Government Efforts to Aid Consumer Well-being: Understanding Federal Health Warnings and Disclosures

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Many products marketed in the United States and around the world can cause harm to consumers if misused. Of even greater concern, some products, such as combustible tobacco, can be inherently harmful to consumers even when used as intended (CDC, 2014a). Since the emergence of the modern-day Federal Trade Commission (FTC) and Food and Drug Administration (FDA) in the 1930s, the U.S. government has enacted legislation and regulations that help to protect consumers through information disclosures and/or warnings to identify potential risks. Laws and regulations involving consumer protection are directly related to the provision of objective and truthful information to consumers and how they, in turn, utilize this information. These laws are designed to prevent organizations from engaging in deceptive or unfair business practices and to help protect the rights of consumers. For example, in the United States, agencies such as the FDA, FTC, Consumer Product Safety Commission (CPSC), Federal Communications Commission (FCC), and others establish and enforce regulations that help to protect consumers. As part of this regulation, agencies often require marketers to provide disclosures or warnings on packaging or at the point of purchase, particularly for products in which safety or public health is an issue, such as for food, tobacco, and prescription drugs.

Federal agencies make decisions regarding whether or not a warning or disclosure is appropriate and how such information should be presented to consumers. To make these decisions, agencies require a clear understanding of how consumers acquire, process, and use warning and/or disclosure information. Furthermore, federal agencies take into account consumers’ initial beliefs and knowledge regarding the product, potential individual differences among consumers, economic costs and benefits, and situational moderators.

At any point in time, agencies may be deluged with hundreds of current or emerging questions that present opportunities for consumer research. However, due to time and resource constraints, existing regulations and court decisions, and filing requirements for new regulations (e.g., Office of Management and Budget; Federal Register posting), the federal agencies are only able to address a small fraction of these questions and issues that often have important implications for consumer health and well-being. This situation therefore
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creates both an important need and rich opportunity for consumer researchers. In this chapter, we first introduce conceptual frameworks for the study of warnings and disclosures. We also review recent research on critical topical domains. We also highlight areas that offer substantial opportunity and need for additional study.

Several well-established information processing models can serve as useful guides for government agencies making decisions about the design of warnings and disclosures and the evaluation of intended and unintended outcomes for consumers and marketers. For instance, the Transtheoretical Model (i.e., "Stages of Change") (cf. Prochaska & DiClemente, 1983) measures one's progression through precontemplation, contemplation, preparation, action, maintenance, and possible relapse stages as a result of interventions to reduce product addictions (e.g., to nicotine, alcohol, prescription drugs, and other drugs). Similarly, Protection Motivation Theory (cf. Rogers, 1975) posits that we respond to interventions to change our behavior based on the perceived severity of a threatening event, the perceived probability of the occurrence (vulnerability), the efficacy of the recommended preventive behavior to reduce our risk, and our perceived ability to undertake the recommended preventive behavior (self-efficacy). These models have been useful in understanding situations in which the warning or disclosure presents an impending threat as part of the counterpersuasion process. However, sometimes warnings and disclosures can be beneficial even when they do not present an explicit impending threat directly to consumers. Thus, a broader model of consumer information processing may be more appropriate for the study of disclosures and warnings.

Perhaps the most broadly applicable framework to the study of warnings and disclosures is McGuire's Steps in Information Processing (1980). In this model, McGuire offers a helpful set of output variables into which effects on warnings and disclosures can be categorized: exposure, perception (attention), comprehension, agreement (attitude change), retention, retrieval, decision making (intentions), and action (behavior). These outcomes are specified by McGuire (1980) in his Communication-Persuasion Matrix and also include the following input variables: source, message, channel, receiver, and destination. More recently, the "Logic Model" (cf. Burke, 2007) has applied aspects of communication variables as inputs and information processing steps as outputs.

1 Interested readers are referred to earlier and more detailed reviews of general warnings and disclosures research (cf. Andrews, 2011; Argo & Main, 2004; Bettman, Payne, & Staelin, 1986; Cox, Wogalter, Stokes, & Murff, 1997; Morris, Mazis, & Barofsky, 1980; Stewart & Martin, 1994), as our focus is on the application of federal agency health warnings and disclosures to the most current public policy issues.
and outcomes in planning and evaluation activities by federal and funding agencies. A similar, yet more succinct, model is Wogalter's (2006) Communication-Human Information Processing (C-HIP) Model. This is a helpful, alternative framework for considering public policy issues involving warnings and disclosures and for understanding their effects.

Based on these theoretical frameworks, we present a "Model of Consumer Responses to Warnings and Disclosures" in Figure 20.1 that identifies important outcome variables to consider when designing warning and disclosure programs. These include receiver outcome variables that are based on prior information processing and persuasion frameworks (e.g., Burke, 2007; McGuire, 1980; Petty & Cacioppo, 1986; Rogers, 1975; Wogalter, 2006). In addition, we identify specific individual and situational variables (e.g., prior expectations, complexity of choice, experience with the product, shopping environment) that have proven to be important in the disclosure and warning literature. Given this conceptual lens, we now examine graphic tobacco warnings, nutrition disclosures, and other federal agency applications of warnings and disclosures utilizing aspects of our model.

