
	White	43,202	72.21	63,961	75.08
	Black	3,941	6.59	5,456	6.40
	Hispanic	9,792	16.37	12,234	14.36
	Other	2,896	4.84	3,537	4.15
Education:					
	Less than HS	7,343	12.27	10,697	12.56
	HS Grad	16,063	26.85	24,658	28.95
	Some College	16,601	27.75	23,466	27.55
	College Grad	19,552	32.68	26,054	30.58
Income:					
	< $32,500	8,076	13.50	12,664	14.87
	$32,501 - $55,000	10,636	17.78	16,294	19.13
	$55,001 - $87,500	13,599	22.73	20,013	23.59
	$87,501 - $125,000	19,426	32.47	26,197	30.75
	> $125,001	8,094	13.53	9,940	11.67
Married Status:					
	Single	11,409	19.07	15,165	17.80
	Married	38,858	64.95	56,121	65.88
	Divorce/Seperated/Widowed	9,040	15.11	13,249	15.55
Size of Family:					
	1	5,476	9.15	8,133	9.55
	2	19,820	33.13	29,939	35.14
	3	11,719	19.59	16,504	19.37
	4	11,359	18.99	15,599	18.31
	5+	5,905	9.87	15,013	17.62
Employment Status:					
	Not Employed	20,874	34.89	30,419	35.71
	Employed	38,957	65.11	54,769	64.29
Census Region:					
	Northeast	14,984	25.04	17,750	20.84
	South	16,781	28.05	28,709	33.70
	Midwest	15,112	25.26	22,479	26.39
	West	12,954	21.65	16,250	19.08
Total		59,831	100	85,188	100