The Effect of Advertising and Deceptive Advertising on Consumption: the Case of Over-the-Counter Weight Loss Products[1]

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Abstract

This paper is the first to estimate the impact of exposure to deceptive advertising on consumption of the advertised product and its substitutes. We study the market for over-the-counter (OTC) weight-loss products, in which deceptive advertising is rampant. Strengths of the paper include matching of specific advertisements to individual respondents based on their reported magazine reading and TV watching behavior, quantification of the deceptiveness of ads based on explicit FTC guidelines for this product category, and various methods to control for targeting of ads. We find that, for women, exposure to non-deceptive ads is associated with a higher probability of consuming OTC weight loss products. We find some evidence that exposure to deceptive advertising is associated with a lower probability of consumption by women. The association of ad exposure with consumption is greater for women than men, and greater for white females than African-American females.

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Introduction

The research question of this paper is: to what extent do advertising, and deceptive advertising in particular, affect consumption of the advertised good and its substitutes? Deceptive advertising is defined as a firm misrepresenting to the consumer the attributes of the advertised product (e.g., Nagler, 1993), and thus the expected utility from using the product. The Federal Trade Commission Act prohibits "unfair or deceptive acts or practices", including both misstatement of facts and failure to disclose important information that consumers should know (Correia, 2004). The research literature on deceptive advertising spans economics, marketing, and consumer policy. Much of it focuses on factors that alter firm incentives to engage in deceptive advertising (Posner, 1973; Darby and Karni, 1973; Nagler, 1993; Kopalle and Lehmann, 2006) and the impact of specific regulatory policies (Byrd-Bredbenner et al., 2001; Sauer and Leffler, 1990). Marketing researchers have conducted lab experiments with small samples to determine how subjects perceive deceptive advertisements constructed by the researcher (e.g. Olson and Dover, 1978; Burke et al., 1988; Johar, 1995; Compeau et al., 2004). However, no previous study has estimated the impact of deceptive advertising on an individual's consumption of the advertised good and its substitutes.[2]

Whether and how much deceptive advertising impacts consumption is unclear *a priori* because firms can counter-advertise to reveal deceptive claims by their rivals and consumers may be sufficiently savvy to disregard exaggerated claims (e.g., Posner, 1973). Moreover, advertising in general and deceptive advertising in particular can be cooperative, increasing total consumption, or competitive (predatory), keeping total

[2] In contrast, several papers have measured the impact of volume of advertising at the market level on purchases of the advertised good; see the review in Bagwell (2007).

consumption unchanged but increasing market share at the expense of rivals (Bagwell, 2007). Advertising can have both effects, increasing the consumption of the advertised product and decreasing consumption of rival products.

This paper is the first to estimate the impact of exposure to deceptive statements on the consumption of the advertised product and its substitutes. We study unique individual-level data that include consumption, magazine readership, and television viewing. The advertisements that ran in those magazines and on those television shows have been coded for the number of deceptive statements using explicit guidelines that the Federal Trade Commission (FTC) developed specifically for the market in question. Exposure to deceptive statements is then used to predict consumption, controlling for demographic factors and other variables used by marketers to target their ads.

The Market for Over-the-Counter Weight Loss Products

We examine advertising in the market for over-the-counter (OTC) weight loss products. As of 2007-2008, 68.0% of Americans were at least overweight and 33.8% were obese (Flegal et al., 2010).[3] Given those statistics, it may not be surprising that 46% of American women and 33% of American men are trying to lose weight (Bish et al., 2005). Safe and effective methods of weight loss involve behavior modification: decreased calorie intake and increased physical activity resulting in weight loss of 1-2 pounds per week (NHLBI, 2000; U.S. D.H.H.S. and U.S.D.A., 2005). Such "lifelong effort" (NHLBI, 2000) and gradual weight loss is not particularly appealing, and as a result some people consume OTC weight loss products that promise rapid weight loss with little or no effort. Such OTC weight loss products have been consumed by 20.6% of

[3] Overweight is defined as a body mass index (BMI) of greater than or equal to 25, and obesity is defined as a BMI of greater than or equal to 30; NHLBI (2000).

adult women and 9.7% of adult men (Blanck et al., 2007), and by 14.4% of female adolescents and 7.2% of male adolescents (Wilson et al., 2006). Substantial percentages (11.3% of women and 6.0% of men) have used them in the past year alone (Blanck et al., 2007). In each case, these are percentages of the entire U.S. population, not just of the subpopulation that is overweight or trying to lose weight. Among those who have ever made a serious weight-loss attempt, 33.9% used an OTC weight loss product (Pillitteri et al., 2008). Americans spent $2 billion on OTC weight loss products in 2001 (GAO, 2002). This is a very heterogeneous market, with products in the form of pills, powders, drinks, creams, gels, patches, and jewelry, all of which promise to help the user lose weight.

The widespread use of these products is troubling because OTC weight loss products are loosely regulated and have a history of little efficacy and dangerous side effects. OTC weight loss products are governed by the 1994 Dietary Supplements Health and Education Act (DSHEA) and are treated as foods (Correia, 2004; GAO, 2002). They are sold OTC in supermarkets and pharmacy aisles as well as through the mail and over the internet. Because they are regulated as foods, manufacturers need not show any benefit from the product but also cannot make specific disease claims. Manufacturers bear no responsibility for proving safety before marketing (like food, it is assumed to be safe); the government bears the burden of proof to show that the product is unsafe. Advertising of OTC weight loss products is subject to the same regulations that govern advertising of food; they are not subject to the far more stringent regulations on the

advertising of prescription medications.[4] As a result, manufacturers of OTC weight loss products have considerable latitude in the marketing of their products.

OTC weight loss products are generally ineffective and can have severe, even potentially fatal, side effects (GAO, 2002).[5] Two active ingredients that were common in this class of products have since been banned by the Food and Drug Administration (FDA) for increasing the risk of stroke and cardiac events: phenylpropanolamine (PPA) in 2000 and ephedra in 2005. Although these and similar active ingredients have little effect on calorie expenditure and therefore weight loss, they do increase heart rate, which could be interpreted by a poorly-informed consumer as an increase in metabolism that will burn fat; in fact, they have little if any impact on weight but do increase the risk of heart attack and stroke.[6] To increase the sensation that metabolism has increased manufacturers often include caffeine as well which further raises the risk of cardiac events. Even after PPA and ephedra were removed from the market by the FDA, these products continue to have active ingredients with negligible efficacy and substantial side effects (Dwyer et al., 2005; Pittler and Ernst, 2004; Bouchard et al., 2005). Analysis of a dozen weight-loss supplements sold on the internet in 2007 found that two-thirds contained one or more ingredients associated with multiple incidents or life-threatening

[4] During the period we examine, the OTC weight loss market did not yet include Alli, the OTC version of the prescription weight loss drug Xenical that was introduced June 15, 2007 and is the only weight loss product approved by the FDA for OTC sale.

[5] A review of the evidence on the safety and efficacy of OTC weight loss products concluded, "The evidence for most dietary supplements as aids in reducing body weight is not convincing. None of the [twelve] reviewed dietary supplements can be recommended for over-the-counter use" (Pittler et al., 2004).

[6] Awareness of the fatal side effects associated with OTC weight loss products was increased by the highly-publicized deaths of several professional athletes (Korey Stringer of the Minnesota Vikings football team whose death led the NFL to ban players' use of ephedra; Steve Bechler of the Baltimore Orioles baseball team; Rashidi Wheeler, a Northwestern University football player; and Devaughan Darling, a Florida State football player) who were consuming the products to try to lose weight they had gained during the off-season; see Sheinin (2003).

cardiac complications or death, but none of the product advertisements, labels, or accompanying materials warned of such adverse events (Nazeri et al., 2009).

The market for OTC weight loss products is characterized by incomplete information. OTC weight loss products can be experience goods (consumers do not know how well the product will work for them until they consume it) or even credence goods (consumers aren't sure how well it worked even *after* they consume it). Drugs and supplements can have person-specific effects, so even information from friends and family who have consumed the product may be of uncertain relevance. Asked to rate the effectiveness of OTC weight loss products, 62.9% of those who had used, and 42.8% of those who had not used, the products rated them as either "very effective" or "somewhat effective" (Pillitteri et al., 2008). Consumers are also poorly informed about government regulation of these products; roughly half of Americans believe that OTC weight loss products must be approved for safety and efficacy before being sold to the public (Pillitteri et al., 2008; Harris Interactive, Inc., 2002). Consumers' confusion about regulation of OTC weight loss products could be due in part to similar confusion among physicians. A recent survey found that 37% of physicians in residency training programs were unaware that OTC dietary supplements do not require FDA approval before sale (Ashar et al., 2007).

The market failure of imperfect information makes deceptive advertising potentially profitable. In general, deceptive advertising is more advantageous to firms selling experience or credence goods (Nelson, 1974).[7] Another factor promoting

[7] Nelson (1974) reports that for the first 6 months of 1965 the Federal Trade Commission found 58 advertisements to be deceptive, and all concerned experience qualities.

deceptive advertising is a high turnover of firms.[8] Although such turnover may be endogenous (e.g. to avoid FTC penalties for deceptive advertising), it also increases the incentives for deceptive advertising because it decreases the marginal cost of deceptive advertising - firms may not expect to remain in the market long enough to suffer the consequences of a bad reputation.

Posner (1973) lists four mechanisms that deter deceptive advertising: 1) the knowledge and intelligence of the consumer; 2) cost to the seller of developing a reputation for dishonesty; 3) firms pointing out deceptive statements of their rivals; and 4) private legal actions by consumers. All four of these mechanisms are weak in the OTC weight loss products market, the first because weight loss products are experience or credence goods, and the final three because high firm turnover implies low cost of a future bad reputation and makes counter-advertising and legal action by consumers unprofitable.

As a result of these factors, the FTC has found that "The use of false and misleading claims in weight-loss advertising is rampant" (FTC, 2002). A Commissioner of the FTC wrote in *Advertising Age* in 2003 that "There is an explosion of dietary-supplement and weight-loss advertising…and much of it appears to be false or unsubstantiated." (Anthony, 2003).

Deceptive advertising of OTC weight loss products could have several negative consequences, the magnitudes of which depend on the effect of deceptive advertising on consumption. If deceptive advertising is cooperative (increases the probability of use) then the negative consequences may be substantial; those induced by the deceptive ads to

[8] Kopalle and Lehmann (2006) find that 75% of firms charged with deceptive advertising by the FTC between 1996 and 2002 could not be found in any of five major business databases.

begin consuming OTC weight loss products face a risk of adverse, even potentially fatal, side effects. In addition, consumers face financial losses; the GAO estimates that $2 billion per year is spent on ineffective weight loss products (FTC, 2002; GAO, 2002). Even if deceptive advertising is merely competitive or predatory (causing existing users to change brands but not convincing any abstainers to begin using the products) it still has adverse consequences. First, it may create a "lemons market" in which deceptively-advertised products drive the more honestly-advertised products out of the market (Akerlof, 1970; Carlton and Perloff, 2000).[9] Second, the false promises of substantial weight loss may have negative public health effects by leading consumers to become discouraged by their own experience and eventually abandon attempts to lose weight by any, even healthier, means.

Given the large number of Americans taking OTC weight loss products, the products' ineffectiveness, history of substantial side effects (including death), and the frequency with which these products have had to be withdrawn from the market for safety reasons, the effect of deceptive advertising on consumption of these products is of considerable interest for public policy and public health.

Conceptual Framework and Hypotheses

We set aside the decision of the firm to engage in deceptive advertising (Posner 1973; Darby and Karni, 1973; Nagler, 1993; Kopalle and Lehmann, 2006) and focus on how deceptive advertising affects consumer behavior. The conceptual framework for the

[9] The FTC has written, "…if the entire field of weight-loss advertising is subject to widespread deception, then advertising loses its important role in the efficient allocation of resources in a free-market economy. If the purveyors of the "fast and easy fixes" drive the market place, then others may feel compelled to follow suit or risk losing market share to the hucksters who promise the impossible. Public health suffers as well." (FTC, 2002).

analysis is based on economic models of body weight (Philipson and Posner, 1999; Lakdawalla and Philipson, 2002; Cawley, 2004a; and Lakdawalla, Philipson, and Bhattacharya, 2005). In these models, utility is a function of food consumption, the allocation of time to various pursuits, body weight, health, and a composite good (all other goods).

One cannot directly choose body weight or health – these stocks can be affected only through the following flows: food consumption (caloric intake), the allocation of time (which determines caloric expenditure), and consumption of weight loss products. Individuals are assumed to allocate their time and money in such a way as to maximize their utility subject to constraints on their time, budget, and biology (the biological constraint states that changes in weight are determined by the excess of calories consumed over calories expended).

The demand for weight loss products is a derived demand, derived from the demand for weight and health. Weight loss is produced in the household by combining time and effort with market goods (such as weight loss products). Factor substitution is possible because there is more than one way to lose weight – one can decrease food consumption, increase exercise, and consume weight loss products, in any combination. The utility-maximizing consumption of weight loss products is characterized by the "last dollar rule": the last dollar spent on each good (including inputs into weight loss such as OTC weight loss products, prescription weight loss drugs, gym memberships, and so on) provides equal marginal utility. (If this were not the case, consumers could rearrange their spending to achieve higher utility with the same budget.) However, because weight loss products are experience or credence goods, consumers do not know with certainty

the benefits and costs of consuming OTC weight loss products. We assume that consumers' beliefs regarding the marginal costs and benefits of consumption are based in part on the advertisements to which they are exposed. As a result, consumers may overconsume OTC weight loss products (and underconsume substitute products such as prescription weight loss drugs, gym memberships, and so on) relative to what would truly maximize the present discounted value of lifetime utility.