Figure 20.1 A Model of Consumer Responses to Warnings and Disclosures.
Note: The model is adapted from the following information processing and persuasion models: Logic model (Burke, 2007); Communication-Persuasion Model (McGuire, 1980); Protection Motivation Theory (Rogers, 1975); Elaboration Likelihood Model (Petty & Cacioppo, 1986); and the Communication-Human Information Processing (C-HIP) Model (Wogalter, 2006). The moderators identified represent a subset of the broad array of possible conceptual and practical moderators researchers may examine.
In the twentieth century, 100 million people died worldwide from tobacco-related diseases, and approximately 8 million deaths due to tobacco use are expected annually by 2030 (CDC, 2014a; Jha, 2009). In the United States, it has been fifty years since the first Surgeon General report on the health effects of smoking. Shortly after, in 1965, Congress passed the Federal Cigarette Labeling and Advertising Act (FCLAA), which required health warnings on all cigarette packages. Despite five decades of government regulation designed to warn consumers about the dangers of tobacco use, tobacco remains the leading cause of preventable disease and death in the United States, resulting in more than 480,000 deaths per year (DHHS, 2014). Along with antitobacco media campaigns, taxation, and restrictions on tobacco marketing, on-package warnings are an important mechanism to help curb tobacco use. Given the worldwide push for stronger and more graphic cigarette warning labels, and the rapidly changing regulatory environment for alternative tobacco products, tobacco is an important and fruitful area to study disclosures and warnings.

This section begins with a discussion of the most dangerous form of tobacco, combustible cigarettes, and the role that warnings play in discouraging cigarette smoking. Next, we will address alternative tobacco products (i.e., electronic cigarettes) and the role that disclosures and warnings play for these potentially ‘modified risk’ tobacco products. Research needs are identified, and given the rapidly changing (and controversial) regulatory environment for tobacco, there are excellent opportunities to contribute to this very important area of study.

**Cigarettes and Graphic Health Warnings**

In 2009, Congress passed the Family Smoking Prevention and Tobacco Control Act (FSPTCA), which put tobacco legislation under the FDA’s purview for the first time in American history (FSPTCA, 2009). The law also mandated the use of larger, more prominent graphic health warnings (GHWs) on cigarette packages. This law would have marked the first change in cigarette warnings in the United States since warnings were first required on cigarette packages in 1965 by the FCLAA. However, in 2012, a federal appellate court affirmed a lower court’s decision to strike down the proposed rule. The court ruled that the new graphic warnings proposed by the FDA violated corporate free speech rights and that the FDA had failed to provide “a shred of evidence” that the new graphic warnings would reduce smoking rates. Yet, others have countered this assertion based on the existing research evidence on GHWs (Myers, 2013). While graphic cigarette warnings have been put “on hold” in the United States, some fifty-eight countries worldwide, covering about one-third of the world’s population, have adopted graphic warnings since Canada became the first country to require them in 2000 (Hammond et al., 2004; World Health Organization, 2014). Some examples of these graphic health warnings are shown in Figure 20.2.
To date, there has been considerable research on the effects of GHWs (cf. Myers, 2013) that address a wide variety of outcomes in our model (see Figure 20.1). For example, in one of the first studies conducted after GHWs were required in Canada, Hammond and colleagues (2004) found that almost all Canadian smokers (91 percent) had read the warning labels and demonstrated a thorough knowledge of their content. A strong positive relationship was then observed between a measure of cognitive processing and smokers’ intentions to quit and later cessation behavior. Eye-tracking studies have shown positive effects on viewing of the graphic warning text and dwell time in cigarette ads (Strasser et al., 2012). Other GHW eye-tracking research shows...
greater attention toward health warnings compared to brand information when shown on plain packs (i.e., without the colored logo associated with the brand name) versus regular branded packs, with effects observed among nonsmokers and weekly smokers, but not daily smokers (Munafo, Roberts, Bauld, & Leonards, 2011). Yet, interestingly, Maynard and colleagues (2014) found in an eye-tracking study that regular smokers fixated more on the branding rather than the health warning. This bias was smaller, but still evident, for “blank packs,” where smokers preferentially attended to the blank region over the health warnings.

Other GHW research has examined further processing of the warnings beyond attention in experimental (causal) research. For example, using adult smokers from the United States and Canada, Kees, Burton, Andrews, and Kozup (2006) show that the addition of the GHW to the text-based warning significantly decreases the perceived attractiveness of the cigarette package. Similarly, Peters and colleagues (2007) find that the Canadian labels (combined text and GHWs) produced a greater negative response for U.S. adult smokers than the U.S. text warnings, without any signs of defensive or reactive responses. Later, Kees, Andrews, and Kozup (2010) discovered that the more graphic the warning, the greater the evoked fear, and fear acts as a mediator that explains increases in quit intentions for adult smokers. Romer, Peters, Strasser, and Langleben (2013) note that smoker self-efficacy in quitting is important in gauging the effects of the GHWs, as self-efficacy is lowest for new smokers and long-time smokers. Thus, they find that the GHWs are most effective for smokers with stronger quit-efficacy beliefs.

Additional research has shown that GHWs can lower intentions to smoke among young adult, occasional smokers (Blanton, Snyder, Strauts, & Larson, 2014), significantly reduce craving and electrophysiological brain responses to smoking cues (Wang et al., 2013), and influence affective and cognitive responses for adult smokers (Emery et al., 2013), as well as for young adult smokers and susceptible youth (Nonnemaker et al., 2010). Yet, given that 88 percent of current smokers begin during adolescence, an important population for the study of the GHWs is adolescent smokers (Kessler et al., 1997; Surgeon General Report, 2012). In a study of dual pathways to persuasion, Andrews, Netemeyer, Kees, and Burton (2014) find that both emotional responses (evoked fear) and beliefs from the GHWs affected adolescent smokers’ thoughts of quitting. Evoked fear is found to have a stronger effect than beliefs in mediating the effects of GHWs on quit thoughts for adolescent smokers, yet this is reversed in a longitudinal study of young adult smokers. A recent examination of male, adolescent nonsmoker data (Pepper et al., 2013) reveals that the GHWs discouraged most male adolescents from wanting to smoke, but lung cancer warnings discouraged them more than addiction warnings. Finally, moderators can have an important impact on the effectiveness of the GHWs. For example, Andrews and colleagues (2014) show that smoking frequency for both adolescents and young adults moderated the impact of the GHW levels on quitting thoughts. In Zhao, Nan, Yang, and Lies (2014), warning message framing is an important
moderator, with a loss frame found to be more effective than a gain frame. For text-only GHWs, message framing did not matter. Thus, in sum, as argued by Myers (2013), there is clear evidence across the stages of information processing indicating that the GHWs are effective.

**Challenges in Developing Cigarette Warnings and Directions for Future Research**

As noted previously, a specific challenge to developing effective cigarette warnings is the dearth of research examining the most important target audience for these types of warnings: adolescents. As noted previously, tobacco use is almost always initiated during adolescence. Each day, 3,200 adolescents under age eighteen smoke their first cigarette, and one-fifth of these youths become daily smokers (DHHS, 2014). From a persuasion standpoint, it is problematic that most of the 10 million adolescents in the United States who are open to trying smoking, or have already tried smoking, do not consider themselves smokers (FDA, 2014c). This segment also may not be particularly interested in the topic of tobacco risks and may not believe they will become personally addicted to tobacco (Arnett, 2000; Mayhew, Flay, & Mott, 2000). Thus, it is particularly challenging to develop warning messages to reach an audience who is not interested in the topic and likely does not feel like the message is relevant to them. Given these significant challenges, research is needed to understand how warnings can best reach this critical segment.

Consistent with the model of consumer responses to warnings and disclosures offered in Figure 20.1, the following questions are important to consider: Can cigarette warnings be designed to capture adolescents' attention? What types of warning will adolescents notice and comprehend? Is this segment more prone to a cognitive/factual appeal or can an emotional message be more effective? In one of the few studies examining the impact of graphic cigarette warnings on adolescent smokers, Andrews and colleagues (2014) find that highly graphic warnings were effective at impacting adolescent smokers' thoughts of quitting. Clearly, studies increasing our understanding of the breadth of adolescents' emotional and cognitive reactions to GHW's and plain packaging are needed. More generally, research addressing how cigarette warnings impact adolescent smokers and nonsmokers' beliefs about smoking and smoking behavior will be beneficial to policy makers and the public health community.

Time is also an important issue in considering the effects of labeling. The vast majority of studies that examine cigarette warning labels are cross-sectional in nature. These studies typically examine the impact of different types of warnings on short-term response outcome variables such as attitude, beliefs, affect, and intentions. While results from these studies are useful, some scholars note the potential for the warnings to become less effective or "wear out" after repeated exposure (Strahan et al., 2002). It is especially important from a regulatory perspective to understand what types of warnings have an effect that persists over time. While there have been studies that have examined the impact
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of antismoking media campaigns over time (e.g., Siegel & Biener, 2000), there have been very few studies that have studied the impact of warnings using a longitudinal design (Hammond et al., 2004). In one study that examines the impact of different graphic warning labels, Andrews and colleagues (2014) find that graphic warnings can have a carryover effect on thoughts of quitting smoking for young adult smokers after a one-week delay following exposure to the cigarette package warning. Currently, the FDA is conducting longitudinal research to measure the impact and effectiveness of “The Real Cost” antismoking campaign in which they will follow thousands of the same youths over a two-year period in seventy-five major media markets, assessing potential changes in their smoking behavior over time (FDA, 2014d). More longitudinal research is needed to understand the impact of cigarette warning labels on smoking behavior over time (see Figure 20.1) and the moderators impacting these effects.

Finally, there have been very few studies that can directly attribute cessation behaviors to cigarette warnings. Due to methodological challenges (e.g., intervening variables that are difficult to control), coupled with the nature of the regulated environment, the ability to demonstrate that any cigarette warning directly results in smoking cessation can be challenging. For a highly addictive behavior such as smoking, while some warnings may be able to encourage attempts to quit or the reduction of smoking frequency, they are unlikely to be the sole reason for cessation. Any research that can demonstrate a causal relationship between a warning and actual smoking behavior and demonstrate that the warning can singularly reduce smoking incidence (while controlling for other influential factors and possible intervening variables) would make an important contribution to the warnings literature. In the absence of research with smoking incidence as the outcome variable, studies could employ dependent variables, such as number of cigarettes smoked over time, calls to a quit line, and purchase of medications to assist with cessation.

Clearly, combustible tobacco products (e.g., cigarettes, cigars, cigarillos, hookah in which tobacco is burned and inhaled) are the most dangerous form of tobacco and pose the greatest risk to consumer health and well-being. It is in the best interest of public health to persuade smokers to quit. However, given the challenges associated with getting smokers to quit smoking altogether, there has been considerable debate within the public health community around the potential benefits of encouraging cigarette smokers to switch to a “less harmful” form of tobacco (Haar, 2014). If there is some health benefit to consumers switching from combustible cigarettes to an alternate form of tobacco, how might warnings and disclosures inform consumers of this benefit while still generally discouraging tobacco use, especially for potential new users? Can warnings and disclosures be designed both to persuade smokers to quit using tobacco and, in the absence of quitting, at least use a less dangerous form? Can disclosures on alternative tobacco products communicate the realistic (lower) risks of the product relative to combustible cigarettes, without the unintended consequences of attracting new or former tobacco users, contributing to
adolescent nicotine use, or encouraging poly-use of tobacco products (Bombard, Pederson, Nelson, & Malarcher, 2007)? These are some of the issues we address in the next section.