It is unclear *a priori* whether advertising in general, and deceptive statements in particular, increase consumption of OTC weight loss products (cooperative effects), or simply increase market share for the advertised brand without increasing overall consumption (competitive or predatory effects). It is possible that exposure to non-deceptive ads and exposure to deceptive ads could have different effects. Because we consider this to be an empirical question we do not have a strong *a priori* hypothesis about whether exposure to non-deceptive or deceptive ads have cooperative or competitive effects.

The demand for substitute methods of weight loss (e.g. prescription weight loss medications) is hypothesized to decrease with exposure to advertisements for OTC weight loss products. The logic is that exposure to advertisements will lead the consumer to overestimate the effectiveness of OTC weight loss products, and to shift spending to them and away from substitute methods of weight loss. There are possible offsetting effects, however; exposure to ads for OTC weight loss products could lead consumers to visit their doctors, and increase the probability of being prescribed a Rx weight loss medication. Unlike OTC weight-loss products, prescription (Rx) weight loss medications

are subject to rigorous pre-market testing for safety and efficacy, and thus are assumed to be both safer and more effective than OTC weight loss products.[10]

Other methods of weight loss, such as dieting and exercise, could be either complements to, or substitutes for, OTC weight loss products. For this reason, it is ambiguous whether exposure to deceptive advertising will increase or decrease the probability of dieting and/or exercising.

We predict that advertising exposure will have less of an impact on consumption for men than women; this hypothesis is specific to the market for OTC weight loss products. There is a large body of evidence that the labor market and social consequences of being overweight or obese are less for men than women: obese men are less likely than obese women to be socially stigmatized (Puhl, forthcoming), develop obesity-related depression (Granberg, forthcoming), or suffer labor market penalties such as lower wages (Cawley, 2004b; Averett, forthcoming). For these reasons, we hypothesize that men have a demand for OTC weight loss products that is small and relatively inelastic to advertising.

We also predict that advertising exposure will have less of an impact on consumption for African-American females than for white females. Research has found that obese African-American women are more satisfied with their appearance and are less likely to suffer obesity-related depression, social stigmatization or employment discrimination than obese white females (Granberg, forthcoming; Puhl, forthcoming; Averett, forthcoming). This may to some extent explain why the prevalence of obesity is

[10] The only two prescription strength weight loss drugs approved by the FDA for long-term use are the appetite supressant sibutramine (Meridia), which was introduced in 1998, and the fat absorption inhibitor orlistat (Xenical), which was introduced in 1999. A literature review concluded that pharmacologic therapy with these drugs provides 5-10 kg weight loss after 1-2 years (Douketis et al., 2005).

much higher for African-American adult women (49.6%) than for white adult women (33.0%; see Flegal et al., 2010). Based on the research suggesting a lower cost of obesity for African-American females, we hypothesize that their demand for OTC weight loss products that is small and relatively inelastic to advertising.

Data

National Consumer Survey

Our individual-level data are from the Simmons National Consumer Survey (NCS, 2009). The NCS provides detailed information on Americans' consumption, magazine reading, and television viewing. The NCS is a repeated cross-sectional survey, in which each wave is an independently drawn multistage stratified probability sample of all telephone households in the United States (excluding Hawaii and Alaska); see Simmons (various years). In order to minimize respondent fatigue, the data are collected in several phases. In phase I, face-to-face interviewers collect demographic data and data on magazines reading and TV shows watched. During a subsequent part of phase I, respondents report, by filling out a questionnaire, whether they purchase and use specific products, including weight loss products. In Phase II, which is typically conducted about eight weeks after the phase I interview, interviewers collect and review with the respondent his/her answers to the consumption questionnaire. Survey response rates in the NCS are generally high (approximately 70%).

Respondents provide information about a host of demographic characteristics such as age, gender, race, marital status, number of children, and census region, and

socioeconomic characteristics such as education, income, employment status, and work hours.

Respondents are asked a series of questions about weight loss methods, but not everyone in the sample is asked every question. The entire sample is asked "Are you presently watching your diet?" Those who respond positively to this question are asked to indicate which non-prescription products or weight loss-methods they have used or participated in: e.g. non-prescription weight loss pills, meal replacement products, diet centers, Jenny Craig, NutriSystem, and Weight Watchers.

The entire sample is also asked whether they have had specific medical conditions in the past 12 months, including whether they were obese (asked 2001-2002) or 30 or more pounds overweight (2003-2007). Those who respond positively to this question are asked whether they have used prescription product for weight loss in the past 12 months.[11] It is an inherent limitation of the data that not every respondent is asked about consumption of weight loss products.

The entire sample is asked whether they engaged in specific activities in the past 12 months; we code a person as having engaged in exercise if they participated in aerobics, fitness walking, jogging/running, used cardio machines, or weight training.

Respondents are shown copies of the covers of over 100 magazines and are asked, on average, how frequently they read each magazine (specifically, how many of the last four issues of the magazine they read) over the past six months.

[11] Those who respond that they have been obese (2001-2002) or 30 or more pounds overweight (2003-2007) in the past year are also asked whether they have consumed a nonprescription drug for weight loss in the past 12 months, but this question is answered by many fewer people than who answer the question about OTC weight loss products that follows the question about whether the respondent is watching his or her diet, so we use the latter question for which there is a much larger number of responses.

Respondents were asked about their viewing habits for a list of approximately 400 broadcast television programs and almost as many cable television programs. For broadcast television programs, the NCS asks respondents how many episodes of that show they have watched out of the total aired in the past month (for weekly shows) or past week (daily shows). For each cable TV show, respondents indicate whether they have watched it in the past week or in the past month.

We pool data from the 2001-2007 cross sections of the NCS (specifically, the odd-numbered waves from 25-49). We assign households to Designated Marketing Areas (DMAs) based on their county of residence. Our sample includes only those living in the top 75 DMAs (in 2001) or top 100 DMAs (in 2002-2007) because we only have data on TV ads for those areas. Our final samples consist of roughly 47,000 men and 59,000 women.

Magazine Advertisements

Images of the magazine advertisements were drawn from the Advertising Database (ADS) archived at Cornell University.[12] The ADS archive contains a digital collection of all print advertisements for medications that appeared between January 1985 and January 2007 in 26 consumer magazines: *Better Homes & Gardens, Black Enterprise, Business Week, Cosmopolitan, Ebony, Essence, Family Circle, Glamour, Good Housekeeping, Jet, McCall's* (name changed to *Rosie's* on January 1, 2001), *Modern Maturity, Money, National Geographic, Newsweek, People, Playboy, Readers*

[12] The authors thank Donald S. Kenkel, Dean Lillard, and Alan Mathios for their generosity in sharing the ADS database. For more on this database, see Avery et al. (2007).

Digest, Rolling Stone, Seventeen, Sports Illustrated, Time, TV Guide, U.S. News &World Report, Vogue, and *Women's Day*.

The 26 ADS magazines were selected to include the magazines most frequently read by specific demographic groups (defined by race, education, income, age, and gender). Although 20 demographic groups were defined, members of each group often read the same magazines. Consequently, the final set of magazines used to create the digital archive includes the above 26 magazines.

The creators of the database estimate that the 26 magazines in ADS account for somewhere between 30% and 60% of total U.S. magazine circulation, and probably a higher fraction of all magazine advertisements (Avery et al., 2007). Although the ADS magazines are a substantial portion of the market, the sample of advertisements in ADS is not a random sample of all magazine advertisements. However, advertising in ADS closely tracks total advertising expenditures, and the variation in the ADS data explains most of the variation in advertising expenditures over the same time period (Avery et al., 2007).

All print advertisements for weight-loss products that appeared in every issue of these 26 magazines between January 1985 and January 2007 were analyzed (N=1,061).

Television Advertisements

The data on television advertisements for OTC weight loss products comes from a commercial source, TNS Media Intelligence. The TNS data provide information on the exact time and program during which specific OTC weight loss product ads aired. We use TNS data on advertisements that aired from 1999-2007 on national networks, cable,

and spot markets identified by Designated Marketing Areas (DMAs). The TNS data cover the largest 75 DMAs in 2001 and the 100 largest Designated Marketing Areas (DMAs) from 2002-2007.

Definition of Deceptive Advertising of OTC Weight Loss Products

Undoubtedly, one reason for a lack of previous empirical research on the impact of deceptive advertising on consumption is the difficulty in defining "deceptive." One advantage to studying the market for OTC weight loss products is that the FTC has issued specific definitions of deception for this market. Specifically, the FTC issued a list of seven weight-loss claims that it deems "not scientifically feasible," "facially false," "bogus," and "too good to be true" (FTC, 2003, 2005). The FTC calls these claims "red flags" because the claims are so outrageous that they should raise a red flag for magazine publishers and television stations. These seven false claims are that a weight-loss product will:

1) Cause weight loss of two pounds or more a week for a month or more without dieting or exercise[13];
2) Cause substantial weight loss no matter what or how much the consumer eats;
3) Cause permanent weight loss (even when the consumer stops using product);
4) Block the absorption of fat or calories to enable consumers to lose substantial weight;
5) Safely enable consumers to lose more than three pounds per week for more than four weeks[14];

[13] This is deceptive not so much because of the rate of weight loss - the NHLBI (2000) recommends weight loss of 1-2 pounds per week - but because of the promise that weight loss can be achieved without dieting or exercise.

6) Cause substantial weight loss for all users;

7) Cause substantial weight loss by wearing it on the body or rubbing it onto the skin.

These definitions of deception seem reasonable to us. However, even if one disagrees with them the FTC standards remain policy relevant because they are the official definitions of the relevant governing agency.

In the *Reference Guide for Media on Bogus Weight Loss Claim Detection* (FTC , 2003), the FTC provides detailed instructions for identifying each of the above deceptive claims and clear examples so that media can avoid running advertisements that contain them. Our researchers used those FTC instructions to identify which deceptive claims (if any) appear in the sample of magazine and television weight-loss advertisements. To ensure the accuracy of the coding, a second researcher independently coded the same advertisements and, if a significant number of discrepancies were found, a third researcher coded them as well and resolved the discrepancy. Thanks to the clarity of the FTC guidelines we obtained inter-coder reliability over 89% on all seven coded dimensions. Magazine advertisements illustrating each of these deceptive statements are provided in the Appendix.

Measures of Exposure to Advertisements and Deceptive Statements

We construct measures of individual exposure to advertisements for OTC weight loss products in the following manner. The variable $Read_{im}$ is the fraction of issues of magazine *m* read by person *i*, and $Watched_{iv}$ is the fraction of episodes of television show

[14] This is deceptive because of the rate of weight loss; the NHLBI (2000) recommends weight loss of 1-2 pounds per week.

v watched by person i.[15] The number of ads for OTC weight loss products that appeared in magazine m during year t is Ads_{mt} and the number of OTC weight loss advertisements that were shown during television show v during year t is $Ads_{vt.}$ We multiply the fraction of issues read of each magazine by the number of ads that ran in that magazine in the past year and sum across all magazines, then multiply the fraction of episodes watched of each television show by the number of ads that ran during that show in the past year and sum across all shows to calculate individual i's potential exposure to magazine and television advertisements for OTC weight loss products exposure to advertisements for Rx weight loss products in the past year:

$$OTC\_Ad\_exposure_{it} = \sum_{m=1}^{26} Ads_{mt} * Read_{im} + \sum_{v=1}^{V} Ads_{vt} * Watched_{iv}$$

$$Rx\_Ad\_exposure_{it} = \sum_{m=1}^{26} Rx\_Ads_{mt} * Read_{im} + \sum_{v=1}^{V} Rx\_Ads_{vt} * Watched_{iv}$$

where the subscript m refers to each of the 26 magazines in the ADS database and the subscript v refers to each of the 700+ television shows asked of NCS respondents.

We construct measures of individuals' exposure to deceptive statements in a very similar manner:

$$OTC\_Deception\_exposure_{it} = \sum_{m=1}^{26} Deception_{mt} * Read_{im} + \sum_{v=1}^{V} Deception_{vt} * Watched_{iv}$$

Where $Deception_{mt}$ is the number of deceptive statements that ran in magazine m in year t and $Deception_{vt}$ is the number of deceptive statements that ran during television show v in year $t.$ We also at times divide *OTC_Ad_Exposure* into exposure to ads with no deceptive statements and exposure to ads with any deceptive statements.

[15] Specifically, based on the questions that the Simmons NCS asks about TV viewing, we match ads to network TV shows and to cable TV "day parts" (times of the day by day of the week).

Exposure to deceptive statements regarding Rx weight loss drugs is not relevant because advertising of Rx medications is heavily regulated by the FDA and deceptive statements do not appear in the ads.[16]

In these calculations, we assume that reading habits over the last six months reflect those over the past year and that TV viewing habits over the past month or week reflect those over the past year. We also assume that most of the impact of an advertisement occurs within a year; consistent with this, Bagwell (2007) describes empirical evidence that the average effect of advertising on sales is mostly depreciated within 6-9 months (Bagwell, 2007).

By matching individual magazine reading and television viewing over specific periods of time to the ads that ran in those magazines and during those television programs at the time that the respondent reported viewing them, our individual-level calculation of advertising exposure is far more accurate than in the previous literature on the effects of advertising using almost exclusively market-level (DMA) advertising volume or expenditure, implicitly assuming that all individuals in a large market are exposed to the same advertising (see the review in Bagwell, 2007). (The exception is Avery et al. (2007), which examines individual-level effects of advertisements for smoking cessation products—and on which our measures of ad exposure are based.)