**New Frontiers: Modified Risk Tobacco Products**

No tobacco product is safe. However, some forms of tobacco may be more dangerous to consumers’ well-being than others. This is the premise for the provision under the Family Smoking Prevention and Tobacco Control Act (2009) that could potentially allow some modified risk tobacco products (MRTPs) to be marketed as “less harmful” or to “reduce the risk of tobacco-related disease” pending an MRTP application to the FDA’s Center for Tobacco Products (FSPTCA, 2009). Examples of potential MRTPs include tobacco lozenges and e-cigarettes; the latter has grown from $2 million in sales in 2009 to $722 million in 2013 (Wall Street Journal, 2014). Any modified-risk claims would have to be backed by scientific evidence and would need to benefit the health of the population as a whole, taking into account both users and non-users of tobacco products. Gaining approval from the FDA to sell an MRTP would not signal that the product itself is safe or improves the health of the consumer. This designation would simply imply that the product has the potential to reduce tobacco-related harms compared with conventional tobacco products (i.e., combustible cigarettes). Furthermore, any potential MRTP must also contribute to reducing the overall rates of tobacco use and tobacco-related harm across the country.

There is a dearth of research regarding the actual and perceived health effects of MRTPs to guide federal regulatory decisions (IOM, 2011). In one of the few studies that examines the potential impact of tobacco harm reduction statements, Capella, Taylor, and Kees (2012) find that a disclosure suggesting that smokeless tobacco is less risky than cigarettes did not significantly impact consumers’ relative risk perceptions of smokeless tobacco. The authors suggest that this lack of effect may be due to the presence of the mandated warning label that was present on the experimental stimuli or the lack of perceived credibility of the harm reduction statement, which was not attributed to the FDA in the studies. Thus, there is need for more research that examines how consumers may process any “harm reduction” disclosures for MRTPs, especially for absolute levels of safety and risk. Even if the evidence suggests that a modified risk tobacco product is safer than conventional tobacco products, will consumers interpret this information as suggesting that the product is objectively “safe” when it clearly is not? After all, such absolute health halos have occurred in the processing of relative nutrient content claims (cf. Andrews, Burton, & Netemeyer, 2000). Thus, it is unclear how the potential labeling of some tobacco products as less risky will impact consumers. These are the types of research questions that should be considered for various emerging alternative tobacco products.

The FDA is committed to “stopping practices that may cause people to start or continue using tobacco products that could lead to preventable disease
and death,” but at the same time the FDA’s goal is to “reduce the number of tobacco-related deaths” (FDA 2012). While these two goals may seem aligned, an important question to be considered is whether or not the communication of MRTPs as less risky could result in a “net positive” effect of fewer total tobacco-related diseases and deaths. Could the number of smokers who switch exclusively to a less dangerous alternate tobacco product offset the number of potential new tobacco users who start using the MRTPs? Recent research shows that approximately 32.1 percent of adults in the United States use one or more tobacco product (with 18 percent smoking cigarettes), and 10.6 percent of adults are multi-users (“poly-users”) of tobacco in the United States, including cigarettes, cigars, little cigars, electronic cigarettes, hookahs, smokeless tobacco, and snus (Lee, Hebert, Nonnemaker, & Kim, 2014). Given this usage pattern, the communication of benefits and risks to consumers by way of disclosures and warnings is an important topic in need of additional research.

Electronic Cigarettes

Perhaps the most popular tobacco product that has been promoted as having potential for harm reduction is electronic nicotine delivery systems (i.e., electronic cigarettes, or e-cigarettes) (Etter et al., 2011). These products tend to have a physical form that somewhat resembles a traditional cigarette, but they use electrical heating elements to vaporize a glycerol solution containing nicotine, which is inhaled by the user. E-cigarettes are aggressively marketed in the United States, and as a result consumer use of the products is increasing rapidly (Chen, 2013). In fact, youth exposure to television e-cigarette ads measured by target rating points (TRPs) increased 256 percent from 2011 to 2013 (Duke et al., 2014). Additionally, in a recent Congressional Report (2014), e-cigarette companies were cited for promoting their products at youth-oriented events and offering their e-cigarettes in flavors appealing to adolescents (e.g., Cherry Crush, Chocolate Treat).

While the FDA currently only regulates e-cigarettes that are marketed for therapeutic purposes, a proposed rule extends (or “deems”) the agency’s tobacco authority to cover e-cigarettes (FDA, 2014a). This proposed rule would prompt the FDA to implement regulatory tools such as age restrictions for minors and manufacturing standards. Importantly, the FDA also would regulate any modified risk claims that may suggest e-cigarettes can reduce tobacco-related disease and death, and any warnings that indicate that e-cigarettes are no less addicting than traditional tobacco. This is important, as e-cigarettes are commonly marketed as safer alternatives to combustible cigarettes and even as smoking cessation aids. U.S. sales of e-cigarettes have increased to $1.7 billion from almost nothing in a five-year period, and some estimate the market could expand to $10 billion in the next three years (Duprey, 2014). Given that e-cigarettes are an extremely high-growth tobacco product in the United States, much research (in both the social and hard sciences) is needed to understand the specific risks and how to communicate these risks to consumers.
At present, research is mixed in regards to the efficacy of e-cigarette in helping smokers quit. Siegel, Tanwar, and Wood (2011) conducted a study using 216 smokers who had purchased e-cigarettes for the first time. Results showed that 31 percent of the sample reported cigarette smoking abstinence after six months, and, of those who were not smoking, 34 percent reported being nicotine-free. Almost two-thirds of the sample reported a reduction in the number of cigarettes they smoked. In contrast, Bullen and colleagues (2013) found that of the 289 smokers who tried e-cigarettes as a means by which to quit smoking, only 7 percent had quit smoking after six months. Finally, after reviewing the existing clinical trials involving e-cigarettes as a cessation strategy, Grana, Benowitz, and Glantz (2014) concluded that e-cigarettes are not associated with successful cessation in general population-based samples of smokers. Regardless of whether or not e-cigarettes are, in fact, an effective method to quit smoking, smokers seem to perceive them as such. In fact, the majority of e-cigarette users report smoking reduction or cessation as their primary motivation for using the product (Goniewicz, Lingus, & Hajek, 2013). In a recent survey of over 1,500 smokers, those who tried e-cigarettes as a means by which to quit smoking reported a higher motivation to quit, higher quitting self-efficacy, and longer recent quit duration than did other smokers (Pokhrel et al., 2013).

One critical issue that is fruitful for future research is whether and how e-cigarettes can be marketed as a modified risk tobacco product or as a smoking cessation tool. Research in the *New England Journal of Medicine* suggests that e-cigarettes are likely to contain lower levels of toxins and carcinogens than combustible cigarettes (Cobb & Abrams, 2011). Yet, another well-controlled study of samples from twelve brands of e-cigarettes indicates that although levels of toxicants were 9 to 450 times lower than those of cigarette smoke, they still contained significantly higher levels of many carcinogenic and toxic compounds (e.g., formaldehyde, acetaldehyde, nitrosamines, cadmium, nickel, and lead) compared with Nicorette inhaler vapor (Goniewicz et al., 2013). Currently, U.S. tobacco marketers are not required to disclose the ingredients in their e-cigarette products, which have been found to deliver inconsistent levels of nicotine and contain some toxins (Riker, Lee, Darville, & Hahn, 2012). However, when the FDA implements regulations related to manufacturing standards for e-cigarettes, it should be possible to discern the level of risk of e-cigarettes relative to combustible cigarettes. Even given the uncertain science around the risks of e-cigarettes, from a public health perspective, it appears that society would in theory be better off if tobacco consumers used only e-cigarettes rather than combustible cigarettes (American Cancer Society, 2014). Of course, the potential for poly-use, nicotine poisoning among young children, and new and former tobacco users entering the market complicates the issue. Recently, a Centers for Disease Control and Prevention (CDC) study showed the percentage of e-cigarette users in high school more than doubled from 4.7 percent to 10 percent from 2011 to 2012, and more than 20 percent of middle-school students who reported using e-cigarettes claimed that they never had even tried traditional cigarettes (CDC, 2013).
It is unclear what (if any) messaging can be developed that would be effective at communicating the lower risk of e-cigarettes without the unintended consequence of attracting new tobacco users to the product as “dual-use” tobacco users, which would obviously be undesirable for public health. Recent research has confirmed that attracting new, young, tobacco users is a legitimate concern. Using data from the National Youth Tobacco Survey, Dutra and Glantz (2014) concluded that middle and high school students who use e-cigarettes are more likely to become regular smokers of combustible cigarettes. Other studies have found that e-cigarettes are perceived positively by young adults, and this segment is willing to experiment with the product (Choi et al., 2012).

Currently, e-cigarettes are not required to carry any warnings on packaging or advertising. As the FDA begins to create policy for e-cigarettes, research will be needed to guide these regulatory decisions. Should e-cigarettes carry the same Surgeon General warnings as more conventional tobacco products? While combustible cigarettes appear to warrant the strongest types of warnings about the health risks of smoking, will these types of warnings be appropriate for e-cigarettes, where the long-term health risks are not yet fully understood? While nicotine use should be discouraged, mandatory disclosures and warnings ought to be truthful, objective, and reflect what the scientific evidence tells us about the product risks. Research is needed to understand how consumers may respond to mild or ambiguous warnings about the uncertain long-term risks of e-cigarettes, as well as perceptions of health risks (beyond addiction) associated with combustible products.

Alternatively, given prior consumer testing with e-smokers (“vapers”), would a disclosure approach similar to qualified health claims on food products be more appropriate? In this scenario, the e-cigarette marketer would be allowed to claim that e-cigarettes are a safer form of nicotine consumption than combustible cigarettes, but would also be required to disclose that nicotine is highly addictive and that the long-term risks associated with the product are not understood. Of course, the critical research questions for any warning or disclosure approach would concern how young consumers, and other non-tobacco smokers considering trial, interpret the information. Will mild warnings or harm reduction claims (with risk disclosures) result in increased e-cigarette initiation rates and “dual use” of e-cigarettes and conventional tobacco products? In essence, is it possible to make truthful claims about the benefits of MRTPs (relative to conventional tobacco products) without experiencing the unintended consequence of drawing in new tobacco users? Finally, research would be needed to determine which segments may be most receptive to modified risk tobacco disclosures.

**Obesity Trends: A Critical Global Issue**

In the past fifty years, the prevalence of obesity among U.S. adults almost tripled, growing from approximately 13 to 36 percent (NIH, 2014).
Obesity is directly or indirectly related to chronic health conditions and diseases such as cancer, diabetes, and heart disease and is associated with some three hundred thousand deaths annually after adjustments for age and smoking factors (CDC, 2014b; U.S. Surgeon General, 2013). With more than two-thirds of Americans aged twenty years or older who are now overweight, there are dire concerns about the future impact on long-term consumer welfare. Estimates of the annual financial cost of obesity in the United States reach as high as $200 billion, which include direct medical costs, lost productivity costs, transportation costs, and human capital costs (Hammond & Levine, 2010).