Empirical Model and Identification

Our ideal research design would be to conduct a randomized experiment, in which thousands of people, in the normal course of their lives, were exposed to randomly

[16] Our review of advertisements for Rx weight loss drugs in the sample confirms that they do not contain deceptive statements as defined by the FTC for the OTC weight loss market.

varying numbers of advertisements and deceptive statements regarding OTC weight loss products. We would then estimate how consumption of OTC weight loss products varied with this exogenously-generated variation in exposure, controlling for all relevant individual characteristics, and could be confident that the estimate was an accurate measure of the causal impact of exposure on consumption.

Unfortunately such a randomized experiment is not feasible. As a result, we use opportunistic data in which exposure is not experimentally manipulated but varies based on date of interview, TV media market, choices about magazine readership and choices about TV watching. We use these data to estimate reduced-form logit models of whether the respondent consumes an OTC weight loss drug as a function of exposure to deceptive advertising:

$$\Pr(Consume_{it}=1) = F(\alpha_1 + OTC\_Ads_{it}\beta_{A1} + OTC\_Deceptive\_Statements_{it}\beta_{D1} + Rx\_Ads_{it}\beta_{R1} + X_{it}\chi_1)$$

$$\Pr(Consume_{it}=1) = F(\alpha_2 + OTC\_Nondeceptive\_Ads_{it}\beta_{A2} + OTC\_Deceptive\_Ads_{it}\beta_{D2} + Rx\_Ads_{it}\beta_{R2} + X_{it}\chi_2)$$

$$\text{where } F(z) = \frac{e^z}{1+e^z}$$

The binary outcome $Consume_{it}$ is set equal to one if the respondent reports having consumed an OTC weight loss product in the past year. (Subsequent models use binary dependent variables that indicate consumption of prescription weight-loss medications, dieting, and exercise.)

OTC_Ads_{it} and $OTC\_Nondeceptive\_Ads_{it}$, controlling for measures of exposure to deceptive advertising, are alternate measures of exposure to non-deceptive advertisements for OTC weight loss products. We hypothesize that exposure to

additional non-deceptive advertising provides information and may increase consumers' expected marginal net benefit of consuming an OTC weight loss product, so we hypothesize that $\beta_A>0$.

$OTC\_Deception\_Statements_{it}$ and $OTC\_Deceptive\_Ads_{it}$ are alternate measures of exposure to deceptive advertising, which is hypothesized to increase the consumers' expected marginal net benefit of consuming an OTC weight loss drug. In other words, we hypothesize that $\beta_D>0$; i.e., that exposure to deceptive advertising will increase the probability of using OTC weight loss drugs.

The vector of controls X includes the following variables: age (indicator variables for 18-24, 25-34, 35-44, and 45-54, where 55 and older is the reference category), race (African-American, Hispanic, Asian, and Other, with White the reference category), education, income ($32,501-$55,000; $55,001-$87,500; $87,501-$125,000; $125,001 and higher; with $32,500 and under the reference category), year, marital status (single, divorced/separated/widowed, with married the reference category), household size, employment status (employed, with unemployed or out of the labor force the reference category), census region (Midwest, South, West, with Northeast the reference category), work hours, total magazine issues read in the past 12 months, and average hours of television watched per week. We also include indicator variables for whether the respondent said that in the past 12 months they were obese (2001-2002) or 30 or more pounds overweight (2003-2007). In certain regressions we also control for whether the respondent reads any magazines in certain categories (women's, young adult, African American, or general interest) and whether the respondent watches any television shows in certain categories (including news programs, soap operas, sitcoms, dramas, court TV

shows, celebrity news programs, and cartoons). We also control for the respondent's exposure to advertisements for prescription weight-loss medications. We lack data on the price of OTC weight loss products, but annual changes in such prices are reflected in the coefficients on the indicator variables for year. All models are estimated separately by gender.

The main threat to identification is the non-random nature of exposure to advertisements and deceptive statements; in particular, advertisers targeting their ads to people likely to consume the products. We address targeting in the following ways:

1) We use the NCS, the very database used by advertisers to target their ads. The NCS website states: "The product usage, media usage, consumer demographic, psychographic and lifestyle profiles measured and reported by Simmons are the basic building blocks of virtually every major marketing firm and advertising agency in the U.S." (NCS, 2009). The NCS allows us to control for the very variables used by advertisers to target their ads, ensuring that our coefficient estimates suffer from a minimum of omitted variable bias due to targeting. As a result, we have the same set of variables as those commercial entities targeting the advertisements. Although nothing is observed by the advertiser that is not observed by the econometrician, we acknowledge that we may use the variables in different ways and thus not fully adjust for targeting.
2) We control for the total number of magazine issues read in the past 12 months and average number of hours of TV watched in the past week, in order to control for reading and viewing intensity that would result in increased potential exposure to number of advertisements.

3) We control for the types of magazines the respondent reads and the types of TV shows that the respondent watches. To the extent that people who read women's magazines or watch soap operas will be particularly likely to diet or consume weight loss drugs, that will be controlled for by the indicator variables for types of magazines and television shows, i.e., magazine and program type fixed effects. Thus, identification will come from (e.g.) one woman who reads fashion magazine choosing *Cosmopolitan*, while another woman who reads fashion magazines chooses *Glamour*.
4) We control for whether the respondent is obese or 30 pounds overweight to address targeting of these ads to overweight or obese individuals.
5) Our models estimate the impact of potential exposure to deceptive statements on consumption controlling for exposure to advertisements for OTC weight loss products in general. To the extent that ads and deceptive ads are targeting the same individuals, this will reduce or eliminate omitted variable bias due to targeting.
6) We control for exposure to advertisements for prescription weight loss products.[17] To the extent that prescription and over-the-counter weight loss products are targeting the same individuals, this will reduce or eliminate omitted variable bias due to targeting.
7) We will estimate some models within groups that we believe may be targeted by advertisers. Specifically, we will estimate models using women who read either of the fashion magazines *Cosmopolitan* or *Glamour* (which contain the majority

[17] Exposure to ads for prescription weight-loss medications is constructed in a similar way to the exposure to deceptive statements, with the exception that instead of counting deceptive statements per issue of each magazine it counts ads for prescription weight loss medications.

of deceptive statements in our sample) or watch soap operas. Even within this group there is variation in the exposure to deceptive statements because of differences in: whether the individual reads one or the other or both fashion magazines, variation in the number of issues read, and year-to-year variation in the number of deceptive statements appearing in those magazines.

Our approach utilizes variation in exposure due to individuals reading different magazines, reading a different number of issues of a given magazine, watching different TV shows, watching the same TV shows but with different frequency, being surveyed in different years, and from living in different local media markets.

This approach has its limitations. First, there is measurement error in our estimates of exposure to advertising and deception. These measures of exposure assume that two respondents in the same NCS wave who read the same number of issues of the same magazines and watched the same fraction of episodes of the same TV shows were exposed to the same number of advertisements. However, we do not know for certain that both people would have seen all of the advertisements. For example, even if you report having read the entire issue of a magazine, you might have flipped by the page with the ad and never seen it. Likewise, even if you report having watched a specific TV show, you might have left the room when the advertisement happened to run. This measurement error likely results in attenuation bias in our estimates of the impact of advertising exposure. Another limitation is that even within categories of magazines and TV shows, there may be targeting of ads to women who (e.g.) watch one soap opera instead of another.

Empirical Results

Use of Weight Loss Methods in the NCS

Table 1 contains summary statistics for the Simmons National Consumer Survey, 2001-2007. Only those who report watching their diet (45.3% of women, and 30.1% of men) are asked whether they have used an OTC weight loss product in the past 12 months. Among that group, 11.9% of women, and 8.4% of men, report consuming OTC weight loss pills in the past year. These reports are similar to those found in surveys that are not conditional on dieting; e.g., Blanck et al. (2007) found that 11.3% of women and 6.0% of men have used OTC weight loss products in the past year. Other surveys find that, among those who have ever made a serious weight-loss attempt, 33.9% used an OTC weight loss product (Pillitteri et al., 2008).

Only those who report being obese (5.6% of women and 2.5% of men during 2001-2002) or at least 30 pounds overweight (15.5% of women and 8.2% of men during 2003-2007) are asked whether they have taken a prescription weight loss drug in the past 12 months.[18] Among that group, 4.8% of women and 4.2% of men, report taking an Rx weight loss drug in the past year. In contrast, Cawley and Rizzo (2007) find that, in the Medical Expenditure Panel Survey between 1996 and 2002, the percentage of adults with a scrip for at least one prescription anti-obesity drug ranged from a low of 0.32% to a high of 0.96%.

[18] The percentage of Simmons NCS adult respondents reporting in 2001-2002 that they are obese (5.6% of women and 2.5% of men) is far below the prevalence of obesity in 2001-2002 based on measurements (33.3% of women and 27.8% of men; see Ogden et al., 2006). This is consistent with the previous literature which finds that survey respondents typically underreport their weight (see, e.g. Cawley and Burkhauser, 2006), although in this case respondents are not asked their weight, but whether they were obese in the past year.

Number and Placement of Magazine Advertisements for OTC Weight Loss Products

The results in this section refer to the full duration of the ADS database (January 1985- January 2007). Across those years we find 1,061 appearances of advertisements for OTC weight loss products. Table 2 lists the number of appearances of ads for OTC weight loss products that ran in the 26 magazines contained in the ADS database. These advertisements were especially likely to run in fashion magazines. For example, a majority (56.5%) of all ad appearances were in either *Cosmopolitan* (36.4%) or *Glamour* (20.2%). *Vogue*, a fashion magazine targeted at higher-income and more mature female readers, contained a far smaller percentage of appearances of ads for OTC weight loss products (2.7%). Possible explanations for this include: relative to readers of *Cosmo* and *Glamour*, readers of *Vogue* are higher income women and thus less likely to be overweight or obese (McLaren, 2007), or are better informed about the safety and efficacy of OTC weight loss products, and thus advertisers are less likely to advertise in magazines read by such women. The other magazines that ran the largest percentage of ads for OTC weight loss products were also generally targeted at women: *Woman's Day* (11.0%), *Family Circle* (8.2%), *People* (7.1%), *Better Homes and Gardens* (2.5%), and *McCall's* (1.9%).

It is also interesting to examine which magazines contained few or no ads over the 13-year period 1985-2007. General news magazines such as *Newsweek,* and *US News and World Report* ran no OTC weight loss ads during this period. Very few ads appeared in men's magazines such as *Sports Illustrated* (1.5%) or *Playboy* (0.2%). Although the prevalence of obesity is only slightly lower for men (32.2%) than women (35.5%) (Flegal et al., 2010), men may have a lower demand for OTC weight loss products than women.

Consistent with this hypothesis, research has found that obese men are less likely than obese women to be socially stigmatized, develop obesity-related depression, suffer discrimination, or experience adverse labor market outcomes (Puhl, forthcoming; Granberg, forthcoming; Averett, forthcoming).

African-American magazines contain very few, if any, OTC weight loss ads; *Ebony, Jet*, and *Essence* each ran only one or two, and *Black Enterprise* ran no ads for OTC weight loss products over this 13-year period. The lack of ads in African-American magazines could be due to African-American females having a lower demand than white females for OTC weight loss drugs, or it could be due to a difference in the publisher's willingness to run these ads. (In general, variation across similar magazines in willingness to publish these ads would be useful in generating variation in exposure among similar individuals that is not due to targeting and therefore unobserved demand.)

Exposure to Advertisements for OTC Weight Loss Products

Over the 2001-2007 period spanned by our Simmons NCS data, the average 12-month exposure to OTC weight loss ads (magazine and TV combined) is 68.5 for women and 48.6 for men (see Table 1). Figures 1 and 2 show that the distribution of exposure to ads is highly skewed. Most individuals have very low exposure, but a small fraction of respondents were exposed to a thousand or more ads in the past year.

The correlates of exposure to ads for OTC weight loss products are shown in Table 3. Specifically, the natural log of exposure to ads is regressed on indicators for age category, race, education category, and income category, controlling for wave of the NCS data. (For respondents whose exposure was zero, the zero is converted to 0.001 before

taking the natural log.) The reference person is white, aged 55-75, high school graduate with an income less than $32,501. The results of this regression indicate that, for both women and men, exposure is higher for those who are young, black or white (as opposed to Hispanic or Asian), high school graduates (as opposed to high school dropouts or college graduates), higher income, married, overweight or obese, and for those who read more magazines and watch more TV.

Number, Type, and Placement of Deceptive Statements

The frequency of each type of deceptive statement identified by the FTC is listed in Table 4A for magazine ads and Table 4B for television ads.[19] Our sample includes 647 unique magazine advertisements that ran 1,061 times during the period 1985-2007. Table 4A shows that at least one deceptive statement appeared in 46.5% of unique advertisements, and in 39.7% of ad appearances. The most common deceptive statement is the one the FTC listed as #5 – that the product safely enables consumers to lose more than three pounds a week for more than four weeks; 18.2% of all OTC weight loss ad appearances included this deceptive statement. The second most common deceptive statement is #3 – that the product will cause permanent weight loss, even if the consumer stops using the product; 13.5% of all OTC weight loss ad appearances included this claim. Close behind in third place is deceptive statement #6 – that the product will work for all users; this statement was included in 13.0% of all ad appearances. The least common deceptive claim is that the product will cause substantial weight loss by wearing

[19] Even the names of some products are deceptive: e.g. Blast Away Fat, Fat Assassin, Fat Blocker, Fat Burner, Skinny Pill, Tummy Flattening Gel. The product named Sure Cure II raises the question of what was wrong with Sure Cure I.

it on the body or rubbing it into the skin; this claim appeared in only 2.2% of the ad appearances.

Our sample includes 1,383 unique TV advertisements for OTC weight loss products that ran 1,065,245 times in the period 2000-2007. Table 4B indicates that at least one deceptive statement appeared in 17.9% of all unique TV ads for OTC weight loss products and in 16.1% of TV ad appearances. Both are lower than for magazine ads. The two deceptive statements that were most common in magazine ads are also the most common in TV ads. The most common deceptive statement is that the FTC listed as #5 – that the product safely enables consumers to lose more than three pounds a week for more than four weeks; 9.65% of all TV ad appearances made that deceptive statement. The second most common is that the FTC listed as #3 – that the product causes permanent weight loss. This deceptive statement was found in 5.5% of all TV ad appearances.

Table 5A lists, by magazine, the number of ads that ran in that magazine that contained at least one "red flag" deceptive statement, and the total number of deceptive statements that appeared in ads in that magazines. Deceptive statements were especially likely to be found in certain fashion magazines. By far, the magazine that prints the most deceptive statements regarding OTC weight loss products is *Cosmopolitan* – 60.6% of all deceptive statements that we found were in that magazine. A comparison of the percentage of ads and the percentage of deceptive statements indicates that not only did *Cosmopolitan* publish the most OTC weight loss ads from 1985-2007 (386, or 36.4% of our sample), but that those ads are unusually deceptive, such that that the 36.4% of ads that ran in *Cosmopolitan* explain 60.6% of all deceptive statements in our sample. A

distant second in terms of publishing ads that include deceptive statements is *Glamour*, which published 14.5% of the deceptive statements, and third is *Woman's Day*, which published 10.7% of the deceptive statements.

Table 5B lists, by category of television shows (e.g. morning news program, soap opera) the number of ads that ran during that category of show that contained at least one deceptive statement, and the number of deceptive statements. The largest percentage of deceptive ads ran during daytime talk shows (13.3%), followed by reality shows (10.3%) and morning news programs (9.8%). Very few deceptive ads for OTC weight loss products ran during sporting events (1.7%), news magazine programs (0.8%), or health and fitness shows (0.2%).

Exposure to Deceptive Advertisements

Average 12-month exposure to deceptive statements in magazine or TV ads for OTC weight loss products is 18.5 for women and 12.2 for men (see Table 1). Figures 3 and 4 show that the distribution of exposure to deceptive statements is highly skewed. Most individuals have very low exposure, but a small percentage of respondents were exposed to hundreds of deceptive statements in the previous year.

The correlates of exposure to deceptive statements are shown in Table 6. Specifically, the natural log of exposure to deceptive statements is regressed on indicators for age category, race, education category, and income category, controlling for wave of the NCS data. (For those with zero exposure, the zero is converted to 0.001 before taking the natural log.) The reference person is white, aged 55-75, high school graduate with an income less than $32,501. As was true for exposure to ads in general, exposure to

deceptive statements is higher for those who are young, black or white (as opposed to Hispanic or Asian), high school graduates (as opposed to high school dropouts or college graduates), higher income, married, overweight or obese, and for those who read more magazines and watch more TV.

The Impact of Exposure to Advertising on Consumption

We now turn to examining the impact of exposure to advertising and deception on the probability of using an OTC weight loss product in the past 12 months. An indicator for using an OTC weight loss product in the past 12 months was regressed on exposure to ads for OTC weight loss products, exposure to deceptive statements regarding OTC weight loss products, and exposure to advertising for Rx weight loss drugs. Results for women are provided in Table 7, and results for men are contained in Table 8.

The first column in Table 7 shows that, for women, exposure to additional OTC weight loss ads is associated with a higher probability of consuming an OTC weight loss product. Specifically, exposure to an additional 100 ads is associated with a 1.71 percentage point higher probability of consuming an OTC weight loss product. To put this magnitude in perspective, recall that average annual exposure to OTC ads among women in our sample is 68.5 (s.d. of 103.7), and that 11.9% of women report consuming an OTC weight loss product in the past year.

Higher exposure to deceptive statements is associated with a lower probability of consuming OTC weight loss products; exposure to an additional 100 deceptive statements is associated with a 3.26 percentage point lower probability of use. For perspective, the average annual exposure to deceptive statements among women in our

sample is 18.5 (s.d. of 34.3). One possible explanation for the negative association between consumption and exposure to deception is that deceptive statements that are implausible may unintentionally send a signal to consumers that the product cannot possibly deliver the weight loss that is claimed in the ad and thus increase consumer skepticism and deter purchase.

These estimates (from Table 7, column 1) are from a model that addresses the targeting of advertisers by controlling for demographic and socioeconomic characteristics, overweight or obesity, and total readership of magazines and total TV viewing. The second column of Table 7 presents results that further control for targeting by controlling for indicator variables for types of magazines read and types of TV shows watched. In this model, identifying variation comes from (e.g.) women choosing to read one fashion magazine instead of another, or from watching one daytime talk show instead of another. The results in the second column are quite similar to those in the first: although controlling for types of magazines read and types of TV shows watched reduces the size of the point estimate slightly, higher exposure to ads is still associated with a higher probability of consuming, and higher exposure to deceptive statements is still associated with a lower probability of consuming (although the latter is statistically significant with a p value of .051).

The third column of Table 7 uses a different approach to address targeting: it looks only within the group most targeted by advertisers of these products: the group of women who read either *Cosmopolitan* or *Glamour* (the two magazines that run the most OTC weight loss ads) or watch soap operas on TV (a type of show during which a large number of such ads are run). The logic is that this group is targeted most by advertisers,

so to find a dose-response relationship within this group is strong evidence that exposure to ads and deceptive statements impacts behavior and is not simply picking up differences between those targeted and not targeted by advertisers of these products. The results in column 3 confirm those in the earlier columns: higher exposure to ads is associated with a higher probability of consuming, and higher exposure to deceptive statements is associated with a lower probability of consuming (although the latter is statistically significant with a p value of .086).

Table 8 presents results for similar models estimated for men. In column 1, exposure to ads is associated with a higher probability of consuming. However, the point estimate falls considerably and is no longer statistically significant after we address targeting by controlling for indicator variables for types of magazines read and types of TV shows watched (column 2 of Table 8). In neither column of Table 8 do we see evidence that exposure to deceptive statements is associated with the probability of consumption.

Extension 1: Alternate Measures of Exposure to Ads and Deception

As an extension, we estimate models using different measures of exposure. Instead of examining exposure to ads and exposure to deceptive statements, we instead examine exposure to non-deceptive ads and exposure to deceptive ads. To clarify the difference, in the earlier models (Table 7 and Table 8), seeing five deceptive statements in a single ad would raise one's exposure to deceptive statements by five, but in the model of this section, an ad with any deceptive statements counts as one deceptive ad, no matter how many deceptive statements it contains. Results for women are presented in

Table 9. Because we tend not to find any significant associations for men, we do not present results for them, but tables of results for men are available upon request.

Exposure to non-deceptive ads is associated with a higher probability of consumption, whether one addresses targeting by: (Column 1) controlling for overweight and obesity and total TV watching and total magazine readership; (Column 2) those same controls plus indicator variables for categories of TV shows watched and categories of magazines read; (Column 3), or whether we focus on the subset of women most targeted by this advertising (women who read *Cosmopolitan* or *Glamour* or who watch soap operas). In the model with the strictest controls for targeting (column 3), an additional 100 non-deceptive ads is associated with a 1.7 percentage point higher probability of consuming an OTC weight loss product. (Average exposure to non-deceptive ads among women is 50, with a s.d. of 74.8.) In brief, this is consistent with the earlier results (Table 7).

The point estimates suggest that exposure to deceptive ads is associated with a lower probability of consumption, but this is statistically significant at the 10% level only in column 1, which has the less rigorous set of controls for targeting.

Extension 2: Investigating the Issue of Multicollinearity

We investigate the issue of collinearity between exposure to ads and exposure to deceptive statements. The correlation coefficient between exposure to ads for OTC weight loss products and exposure to deceptive statements is .88, whereas the correlation

coefficient between non-deceptive ads and deceptive ads is .77.[20] One might be concerned that multicollinearity prevents us from accurately estimating the association of both variables with our outcomes of interest. To address this possibility, we estimate a slightly different model that regresses an indicator variable for consuming an OTC weight loss product on exposure to ads for OTC weight loss products and the *percentage* of those ads that contain at least one deceptive statement. These two variables are far less correlated (.30) than exposure to ads and exposure to deceptive statements (.88) or exposure to non-deceptive ads and exposure to deceptive ads (.77). The results for women appear in Table 10. The results are generally consistent with the base model reported in Table 7. Exposure to an additional 100 ads (roughly one standard deviation) is associated with a 0.73 percentage point higher probability of consumption (column 3 of Table 10). Increasing the percentage of ads that are deceptive from 0 to 100 is associated with a 5.6 percentage point decrease in the probability of consumption (column 3 of Table 10), although this is only statistically significant at the 10% level. Overall, the results are consistent with the results of the base model that are reported in Table 7.

Extension 3: Results by Education and Race for Women

In this section we examine results for certain interesting subsamples. First, we examine whether results differ for women of high and low education. Individuals with higher education tend to be in better health, in part because they make better decisions about their health, i.e., they enjoy allocative efficiency in the production of health (Grossman and Kaestner, 1997; Grossman, 2000). This suggests the possibility that

[20] The correlation coefficient between exposure to ads for OTC weight loss products and exposure to ads for Rx drugs is .17, whereas that between exposure to deceptive statements and exposure to ads for Rx drugs is .05.

better-educated women are less influenced by advertising than less-educated women. Better-educated women may also be less likely to be persuaded by deceptive statements.

To investigate this possibility, we estimate models separately for women with education of high school degree or less (Table 11) and women with some college or more (Table 12). Contrary to our hypothesis, it is only among better-educated women that we consistently find that exposure to non-deceptive ads for OTC weight loss products is associated with a higher probability of use, a result that is robust to the inclusion of more rigorous controls for targeting in columns 2 and 3 of Table 12. For the less-educated women in Table 11, point estimates are smaller than those for better-educated women, and are not statistically significant after we include our more rigorous controls for targeting in columns 2 and 3.

We also estimate models separately for white females (Table 13) and African-American females (Table 14). In Table 13, exposure to non-deceptive ads is consistently associated with a higher probability of consumption for white females. In addition, exposure to deceptive advertising is negatively correlated with consumption in columns 1 and 2. In Table 14, no measure of exposure is significantly correlated with consumption for African-American women. The difference is not simply due to sample size; the point estimates are in each case smaller for African-American females than for white females. These results are consistent with our hypothesis that exposure to advertising for OTC weight loss products would have a greater impact on consumption for white females than for African-American females.

Extension 4: Spillover Effects on Consumption of Rx Weight Loss Drugs, and on Dieting and Exercise

Exposure to ads for OTC weight loss products may impact the use of other methods of weight loss that may be either complements to, or substitutes for, the consumption of OTC weight loss products. If advertising leads consumers to overerstimate the benefits and underestimate the total costs of OTC weight loss products relative to the alternatives, it may both increase use of OTC weight loss products and decrease use of substitute products and methods. In this section, we examine whether exposure to ads for OTC weight loss products has spillover effects on the probability of using Rx weight loss drugs, dieting, or exercising.

Table 15 presents results from models of consumption of Rx weight loss drugs by women. In general, the results suggest that exposure to non-deceptive ads is associated with a higher probability of consuming Rx weight loss drugs. The magnitude is such that exposure to an additional 100 non-deceptive ads is associated with a 1.2 percentage point higher probability of consuming an Rx weight loss drug in the past year. For perspective, the average exposure to non-deceptive ads in our sample was 50 (s.d. of 74.8), and 4.8% of women had taken an Rx weight loss drug in the past year. The mechanism may be that seeing an ad for a weight loss product leads women to visit their doctor to ask about obesity or weight loss methods, with the result that they get a script for an Rx weight loss drug. Results indicate no significant association between exposure to deceptive ads and the probability of using a Rx weight loss drug, and the point estimates are negative. Interestingly, we also find no significant association of exposure to ads for Rx weight

loss drugs on their consumption. (Annual exposure to ads for Rx weight loss drugs is low, averaging just 4.7 for women.)

Table 16 presents results from models of dieting. There is little evidence that exposure to non-deceptive ads is associated with the probability of dieting; the coefficient is positive and significant in the first column but not the second or third with more rigorous controls for targeting. Interestingly, exposure to ads for Rx weight loss drugs is associated with a higher probability of dieting in each of the model specifications. Seeing ads for Rx weight loss drugs may lead consumers to visit their physician, and physicians may counsel patients to attempt dieting before they will prescribe a prescription drug for weight loss.

Table 17 presents results from models of exercising. After controls for targeting are included in columns 2 and 3, there is little evidence that either deceptive or non-deceptive ads for OTC weight loss products are associated with the probability of exercising. However, exposure to ads for Rx weight loss drugs is associated with a lower probability of exercising in the models reported in the first two columns. This is in contrast to the results in Table 16 that exposure to more ads for Rx weight loss drugs is associated with a higher probability of dieting.

Discussion

It has long been recognized that advertising can fulfill two functions: provide information to consumers, and persuade or mislead consumers (Bagwell, 2007). This dual nature of advertising led Lester Telser to write that "Hardly any business practice causes economists greater uneasiness than advertising" (Telser, 1964, p. 537). This is the

first paper to provide empirical estimates of the effect of individual-level exposure to deceptive statements on the consumption of the advertised good and consumption of substitute goods.