Thus, U.S. agencies such as the FDA and USDA are concerned about the immediate and long-term consequences of obesity, which clearly represents a critical health issue to the well-being of many consumers. How nutrition information (e.g., calories, levels of saturated fat and sodium) is communicated and used by consumers in evaluations and decisions has become an increasingly crucial issue. Federal agencies such as the FDA should apply an appropriate conceptual lens as the agency considers the complex manner in which nutrition information is communicated, interpreted, and utilized by consumers. This includes information communicated through the two major sources of where and how consumers obtain their food: (1) nutrition disclosures relevant to purchases made at the retail stores and then subsequently prepared and consumed in the home, and (2) purchases of prepared foods from restaurants or other locations away from home.

**Nutrition Disclosures on Product Packaging for Foods Consumed In the Home**

U.S. consumers have had access to specific and thorough standardized nutrition information in the Nutrition Facts label found on the back or side of food packages since 1993. The disclosure of this information was mandated by the Nutritional Labeling and Education Act (NLEA) of 1990, and the FDA conducted qualitative and quantitative research to aid in the design of the Nutrition Facts disclosure. A primary objective of the NLEA was to help consumers make "more informed and healthier food choices in the context of their daily diet" (NLEA, 1990; Federal Register, 2010a).

However, as noted previously, since the time the standardized Nutrition Facts label was added to packages, we have seen concomitant increases in obesity rates among U.S. consumers. Thus, many would dispute whether the provision of information through FDA regulation has been effective in communicating the information to aid consumers in making food choices and whether it is capable of changing consumers' dietary habits (Heike & Taylor, 2012). Others note that not all consumers consult the label when making purchases (Choiniere & Lando, 2013), and that perhaps the obesity crisis would have been even more severe without standardized labeling (Andrews, Lin, Levy, and Lo, 2014). The model offered in Figure 20.1 includes the most significant
issues related to how nutrition information disclosures are presented and subsequently processed by consumers in retail environments.

U.S. consumers have increasingly busy lifestyles, and at the retail shelf, nutrition and health-related evaluations and choices can be daunting. Despite the presence of the Nutrition Facts disclosure, one recent survey reported that many consumers still believe it is harder to identify healthier products while shopping at their grocery retailer than to do their own taxes (IFIC, 2012; Newman, Howlett, & Burton, 2014). This difficulty is impacted not only by the thousands of product alternatives crowding the retail shelf, but the fact that the Nutrition Facts label is found on the side or back of packages, a location that makes comparisons among multiple product alternatives difficult and time consuming. In addition, there can be more than fifty pieces of specific information available in the Nutrition Facts label. While the relatively comprehensive nature of the information disclosed is a benefit to certain consumer segments, it makes the acquisition, integration, and comparisons across products more time consuming and burdensome for the harried consumer. Many contend that the Nutrition Facts label is too complex and is more difficult than it need be for consumers to access the most critical nutrition information to evaluate product alternative healthfulness (Viswanathan & Hastak, 2002). There are also many cues offered on the package by food manufacturers to signal nutritional benefits that are much easier to access and in turn may be used to draw inferences about the perceived healthfulness of products. Unfortunately, these inferences may or may not be consistent with the objective healthfulness of the product (Andrews, Burton, & Kees, 2011; Kozup, Creyer, & Burton, 2003).

Such acquisition, integration and processing issues are important as the FDA is considering modifications to the communication of nutrition information that will increase the ease, or fluency, with which it may be accessed and potentially incorporated into consumer food judgments and decisions. These methods include the provision of front-of-package labeling and revision of the Nutrition Facts label (Federal Register, 2010b).

Front-of-Package Nutrition Disclosures

Over the past decade, consumers have encountered a plethora of front-of-package (FOP) nutrition labeling systems and icons, including Grocery Manufacturers of America and the Food Marketing Institute's Facts-Up-Front system, the United Kingdom's traffic light system, and Hannaford's Guiding Stars (Andrews et al., 2014; Federal Register, 2010b). As shown in Figure 20.3, generally, the systems can be divided into two broad types of disclosure systems: (1) evaluative or interpretive systems for the product that help with the evaluation task, and (2) nutrient-specific or reductive FOP systems that reduce and transfer important calorie and nutrient information from a nutritional panel from the back or side of the package. The evaluative/interpretive system can be further subdivided into systems that provide consumers either with an
Figure 20.3 Examples of Different Types of Front-of-package Nutrition Systems.
In the past decade, an increasing amount of academic research has examined FOP labeling. While a complete review of this FOP literature is beyond the scope of this chapter (interested readers should see Andrews et al., 2014, and Hersey et al., 2013), some recent findings are consistent with the model offered in Figure 20.1. There is some evidence that FOP systems can increase attention to nutrition information and that there is some difference in the ease of processing information from different FOP nutrition disclosure systems (Hersey et al., 2013). For example, in a UK study it was found that a multiple traffic light format took the least time to interpret (the average time was 5.1 seconds) followed closely by the colored GDA (an average time of 5.4 seconds). The color-coding provided through quantitative scoring seems to aid attention and reduce the subsequent time for processing (Synovate, 2005; Hersey et al., 2013). Similarly, evaluative disclosures (e.g., traffic lights, number of stars, or 1-100 rating) seem to be perceived as requiring less time than GDA formats (Hersey et al., 2013). However, other research that compared a colored traffic light–style nutrient-specific disclosure to a no-color option found no differences between the evaluative/interpretive format (i.e., traffic lights) and the reductive format (i.e., no color) in self-reported attention paid to the disclosure or how easily consumers could judge the product's healthfulness (Kees, Stafford, & Cho, 2014).