Previous literature has examined whether advertising has cooperative effects, expanding the overall market, or competitive (predatory) effects, in which advertising increases market share of the advertised product at the expense of rival products without increasing the size of the market. We find evidence that, for women, non-deceptive advertising is cooperative; it is associated with a higher probability that women consume an OTC weight loss product. As such, it is similar to advertising for cigarettes, which is also cooperative (Roberts and Samuelson, 1988).

Given that previous research found that overweight and obese men are less concerned about their weight than women, face less of a labor market penalty, and face less stigma and discrimination, we expected to find less of an impact of advertising on consumption of OTC weight loss products for men than women. As expected, we consistently find little evidence that advertising affects consumption of these products by men. We also find evidence in support of our hypothesis that exposure to advertising would have a greater impact on the consumption of OTC weight loss products for white females than for African-American females.

We find some evidence for women that deceptive advertising is associated with a lower probability of consuming the advertised good. Deceptive statements that are implausible may unintentionally send a signal to consumers that the product cannot possibly be what is claimed, thus discouraging consumption. If deceptive advertising lowers consumption, then what incentive do firms have to engage in deceptive

advertising in this market? Given that 39.7% of all magazine ad appearances for OTC weight loss products between 1985 and 2007 contained at least one deceptive statement, we assume that deceptive advertising must do something to increase firm profits. Although we cannot test for it directly, we assume that it must have competitive or predatory effects, increasing market share of the deceptively advertised product at the expense of rivals. If true, deceptive ads in this market are similar to ads for soda pop, which are also competitive (Gasmi, Laffont, and Vuong, 1992).

The finding that deceptive advertising may have a net negative effect on consumption by women is relevant for public policy. The FTC has aggressively pursued deceptive advertising in the market for OTC weight loss products. The fact that we find no evidence that deceptive advertising convinces consumers to take these products is good news for public health. This is not to say that the FTC should cease enforcing laws against deceptive advertising - it could still be doing harm by driving out products that are marketed relatively honestly and could be leading to long-term discouragement among dieters disappointed with their results – but the harms of deceptive advertising are not as great as if it convinced previously-abstaining consumers to begin consuming these ineffective and risky products.

This paper finds evidence that exposure to advertising of OTC weight loss products may have some positive spillovers for women; specifically, it may increase the probability that they consume a prescription weight loss medication (which are reviewed by the FDA for safety and efficacy). Thus, this paper relates to a previous literature that documents other types of spillovers from advertising of pharmaceuticals. For example, direct-to-consumer advertising (DTCA) for one drug has been found to increase the sales

of the entire class of drugs (Rosenthal et al., 2003; Iizuka and Jin, 2003). DTCA also appears to have spillover benefits at the intensive margin: DTCA of one drug increases compliance among users of other drugs within the same therapeutic class (Wosinska, 2003, 2005). In addition, marketing for prescription drugs has positive spillover effects for same-brand over-the-counter (OTC) versions of the drugs, although DTCA for OTC products do not appear to spill over to same brand in the prescription drug market (Ling, Berndt, and Kyle, 2002). There is also evidence that exposure to ads for prescription weight loss drugs may increase the probability of dieting.

Our analysis has several limitations. First, our efforts to control for the targeting of ads may be incomplete. For example, there may be targeting of ads even within categories of magazines and TV shows; e.g. to women who watch one soap opera instead of another. If this is true, then our estimates suffer from omitted variables bias. In addition, there is measurement error in our estimates of exposure. For example, we are unable to determine if the ad that ran in the magazine the respondent reported reading or during the TV show the respondent reported watching was actually seen by the respondent; thus, they are most accurately described as measures of potential exposure. Thus, we overestimate actual exposure, which likely causes attenuation bias in our results, which makes the finding of an effect of ad exposure on consumption more notable. We lack data on the prices of OTC weight loss products; to some extent this is addressed using indicator variables for survey wave, but we cannot control for heterogeneity in prices at any point in time. Our data, while unusually rich, do not contain the exact brand of OTC weight loss product consumed; as a result we are not able to examine brand-competitive effects. The magazine ads we analyze include those that

ran in the 10 most popular magazines for each race-education-income-age-gender group, but there are of course other magazines that may carry ads for OTC weight loss products and these are not captured in our data indicating we may be underestimating actual level of exposure to ads. In addition, people may be exposed to ads through other media than magazines and television; however, FTC litigation has tended to target magazines as the primary venue for advertising in this market. Despite these limitations, this paper provides the most direct evidence to date on the effect of deceptive advertising on consumption of the advertised good and its substitutes.

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Table 1: Summary Statistics, National Consumer Survey, 2001-2007

	Females			Males		
Dependent Variable	**Mean**	**Standard Deviation**	**N**	**Mean**	**Standard Deviation**	**N**
Took OTC weight loss pill in past 12 months[21]	.119	.324	3,218	.084	.084	1,200
Took Rx weight loss pill in the past 12 months[22]	.048	.215	376	.042	.200	133
Currently watching diet	.453	.498	26,951	.301	.459	14,275
Participate in exercise	.591	.492	35,181	.504	.500	23,875
Ad Exposure Variables						
Total number of ads for OTC weight loss products	68.529	103.737	59,482	48.575	83.086	47,383
Total number of non-deceptive ads	50.031	74.837	59,482	36.425	60.267	47,383
Total number of deceptive statements (red flags)	18.498	34.268	59,482	12.150	26.554	47,383
Total number of deceptive ads	17.525	32.813	59,482	11.699	25.763	47,383
Total number of ads for Rx weight loss drugs	4.733	19.711	59,482	3.699	16.708	47,383
Other Explanatory Variables						
Obese	.056	.230	844	.025	.155	296
>30 pounds overweight	.155	.362	6,910	.082	.274	2,902
Age 18-24	.098	.298	5,848	.102	.302	4,818
Age 25-34	.155	.361	9,193	.153	.340	7,226
Age 35-44	.204	.403	12,111	.204	.403	9,644
Age 45-54	.204	.403	12,151	.205	.404	9,716
Age 55+	.339	.473	20,179	.337	.473	15,979

[21] Only asked of respondents who report watching their diet

[22] Only asked of respondents who report that they were obese (2001-2002) or overweight by 30 or more pounds (2003-2007) in the past twelve months.

White	.634	.482	37,729	.631	.483	29,895
Black	.067	.249	3,956	.055	.229	2,625
Hispanic	.261	.439	15,531	.271	.445	12,861
Asian	.029	.167	1,709	.030	.172	1,438
Other Race	.013	.112	752	.015	.121	699

Table 2: Number and Placement of Magazine Ads for OTC Weight Loss Products

Magazine	N	Percent
Cosmopolitan	386	36.38
Glamour	214	20.17
Woman's Day	117	11.03
Family Circle	87	8.20
People	75	7.07
TV Guide	68	6.41
Vogue	29	2.73
Better Homes and Gardens	27	2.54
McCall's	20	1.89
Sports Illustrated	16	1.51
Rolling Stone	9	0.85
Reader's Digest	3	0.28
Ebony	2	0.19
Jet	2	0.19
Newsweek	2	0.19
Playboy	2	0.19
Essence	1	0.09
Time	1	0.09
Good Housekeeping	0	0.00
Money	0	0.00
Seventeen	0	0.00
Modern Maturity	0	0.00
Black Enterprise	0	0.00
Business Week	0	0.00
National Geographic	0	0.00
Newsweek	0	0.00
U.S. News and World Report	0	0.00
Total	1,061	100.00

Note: there are 647 unique ads during this period, which ran a total of 1,061 times between 1985-2007.

Table 3: Correlates of Exposure to Ads for OTC Weight Loss Products (OLS)

	Females (N=59,482)			Males (N=47,383)		
Dependent Variable	**Coefficient**	**Standard Error**	**P-value**	**Coefficient**	**Standard Error**	**P-value**
Ln (Total number of ads for OTC weight loss products)[23]						
Individual Characteristics						
Age: 18-24	1.064	0.066	0.000	0.561	0.075	0.000
Age: 25-34	0.531	0.054	0.000	0.346	0.062	0.000
Age: 35-44	0.493	0.049	0.000	0.446	0.056	0.000
Age: 45-54	0.285	0.047	0.000	0.293	0.054	0.000
Black	0.579	0.064	0.000	0.411	0.078	0.000
Hispanic	-1.687	0.045	0.000	-1.424	0.051	0.000
Asian	-1.089	0.095	0.000	-0.917	0.104	0.000
Other Race	-0.034	0.139	0.808	-0.276	0.146	0.058
Less than HS	-0.919	0.052	0.000	-0.856	0.057	0.000
Some college	-0.089	0.043	0.038	0.084	0.051	0.098
College degree	-0.507	0.043	0.000	-0.326	0.048	0.000
Income: $32,501-$55,000	0.400	0.047	0.000	0.531	0.056	0.000
Income: $55,001-$87,500	0.638	0.049	0.000	0.786	0.057	0.000
Income: $87,501- $125,000	0.831	0.057	0.000	0.864	0.064	0.000
Income: >$125,001	0.694	0.061	0.000	0.868	0.070	0.000
Single	-0.148	0.050	0.003	-0.301	0.056	0.000
Divorced/Separated/Widowed	0.144	0.043	0.001	0.025	0.059	0.671
Family size	-0.177	0.010	0.000	-0.166	0.012	0.000
Employed	0.023	0.035	0.507	-0.315	0.047	0.000
Midwest	-0.162	0.045	0.000	-0.050	0.051	0.332
South	-0.253	0.042	0.000	-0.153	0.048	0.002
West	-0.343	0.046	0.000	-0.318	0.052	0.000
Overweight/Obese	0.471	0.047	0.000	0.540	0.071	0.000
Number of magazine issues read	0.102	0.003	0.000	0.109	0.003	0.000
Hours spent watching television	0.051	0.001	0.000	0.066	0.001	0.000
Survey wave fixed effects	Yes			Yes		

[23] For this model, we assume ad exposure of .001 ads for those who had a true exposure of 0 in order to take the ln.

Table 4a: Number and Type of Deceptive Advertisements in Magazines

Deceptive Statement	Claim	% Unique Ads	% Appear-ances
Red Flag 1	Product will cause weight loss of more than 2 pounds per week for more than 1 month without diet exercise	11.13	9.71
Red Flag 2	Product will cause substantial weight loss no matter what or how much consumer eats	7.11	8.11
Red Flag 3	Product will cause permanent weight loss, even when the consumer stops using the products	16.69	13.48
Red Flag 4	Product blocks absorption of fat or calories to enable users to lose substantial weight	5.87	6.69
Red Flag 5	Product safely enables consumers to lose greater than three pounds per week for more than four weeks	19.16	18.19
Red Flag 6	Product will cause substantial weight loss for all users	15.77	13.01
Red Flag 7	Product will cause substantial weight loss by wearing it on the body or rubbing it onto the skin	3.09	2.17
One or more	Ads at least one of the preceding claims	46.52	39.68

Notes: there are 647 unique magazine advertisements that appeared a total of 1,061 times between 1985 and 2007.

Table 4b: Number and Type of Deceptive Advertisements on Television

Deceptive Statement	Claim	% Unique Ads	% Appear-ances
Red Flag 1	Product will cause weight loss of more than 2 pounds per week for more than 1 month without diet exercise	1.81	.30
Red Flag 2	Product will cause substantial weight loss no matter what or how much consumer eats	2.10	.0006
Red Flag 3	Product will cause permanent weight loss, even when the consumer stops using the products	5.42	5.48
Red Flag 4	Product blocks absorption of fat or calories to enable users to lose substantial weight	1.59	.0006
Red Flag 5	Product safely enables consumers to lose greater than three pounds per week for more than four weeks	10.05	9.65
Red Flag 6	Product will cause substantial weight loss for all users	.94	1.38
Red Flag 7	Product will cause substantial weight loss by wearing it on the body or rubbing it onto the skin	.29	.0001
One or more	Ads at least one of the preceding claims	17.86	16.09

Notes: there were a total of 1,383 TV advertisements that appeared a total of 1,064,245 times between 2000 and 2007.

Table 5A: Number and Placement of Deceptive Magazine Advertisements for OTC Weight Loss Products (1985-2007)

Magazine	# Ads With At Least One Deceptive Statement	As % of All Ads With Deceptive Statements	# of Deceptive Statement	As % of all Deceptive Statements
Cosmopolitan	207	49.17	459	60.63
Glamour	92	21.85	110	14.53
Woman's Day	41	9.74	81	10.70
TV Guide	26	6.18	35	4.62
Family Circle	18	4.28	33	4.36
Sports Illustrated	11	2.61	11	1.45
People	10	2.38	11	1.45
Vogue	8	1.90	8	1.06
Better Homes and Gardens	5	1.19	5	0.66
Playboy	1	0.24	2	0.26
Reader's Digest	1	0.24	1	0.13
Rolling Stone	1	0.24	1	0.13
Total	421	100	757	100

Note: A total of 647 unique magazine advertisements ran a total of 1,061 times during this period (1985-2007).

Table 5B: Number and Placement of Deceptive TV Advertisements for OTC Weight Loss Products (2000-2007)

Television Category	# Ads	% of All ads	# Ads With At Least One Deceptive Statement	As % of All Ads With Deceptive Statements	# of Deceptive Statement	As % of all Deceptive Statements
Morning news program	104,195	9.79	29,741	17.37	30789	17.09
Evening/late night news program	3,228	0.30	633	0.37	654	.36
Daytime soap opera	41,312	3.88	7,668	4.48	7859	4.36
Quiz/competitive show	54,966	5.16	11,489	6.71	11909	6.61
Late night talk show	20,157	1.89	3,569	2.08	3845	2.13
Day time talk show	141,094	13.26	23,342	13.63	25087	13.92
Sitcom	99,045	9.31	22,981	13.42	24469	13.58
Drama	43,072	4.05	7,662	4.48	8235	4.57
Court program	104,774	9.84	7,983	4.66	8914	4.95
Magazine program	8,309	0.78	1,741	1.02	1777	.99
Celebrity news program	40,150	3.77	6,197	3.62	6407	3.56
Movies	46,662	4.38	6,350	3.71	6759	3.75
Reality shows	109,170	10.26	15,993	9.34	16691	9.26
Political analysis	986	0.09	134	0.08	137	.08
Cartoons	587	0.06	107	0.06	107	.06
Science fiction	15,101	1.42	3,797	2.22	3911	2.17
History/biography	1,749	0.16	282	0.16	282	.16
Awards shows	316	0.03	38	0.02	39	.02
Health & fitness	2,062	0.19	204	0.12	206	.11
Nature/Wildlife	4,157	0.39	211	0.12	241	.13
Cooking/home	8,657	0.81	1,143	0.67	1236	.69
Medical	5,191	0.49	2,083	1.22	2094	1.16
Variety/music	18,440	1.73	2,496	1.46	2575	1.43
Sports	18,333	1.72	899	0.53	946	.53
“Other”	172,532	16.21	14,462	8.45	15007	8.33
TOTAL	1,064,245	100.00	171,205	100.00	180,176	100.00

Note: a total of 1,383 unique TV ads ran a total of 1,064,245 times over this period (2000-2007).

Table 6: Correlates of Exposure to Deceptive Statements Regarding OTC Weight Loss Products (OLS)

	Females (N=59,482)			Males (N=47,383)		
Dependent Variable	**Coefficient**	**Standard Error**	**P-value**	**Coefficient**	**Standard Error**	**P-value**
Ln (Total number of deceptive statements for OTC weight loss products)[24]						
Individual Characteristics						
Age: 18-24	0.869	0.064	0.000	0.337	0.073	0.000
Age: 25-34	0.376	0.053	0.000	0.174	0.061	0.004
Age: 35-44	0.365	0.048	0.000	0.217	0.055	0.000
Age: 45-54	0.211	0.046	0.000	0.217	0.052	0.000
Black	0.762	0.063	0.000	0.549	0.076	0.000
Hispanic	-1.249	0.044	0.000	-0.973	0.050	0.000
Asian	-0.808	0.093	0.000	-0.549	0.102	0.000
Other Race	0.071	0.137	0.603	-0.237	0.142	0.094
Less than HS	-0.735	0.051	0.000	-0.617	0.055	0.000
Some college	-0.135	0.042	0.001	0.029	0.049	0.549
College degree	-0.590	0.042	0.000	-0.358	0.047	0.000
Income: $32,501-$55,000	0.306	0.046	0.000	0.236	0.054	0.000
Income: $55,001-$87,500	0.425	0.048	0.000	0.412	0.055	0.000
Income: $87,501- $125,000	0.585	0.056	0.000	0.387	0.062	0.000
Income: >$125,001	0.425	0.060	0.000	0.360	0.068	0.000
Single	-0.248	0.049	0.000	-0.275	0.054	0.000
Divorced/Separated/Widowed	0.085	0.042	0.044	-0.037	0.057	0.517
Family size	-0.143	0.010	0.000	-0.132	0.011	0.000
Employed	-0.081	0.034	0.018	-0.354	0.046	0.000
Midwest	-0.143	0.044	0.001	-0.069	0.050	0.166
South	-0.600	0.042	0.000	-0.581	0.047	0.000
West	-0.354	0.045	0.000	-0.335	0.050	0.000
Overweight/Obese	0.401	0.046	0.000	0.422	0.069	0.000
Number of magazine issues read	0.093	0.003	0.000	0.101	0.003	0.000
Hours spent watching television	0.050	0.001	0.000	0.062	0.001	0.000
Survey wave fixed effects	Yes			Yes		

[24] For this model, we assume ad exposure of .001 ads for those who had a true exposure of 0 in order to take the ln.

Table 7: Consumption of OTC Weight Loss Products as a Function of Exposure to Ads and Deceptive Statements, Women

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=26,951	N=26,951	N=8,128
OTC Ads/ 100	ME= .0171 p=.001	ME=.0113 p=.005	ME=.0179 p=.009
OTC Deceptive Statements / 100	ME=-.0326 p=.008	ME=-.0238 p=.051	ME=-.0372 p=.086
Rx Ads / 100	ME=.0131 p=.222	ME=.0099 p=.361	ME=-.0091 p=.619
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 8: Consumption of OTC Weight Loss Products as a Function of Exposure to Ads and Deceptive Statements, Men

	Men	**Men**
	N=14,275	N=14,275
OTC Ads/ 100	ME=.0091 p=.085	ME=.0026 p=.633
OTC Deceptive Statements / 100	ME=-.0190 p=.241	ME=-.0123 p=.453
Rx Ads / 100	ME=.0072 p=.685	ME=.0037 p=.837
Demographic variables	Yes	Yes
Socioeconomic variables	Yes	Yes
Overweight / obesity variables	Yes	Yes
Magazine, TV intensity variable	Yes	Yes
Magazine, TV category variables		Yes

Table 9: Consumption of OTC Weight Loss Products as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, Women

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=26,951	N=26,951	N=8,128
OTC Nondeceptive Ads/ 100	ME=.0173 p=.001	ME=.0116 p=.004	ME=.0168 p=.015
OTC Deceptive Ads / 100	ME=-.0148 p=.084	ME=-.0124 p=.150	ME=-.0153 p=.314
Rx Ads / 100	ME=.0140 p=.187	ME=.0106 p=.327	ME=.0110 p=.545
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 10: Consumption of OTC Weight Loss Products as a Function of Exposure to Ads and the Percent of Those Ads that Contain Deceptive Statements, Women

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=26,951	N=26,951	N=8,128
OTC Ads/ 100	ME= .0075 p=.001	ME=.0043 p=.045	ME=.0073 p=.032
Percent of Ads That Were Deceptive	ME=-.0510 p=.001	ME=-.0493 p=.001	ME=-.0566 p=.083
Rx Ads / 100	ME=.0148 p=.174	ME=.0105 p=.342	ME=.0121 p=.518
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 11: Consumption of OTC Weight Loss Products as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, Women with High School Diploma or Less Education

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=10,150	N=10,150	N=2,785
Non Deceptive Ads / 100	ME= .0152 p=.018	ME=.0065 p=.328	ME=.0140 p=.216
Deceptive Ads / 100	ME=-.0027 p=.105	ME=-.0136 p=.336	ME=-.0229 p=.349
Rx Ads / 100	ME=.0269 p=.102	ME=.0252 p=.135	ME=.0100 p=.735
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 12: Consumption of OTC Weight Loss Products as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, Women with Some College or More Education

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=15,741	N=15,741	N=5,080
Non Deceptive Ads / 100	ME= .0206 p=.001	ME=.0164 p=.002	ME=.0204 p=.025
Deceptive Ads / 100	ME=-.0019 p=.291	ME=-.0138 p=.223	ME=-.0130 p=.517
Rx Ads / 100	ME=.0023 p=.873	ME=-.0037 p=.798	ME=.0019 p=.609
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 13: Consumption of OTC Weight Loss Products as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, White Females

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=18,143	N=18,143	N=5,279
Non Deceptive Ads / 100	ME= .0195 p= .001	ME=.0131 p=.004	ME=.0178 p=.039
Deceptive Ads / 100	ME= -.0214 p=.032	ME=-.0200 p=.047	ME=-.0160 p=.403
Rx Ads / 100	ME= .0189 p=.091	ME=.0145 p=.200	ME=.0262 p=.202
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 14: Consumption of OTC Weight Loss Products as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, African-American Females

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=1,576	N=1,576	N=582
Non Deceptive Ads / 100	ME= .0085 p=.314	ME=.0047 p=.585	ME=.0144 p=.246
Deceptive Ads / 100	ME=.0037 p=.840	ME=.0078 p=.669	ME=-.0127 p=.648
Rx Ads / 100	ME=-.0155 p=.600	ME=-.0177 p=.560	ME=-.0454 p=.327
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 15: Consumption of Rx Weight Loss Drugs as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, Women[25]

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=7,754	N=7,754	N=2,261
Non Deceptive Ads / 100	ME=.0069 p=.072	ME=.0063 p=.103	ME=.0116 p=.070
Deceptive Ads / 100	ME=-.0048 p=.570	ME=-.0073 p=.392	ME=-.0148 p=.339
Rx Ads / 100	ME=-.0051 p=.704	ME=-.0079 p=.563	ME=-.0035 p=.892
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

[25] Sample restricted to those who report that in the past 12 months they were obese or 30 or more pounds overweight.

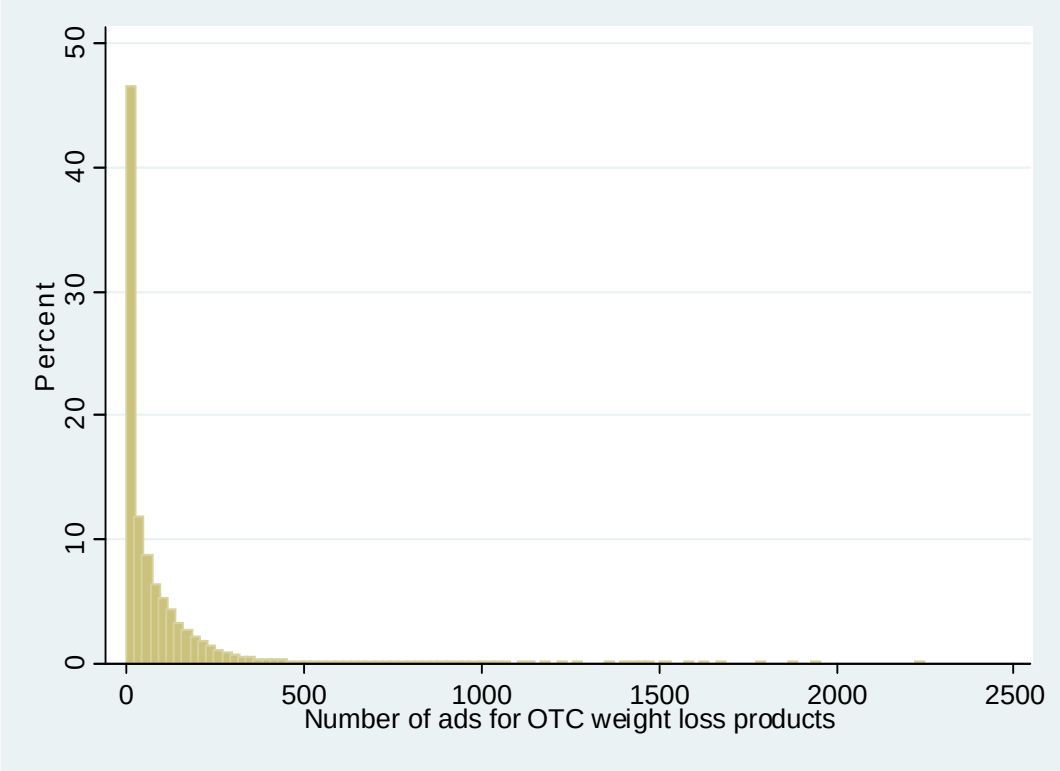
Table 16: Dieting as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, Women

	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=59,482	N=59,482	N=19,013
Non Deceptive Ads / 100	ME= .0110 p=.036	ME=.0003 p=.962	ME=.0040 p=.578
Deceptive Ads / 100	ME=.0070 p=.529	ME=-.0057 p=.613	ME=.0110 p=.468
Rx Ads / 100	ME=.0472 p=.001	ME=.0394 p=.004	ME=.0428 p=.024
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Table 17: Exercising as a Function of Exposure to Non-Deceptive Ads and Deceptive Ads, Women