It seems that consumers do like the general concept of some form of FOP labeling, and there are fairly consistent findings in the literature that consumers exposed to FOP labels perform better in understanding and identification of more healthful products than those exposed to no-FOP control conditions. Some studies have found that the use of evaluative formats with nutrient-specific traffic light formats is associated with a higher likelihood of identifying the healthier food choices compared to labels presenting non-evaluative GDA information (Hersey et al., 2013; Newman, Howlett, & Burton, 2014). However, a comprehensive Institute of Medicine report concluded that no FOP nutrition information system is superior to all others and that each has strengths and weaknesses (IOM, 2011).

**Current and Future Research Needs on FOP Labeling**

Despite an array of studies, there are substantial opportunities for future research to determine whether there is one specific FOP alternative that can most effectively serve needs across diverse situations, goal states, and consumer segments. In the model presented in Figure 20.1, we offer a brief overview of key variables of interest for FOP nutrition labeling: attention and acquisition of the information, processing and comprehension across individual differences and goals of various consumer segments, and broad effects and outcomes related to consumers’ well-being (Andrews et al., 2014).

Research examining how contextual variables in a store/shopping environment are related to FOP attention, acquisition, and use is clearly needed.
Perceptually, what precise design elements, including color, location, size, and contrast, enhance initial awareness and acquisition of the information (Andrews et al., 2014)? How do different FOP label alternatives perform given variance in the number and positioning of manufacturer’s nutrition claims, other promotion material, and level of package clutter?

There is also a dire need to examine what is occurring with shoppers at the store level. Clearly, while academic researchers have difficulty integrating controlled designs with the retail shopping experience, there is a dearth of studies involving consumer responses at the retail shelf. The need for policy-based decisions is obvious. For example, when consumers select a product at the store, observing their search behavior and choices and examining the role played by FOP information relative to other critical marketing variables are needed.

More controlled experiments may expand our understanding of hybrid systems. While evaluative systems may help in comprehension and judgments (Hersey et al., 2013; Newman, Howlett & Burton, 2014), they may at times create some bias depending on the specific objective nutrition profile and cutoff levels established (Andrews, Burton, & Kees, 2011; Andrews et al., 2014). Is there a hybrid system that, despite some additional complexity due to the expanded information conveyed, maximizes benefits while minimizing weaknesses of a single system?

Many questions that are critical to both policy and researchers relate to the long-term and broader effects of FOP labeling. To our knowledge, there is little research related to unintended consequences. For example, if an evaluative disclosure reveals a superior “three-star” product or traffic light format dominated by green, does this stimulate overconsumption by granting the license to consume (e.g., Wansink & Chandon, 2006)? While there is some evidence that the use of FOP labels by a retailer may positively affect healthful choices (Dzhogleva & Inman, 2013; Hersey et al., 2013), effects generally appear fairly small and are not always observed. Are there stronger behavioral effects of some FOP nutrition disclosure systems relative to others? Lastly, from a consumer health and welfare perspective, many researchers believe that the influence of mandates for labeling systems on new product development and reformulation will exceed effects on individual consumer behavior. If a standardized FOP system became required, how would it impact changes in the nutritional content of packaged foods, and would the more aggressive evaluative systems (traffic light, IOM stars) motivate the most substantial product modifications?

However, the questions and problems associated with obesity and the acquisition, use, and processing of nutrition information also concern perceived limitations of the Nutrition Facts label mandated in the United States. The FDA has already proposed changes to the Nutrition Facts label and research addressing these initial proposals, and the breadth of effects when implemented will also be an emerging research concern, with possible implications for consumer well-being (Federal Register, 2014).
Proposed Regulatory Action Regarding Changes to the Nutrition Facts Label

In March 2014, the FDA requested comments on a number of proposed modifications to the Nutrition Facts label, including the enhancement of calorie information and adjustment of some of the serving size information (Federal Register, 2014). These changes represent the most substantial modifications since the introduction of the Nutrition Facts label twenty years ago. The impetus of this substantial proposed update to the Nutrition Facts disclosure on packaged foods is "to reflect the latest scientific information, including the link between diet and chronic diseases such as obesity and heart disease" (FDA, 2014b).

There are a number of important format changes between the current and proposed Nutrition Facts label that can be observed in Figure 20.3. This includes greater emphasis on the calorie content and servings per container by increasing the type size and placing the information in bold type. Clearly, the changes in prominence are designed to encourage attention, allow easier access, and spur its use in forming health-related judgments about products. Furthermore, there are proposed changes to serving sizes listed to reflect more accurately amounts people currently eat, relative to their dietary habits in the 1990s. Modifications proposed also include the presentation of calorie and nutrition information for the entire package of certain food products that could be consumed in a single sitting, including dual-column formats for both per serving and the entire package (Federal Register, 2014). Also, the modifications include switching the Daily Values (DVs) from the far-right to the far-left. While these are among the most prominent changes, the proposed rule lists some thirteen specific changes to the Nutrition Facts label, many of which can be directly observed in Figure 20.4. The FDA proposes that manufacturers have some two years after the effective date to comply with the final ruling.