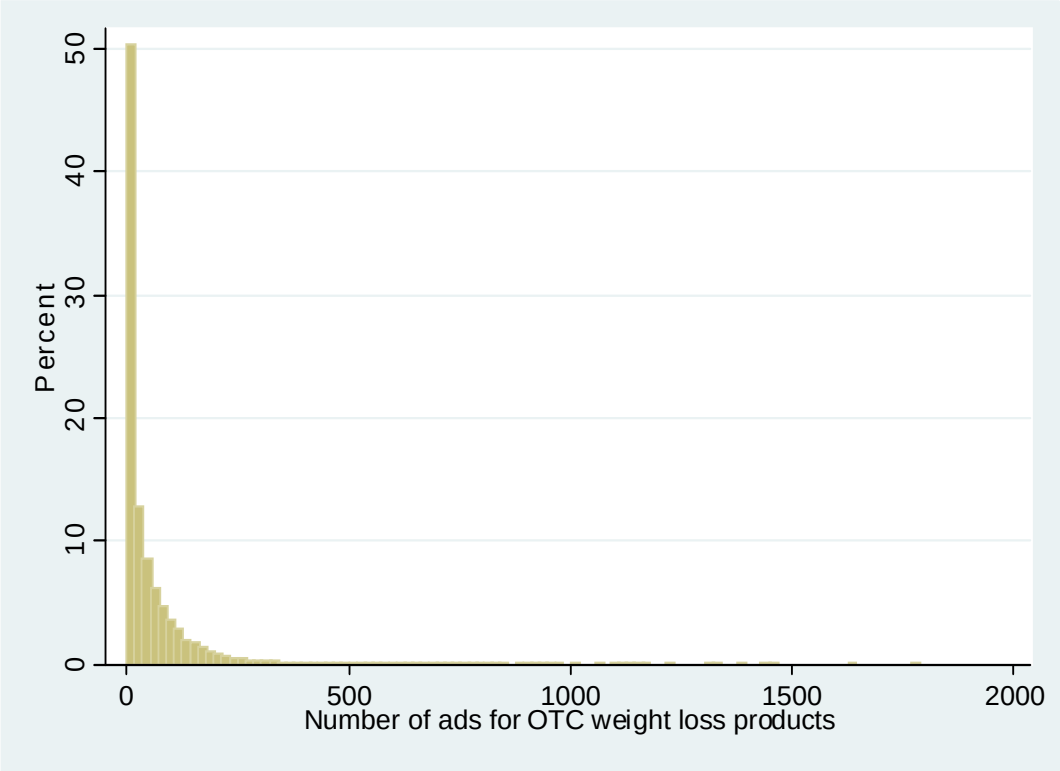
	Women	**Women**	**Women Cosmo-Glamour-Soap Operas**
	N=59,482	N=59,482	N=19,013
Non Deceptive Ads / 100	ME= .0046 p=.461	ME=-.0065 p=.206	ME=-.0015 p=.813
Deceptive Ads / 100	ME=.0201 p=.056	ME=.0115 p=.285	ME=.0081 p=.551
Rx Ads / 100	ME=-.0025 p=.080	ME=-.0276 p=.036	ME=.0158 p=.347
Demographic variables	Yes	Yes	Yes
Socioeconomic variables	Yes	Yes	Yes
Overweight / obesity variables	Yes	Yes	Yes
Magazine, TV intensity variable	Yes	Yes	Yes
Magazine, TV category variables		Yes	

Figure 1: Distribution of exposure to ads for OTC weight loss products, women



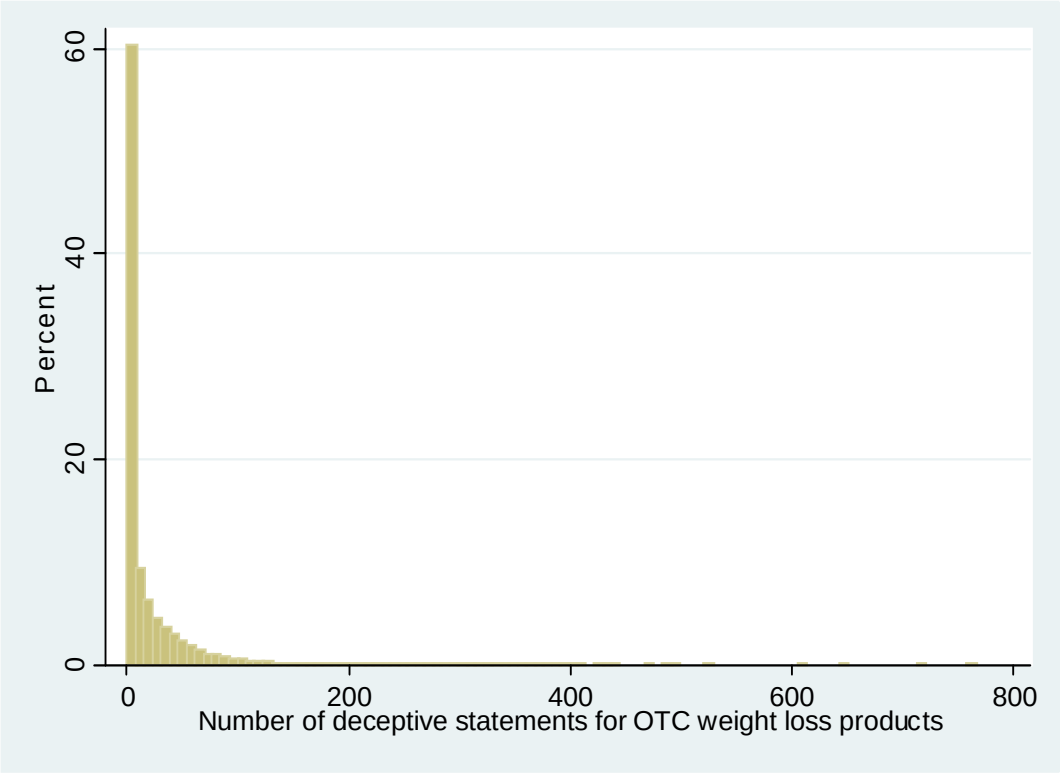
Notes: includes both magazine and television ads.

Figure 2: Distribution of exposure to ads for OTC weight loss products, men



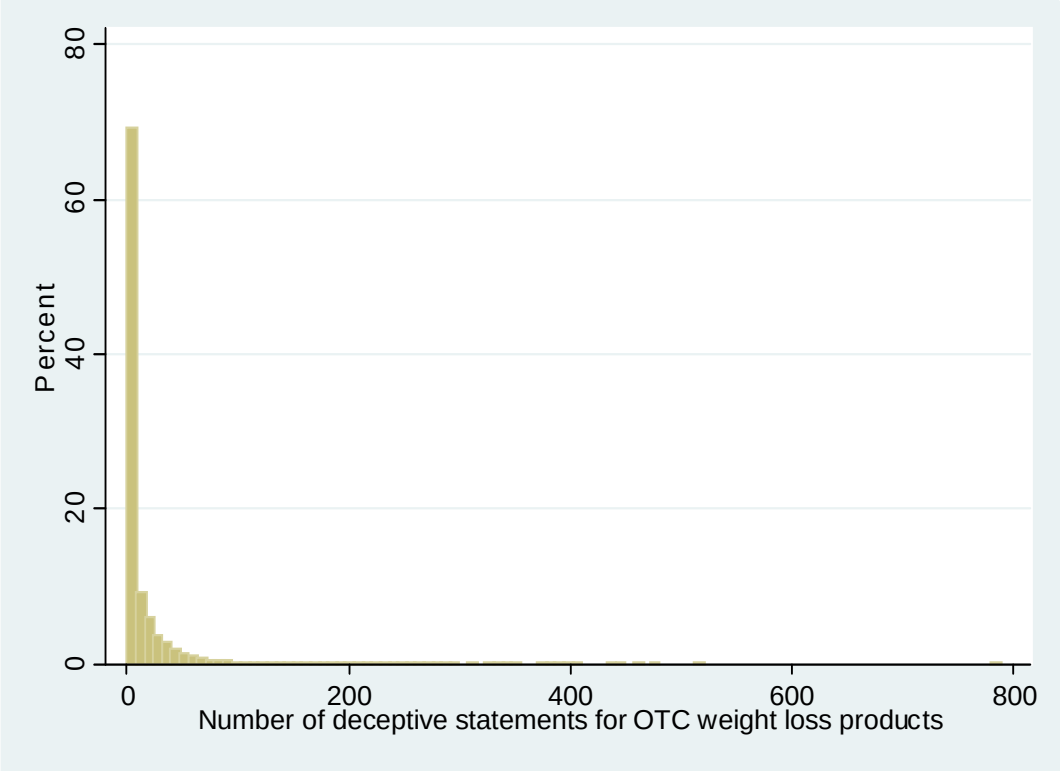
Notes: includes both magazine and television ads.

Figure 3: Distribution of exposure to deceptive statements in ads for OTC weight loss products, women



Notes: includes both magazine and television ads.

Figure 4: Distribution of exposure to deceptive statements in ads for OTC weight loss products, men



Notes: includes both magazine and television ads.

Appendix to:
The Effect of Deceptive Advertising on Consumption:
the Case of Over-the-Counter Weight Loss Products

John Cawley
Cornell University

Rosemary Avery
Cornell University

Matthew Eisenberg
Carnegie Mellon University

Figure 1:
Example of Red Flag #1: "Cause weight loss of two pounds or more a week for a month or more without dieting or exercise."

Note: Published in Women's Day, November 1998

Figure 2:
Example of Red Flag #2: "Cause substantial weight loss no matter what or how much the consumer eats."

DOCTOR DISCOVERS A PERMANENT CURE FOR OVER WEIGHT PROBLEMS

" I LOST 6 1/2" AROUND MY WAIST DURING THE FIRST WEEK AND 8 1/2" BY THE END OF THE SECOND WEEK ! "
" I LOST 28 POUNDS DURING THE FIRST WEEK AND A TOTAL OF 37 BY THE END OF THE SECOND WEEK ! "

I GUARANTEE ! YOU CAN LOSE 70 POUNDS IN 40 DAYS OR YOUR MONEY BACK !!

NO DOCTOR'S PRESCRIPTION NO STARVATION DIETS NO CALORIE COUNTING

NOW YOU CAN EAT ALL YOU WANT WHILE EXTRA WEIGHT DISAPPEARS

" I can hardly believe it myself, but it's true - and now I feel that I want everyone to know my story of how I lost 70 pounds of ugly fat in just 40 days... and to help me lose all this weight I ate all I wanted of fatty meats, bacon, roast chicken, shrimp, roast beef and pork. I used unlimited amounts of cheese, butter, all the oil I wanted in salad dressings and plenty of heavy cream in my coffee. In fact, I ate all I wanted of every high-calorie food that I like. But what amazed me the most was that while I stuffed myself eating as much as I wanted, the fat still kept disappearing from my body. My weight and inches melted away day by day ! And here's the most happy part of it all: After I decided how great I looked and felt at 70 pounds lighter, I stopped the weight loss and have never gained back even one unwanted pound. "

I'LL NEVER BE FAT AGAIN

" I used to look at least ten years older, unattractive, but worst of all, any day I expected a heart attack, stroke or diabetes, and decided that this was too serious a problem to expect my family to have to live with. The expense and care would have wiped us all out financially, even if I didn't die from all these diseases. "

DISCOVERED BY DOCTOR TO HELP OVERWEIGHT PATIENTS WITHOUT A PRESCRIPTION

" The program I used was discovered by a heart specialist who for years had been searching for an easy, safe and permanent scientific program to get the weight of his patients down to normal, and even more important - to keep it down. "

" You will be amazed at this world famous medical doctor's program that melts away 30, 60 or even 100 pounds faster and more safely than anything you've ever tried. Imagine a weight reduction program that requires no doctor's prescription and lets you eat high calorie foods to your heart's content. This is something completely new and extraordinary ! "

LOSE WEIGHT IN TOTAL SAFETY AND SECURITY

" BIO-MINCE is composed completely of all natural ingredients. More than just able to melt away fat, it permits you to eat all you would like because it prevents the fat consumed at the meal from taking hold, so your weight loss becomes natural and evenly spread throughout the body. Plus BIO- MINCE has absolutely no side effects and can even be taken while on medication. "

NO SELF CONTROL NEEDED AS 20 - 30 - 60 - 100 UNWANTED POUNDS & INCHES MELT AWAY

" The program I used has been completely successful on thousands of people just like you and me and I now offer it to the general public by the name of BIO-MINCE. Yes, now there are thousands of healthy, slim, attractive men and women who owe it all to BIO-MINCE. "

FASTEST & MOST PERMANENT WEIGHT-LOSS PROGRAM KNOWN

" Simply take one BIO-MINCE tablet each day at breakfast and watch your extra pounds and inches disappear as you follow the BIO-MINCE plan. Yes, BIO-MINCE is without a doubt the most permanent way to lose weight and keep it off. Previously, I must have tried just about everything I read about or heard about, but this program is based on medical research conducted here and abroad on thousands of overweight people, and due to it's safety and fast action is now available to the general public in this country without a doctor's prescription. "

ABSOLUTELY GUARANTEED AMAZING RESULTS IN 7 DAYS OR A FULL REFUND

" Yes, see for yourself how fast BIO-MINCE will work for you. I'm so certain you'll be delighted. "

YOU'LL NEVER BE FAT AGAIN

" BIO-MINCE is here to help you lose weight ! And keep it off ! "

CUSTOMER'S GUARANTEE

You can eat up to six meals a day. You can lose as much weight as you wish. You will lose weight faster than ever before. You will look better than you ever dreamed possible.
IF ALL THE ABOVE ARE NOT TRUE RETURN UNUSED PORTION WITHIN 30 DAYS FOR A FULL REFUND. GUARANTEED BY BIO-MINCE.

SHIPPED DISCREETLY

❒ Please rush me my order of BIO-MINCE as soon as possible. I understand that if I am not completely satisfied within 30 days I can return the product for a full refund.

❒ 30 day plan - $29.95 + $5.00 shipping & handling = $ 34.95
❒ 60 day plan - $49.95 + $5.00 shipping & handling = $ 54.95
❒ 90 day plan - $69.95 + $5.00 shipping & handling = $ 74.95
❒ 120 day plan - $79.95 + $5.00 shipping & handling = $ 84.95

❒ Check ❒ Money order payable to : BIO-MINCE
348 RT. 11 Champlain New York 12919-4816

Name : _____

Address : _____ City : _____

State : _____ Zip code : _____

Notes: Published in Women's Day, December 1998

Figure 3:
Example of Red Flag #3: "Cause permanent weight loss (even when the consumer stops using product)"

Advertisement

LOSE UP TO 2 POUNDS DAILY... WITHOUT DIET OR EXERCISE

"I LOST 44 POUNDS IN 30 DAYS"

"HERE'S THE STORY OF MY LAST DIET"

"I have always been unhappy with my figure, I've been yo-yo dieting since I was just 18 years old, now I'm 33 and a mother of two. For 15 years, my weight has fluctuated between 120 and 160 pounds, I'd always manage to lose weight for a special occasion, but afterwards, the pounds would pile on faster than it took to lose them. Then, in June of 1998, a movie star revealed on a T.V. show her weight loss secret. Later I found a Quick Slim ad in a magazine and ordered the product. I didn't know that would be my last diet! After 6 days, I lost 12 pounds, felt and looked great, I never had to go on a diet, I just found that I was eating less because I felt full after a few bites. During the next 24 days, I lost an additional 32 pounds. Since that day in July 98, I'm still at 118 pounds. The Quick Slim Fat Blocker worked wonders for me, I'm sure anyone can have the same success." *Janet G., May 1999*

NEW Quick Slim EXTRA STRENGTH WITH BIOLOGICALLY-ACTIVE APPLE CIDER VINEGAR

BEFORE

For 15 years, Janet G. yo-yo dieted without success, fed up and desperate, she discovered a new miracle product to lose weight easily and permanently.

AFTER

MELT BODY FAT AND TRIM INCHES IN JUST 48 HOURS

"I LOST 4 INCHES FROM MY OVERALL MEASUREMENTS IN 28 DAYS" -CAROLINE

A WINNING COMBINATION WITH APPLE PECTIN TO LOSE WEIGHT FOREVER

The Quick Slim Fat Blocker is a new combination of herbs and plant-based ingredients, that we're all familiar with: Sea Kelp, Lecithin, Bromelain, Oyster Shell and Apple Cider Vinegar combined with the Apple Pectin. These proven effective ingredients are combined for the first time into one caplet.

EMAIL ORDERS: www.quickslimdiets.com
QUICK SLIM IS A CERTIFIED INTERNET SECURE MERCHANT

THE EFFECTS OF THE APPLE PECTIN FAT BLOCKER ARE POWERFUL

1. Apple Pectin is an energized enzyme that can ingest up to 900 times it's own weight in fat. That's why it's a fantastic FAT BLOCKER.
2. Apple Pectin attacks fat 24 hours a day, everyday. It's devoured and expelled through your system day after day to eliminate unsightly bulges.
3. The Quick Slim Fat Blocker is 100% natural. Forget about prescriptions. In no way can Apple Pectin harm your health, there's absolutely no side effects.
4. The Quick Slim Fat Blocker eliminates fat for effortless weight loss. Same results as: • Jogging 10 miles per week, • An hour of aerobics per day, • 15 hours of swimming or cycling per week.

"I LOST 30 POUNDS IN 25 DAYS FOR MY WEDDING" -Sofia M.

Yes, I want to lose weight and it's guaranteed

Make your check or money order out to:
Bio Lab
334, Cornelia Street
PMB #289
Plattsburgh
New York, 12901

ORDER 24 hours a day
1-888-900-DIET (3438)
VISA, MASTER CARD AND AMERICAN EXPRESS ACCEPTED

☑ I understand that if I don't lose weight during my treatment, I may return the empty bottle for a refund*, valid for a full month.

❑ Visa ❑ Check ❑ Money Order
❑ Master Card Exp. date: _____
❑ American Express Signature: _____
Acc. #: _____

Special discount coupon: order Quick Slim today and receive a free gift.

	TREATMENT	LENGTH	PRICE	TOTAL
TRIAL SIZE	90 caplets	30 days	$39.95	
SAVE $9.95	180 caplets	60 days	$69.95	
SAVE $29.90	270 caplets	90 days	$89.95	
SAVE $49.85	360 caplets	120 days	$109.95	
	Add $5 shipping & handling			$ 5.00
	Add $15 for express delivery service			$ 15.00
	C-113		TOTAL COST	

You will be another satisfied customer of Bio Lab laboratory
* Less shipping & handling

Name: _____
Address: _____
City: _____
State: _____ Zip Code: _____
Phone #: (____) _____ Email: _____

Note: Published in Cosmopolitan, June 2002

Figure 4:
Example of Red Flag #4: "Block the absorption of fat or calories to enable consumers to lose substantial weight."

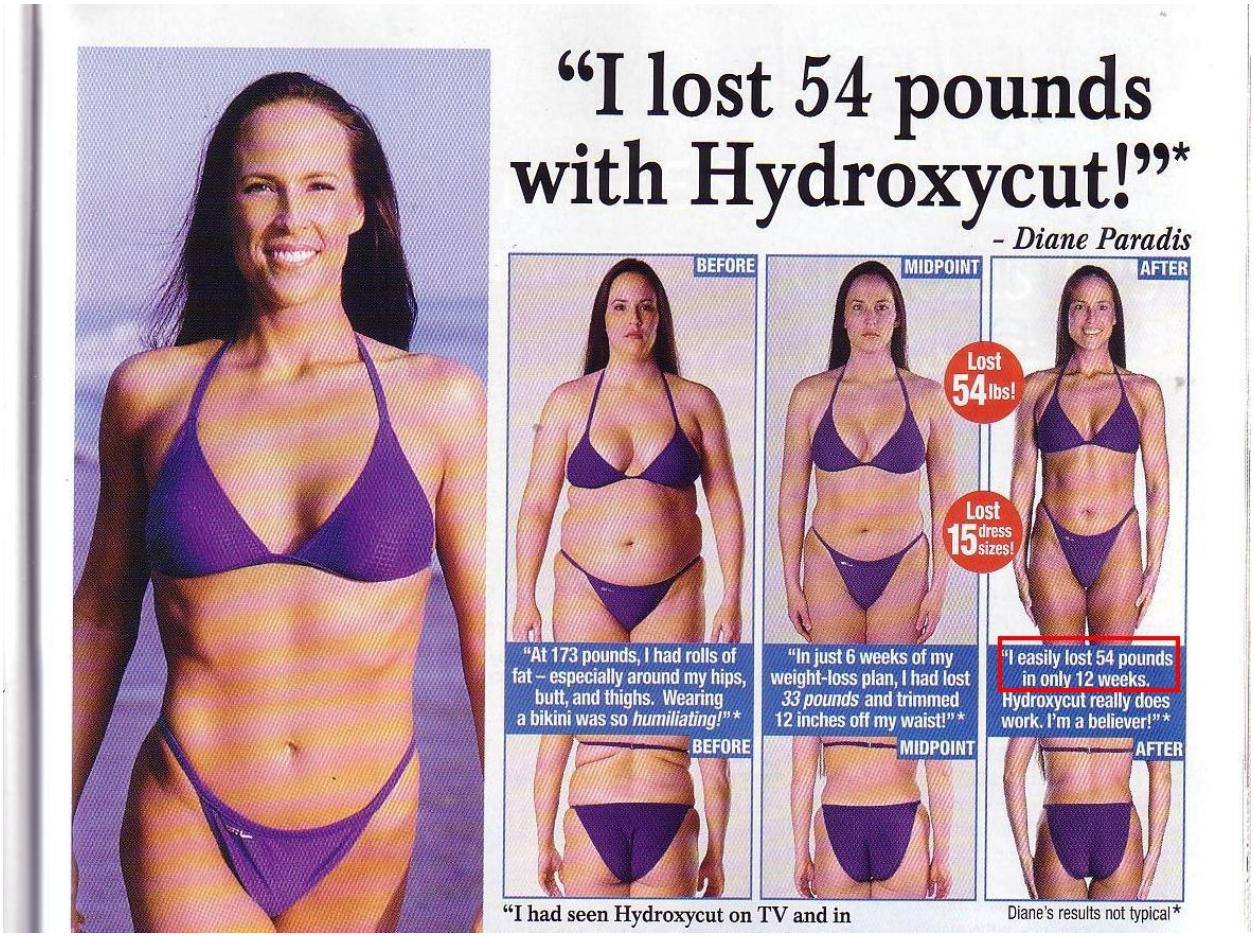
Fat-Fighter the fat absorber!

Approximately 31% - or 59 million adults - are clinically obese, and almost 65% are either obese or overweight, according to the National Health and Nutrition Examination Survey. Yet, despite exercising faithfully, many people discover they aren't experiencing the weight loss they were expecting. One convenient option is Fat-Fighter, an all-natural formula that decreases the amount of fat absorbed by the body by attaching to fatty acids and expelling them through the digestive system. Fat-Fighter holds up to six times its weight in fat for safe and effective elimination and can complement a moderate, consistent exercise program and a sensible diet. Fat-Fighter is not intended for anyone with allergies to seafood or iodine.

For more info about Fat-Fighter
call: 1.800.304.7118 or visit: www.Fat-Fighter.com

Note: Published in Cosmopolitan, July 2003

Figure 5:
Example of Red Flag #5: "Safely enable consumers to lose more than three pounds per week for more than four weeks."



Notes:
1) Published in Vogue, September 2002.
2) NLHBI (2000) Clinical Guidelines recommend weight loss of 1-2 pounds per week.

Figure 6:
Example of Red Flag #6: "Cause substantial weight loss for all users."

New Generation Weight Loss Compound

Fat Cure Revealed

NOW AVAILABLE IN THE USA!

European "Miracle Pill" Ends Dieting... Automatically Restricts Caloric Intake

"I took two Zotrin™ right before dinner. After a couple of bites, I literally couldn't eat any more! I wasn't stuffed or anything, in fact I felt great... I just didn't want any food."

Never "Diet" Again!

- No More Fat!
- No More Flab!
- No More Cellulite!
- No More Failure!

Ever wish there was a "Magic Pill" that could make you stop eating? A tiny, little, easy-to-swallow capsule that would melt off excess pounds of fat, flab and cellulite without "dieting," calorie-counting, or engaging in anything more than modest exercise? What if that tiny capsule not only reduced your daily caloric intake AUTOMATICALLY but also increased energy levels and put you in a great mood? Would you be interested? Well, the "magic pill" is called Zotrin,™ and a new study published in the *Journal of Human Nutrition and Dietetics* says your wish is about to come true.

A major medical breakthrough has shattered the weight-loss barrier and a new generation of non "diet," fast-acting weight-loss compounds has been born – an entirely new generation of powerful, foolproof, bio-active weight-loss compounds that has literally eliminated calorie counting, eliminated strenuous exercise, eliminated fad diets, supermarket "miracle" pills, so-called Japanese "fat-blockers," electric belts, or anything else you have ever tried before.

But most importantly, this new generation of potent compounds has eliminated any possibility of failure and replaced it with guaranteed success. You will not fail this time. In fact, you cannot fail this time because you don't have to do anything more than remember to take your easy-to-swallow Zotrin™ capsules each and every day.

That's it! There is nothing else to do and nothing else to buy. Zotrin™ will do everything for you – automatically. And that's guaranteed.

How Zotrin™ Works

Literally thousands of women who have already used Zotrin™ (Zotril™) report virtually identical results: When you take Zotrin™ you forget about food... you don't want to eat. You have plenty of energy, and you feel great. Zotrin's™ precise mechanism of action is still a mystery. However, all the obesity experts are unequivocal on three main points: First, Zotrin™ delays gastric emptying; Second, Zotrin™ reduces the time to perceived fullness; Finally, **taking Zotrin™ results in significant weight loss.**

That's right, there is no way to deny these simple facts: Zotrin™ makes up for years of overeating, years without exercise, years of being unable to push away that extra dessert or midnight snack, and years of embarrassment and lack of self-confidence. It's no wonder there's been so much excitement surrounding the introduction of Zotrin™ into the U.S. market. As thousands of women just like you have already discovered, there is no easier, more effective weight-loss compound available today. Finally, **automatic** weight-loss. **Guaranteed!**

An Authorized Zotril™ Compound

$89
120 capsules
[Approximately 30-day supply]

Order Now!
Call 24 Hours/Toll-Free:
1-800-218-6741
ext. Z119
or visit www.Zotrin.com

Money-Back Guarantee!

Zotrin™ is covered by our no-nonsense, money-back guarantee. Our guarantee contains no fine print or misleading terms. Simply stated, if you use Zotrin™ and do not see substantial, effortless weight loss, just return the empty container within 30 days for a full, prompt refund. Again, let us restate, if for any reason you are not totally satisfied with Zotrin,™ it will cost you absolutely nothing!

Published Clinical Studies Prove 100% Success!

* Zotrin™ is an authorized ZOTRIL™ formulation – ZOTRIL™ is the U.S. trademark for the proprietary, active compounds used in the clinical trial.

In a six-week, double-blind clinical trial, 46 overweight men and women were divided into two groups. Group A received the active Zotrin™ compound (Zotril™). Group B received a placebo (an inert sugar pill). Both groups were instructed to take their assigned capsules with a glass of water 15 minutes before the main meals of the day and not to change their normal eating habits or exercise routine. At the conclusion of the six-week study the data was independently verified and reviewed.

The results were astounding! Group A (the Zotrin™ group) experienced a significant decrease in overall body weight – an incredible 1603% more weight loss (over 16 TIMES more) than those who took a placebo – without following a complicated diet program or following a prescribed exercise regimen. Every single person who took the active Zotrin™ compound lost a significant amount of weight.

But there's more! The weight loss was permanent. Not one of the subjects who continued taking the Zotrin™ compound for a period of one full year experienced rebound weight gain. Not one! In other words, Zotrin™ caused easy, automatic weight loss without calorie-counting, and without diet rebound. The full report of this clinical study has been peer-reviewed and published in the *Journal of Human Nutrition and Dietetics*.

TEAR OUT & SAVE

Note: Published in Women's Day, June 2002

Figure 7:
Example of Red Flag #7: "Cause substantial weight loss by wearing it on the body or rubbing it onto the skin."

Note: Published in Cosmopolitan, October 2002

Figure 8:
Example of Ad with no Deceptive "Red Flag" Statements