Future Research Needs

Substantial research exists concerning the Nutrition Facts label that has examined alternative formats, effects on processing, evaluations of healthfulness and consumer choices, and macro-level influences of its implementation (see Drichoutis, Lazaridis, & Nayga, 2006, and Heike & Taylor, 2012, for comprehensive reviews). However, scant research has addressed these very specific changes proposed by the FDA and the White House (Harris, 2012). At this point, the FDA offers little direct evidence for effects, simply noting that it will "perform consumer research during this rulemaking process to evaluate how variations in label format may affect consumer understanding and use of the Nutrition Facts label" (Federal Register, 2014, p. 11882).

These modifications for the Nutrition Facts label offer an excellent example of how the consumer research community can provide assistance to
policy-related decisions that appear in dire need of conceptually based empirical research. Over the next three to five years, there is substantial opportunity for research examining how each of the specific modifications (as compared to the current "control" Nutrition Facts label and other possible alternatives) may affect attention, processing, and integration into nutrient and product evaluations and influence choices among alternative choice sets. Which of the specific changes appear to have the greatest relative effects on product choices and evaluations? Subsequently, when the proposed changes are implemented in the future, what will be consumer reactions and effects in the marketplace? Will effects vary across individual difference variables (e.g., those low in nutrition consciousness and objective nutrition knowledge) and consumer segments at

![Figure 20.4. Current Nutrition Facts Panel Compared to the Proposed 2014 Panel.](image_url)

Note: The proposed Nutrition Facts labels are available at [www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm](http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm#images).
greater risk (e.g., high body mass index [BMI], low literacy, those suffering from diabetes or heart disease)? How do the changes to the Nutrition Facts label interact with alternative FOP labeling?

While revisions to both the Nutrition Facts label and front of the package may be beneficial to consumers' well-being, it may be argued that the information required to make an informed food choice is already available in the Nutrition Facts label for knowledgeable and motivated consumers (if the effort is expended to obtain it). However, for food consumed outside of the home, information has not been disclosed to consumers at the point of purchase, and changes to consumer lifestyles have made this an increasingly important issue.

**Nutrition Disclosures for Foods Consumed Outside the Home**

The NLEA (1990) exempted restaurants and other venues selling ready-to-consume prepared foods from nutrition labeling. However, U.S. consumers now consume some one-third of their total calories and spend almost one-half of their food budget on foods prepared outside the home, percentages that have grown substantially over the past forty years (*Federal Register*, 2011). Given these statistics and rising levels of obesity, Section 4205 of the U.S. Patient Protection and Affordable Care Act (2010) required chain restaurants with twenty or more outlets in the United States to provide nutrient content information for standard menu items. Given divergent labeling requirements for menu disclosures from an increasing number of states and localities, many major restaurant chains and the National Restaurant Association supported national legislation that would standardize labeling requirements. The FDA was charged with establishing the final rules, regulations, and outlets to be covered by the legislation, and the labeling changes are scheduled to occur in 2015 and 2016. Among the many difficulties encountered by the FDA were which retail establishments to include. The legislation called for calorie labeling for vending machines, restaurants, and "similar retail food establishments," yet determining what types of establishments should and should not be included as "similar" proved extremely problematic. Convenience stores, supermarkets, and take-out-only pizza chains lobbied for exemptions from the requirements. The final ruling included all of these outlets, but there are still on-going appeals.

**Current Findings and Future Research Needs**

Because a number of states and local governments have mandated calorie labeling for restaurant chains in the past seven years, several field- and lab-based experimental studies have been conducted. In a recent review that examined studies published between 2007 and 2013, it was concluded that despite some positive results concerning effectiveness in lab experiments (e.g., Burton,
Howlett, & Tangari, 2009), the market-based field studies suggest that calorie labeling generally will not reduce the total calories ordered across the general population (Kiszko, Martinez, Abrams, & Elbel, 2014). When considering the underlying model of when disclosures are likely to have effects, such macro-level findings should come as little surprise (Burton & Kees, 2012). That is, the conditions under which effects on a specific consumers’ purchase appear relatively narrow; it is far more likely to find segments in which the labeling may have no effect, or even increase calories in an order, than the opposite.

For example, as suggested in our model, there is a hierarchical chain of very specific conditions, including attention and awareness, processing conditions, integration and evaluation, and situational and individual difference variables that need to be satisfied for consumers to be likely to reduce the caloric content for any specific order at a restaurant (Burton & Kees, 2012). As with any warning or disclosure, restaurant patrons must be aware of the disclosed calorie information. However, information acquisition in many menu board or drive-thru venues, when coupled with time constraints, may be fairly difficult. If consumers tend to order certain familiar items habitually, they may not even examine a menu board or menu. If found and considered, consumers must have the motivation and knowledge to process and incorporate the calorie information into judgments and choices. For the majority of consumers, food attributes such as taste, price, convenience, and meal size are more diagnostic and influential for decisions than is product healthfulness, and both perceptually and objectively these attributes may be negatively correlated to calorie levels. In fact, some may contend that the restaurant industry’s success in designing and delivering convenient, reasonably priced, tasty fare has led to the tremendous increase in the food dollar captured and helped make calories and nutrition a tertiary concern for most consumers. It is also argued that for caloric labeling to have a favorable influence, the disclosed information must deviate from consumers’ prior expectations (Burton, Creyer, Kees, & Huggins, 2006; Howlett, Burton, Bates, & Huggins, 2009). If calorie information merely confirms prior expectations, then little change in choice behavior is anticipated. In addition, there are situational influences in any restaurant setting and biases in processing that may reduce the likelihood of calorie labeling having a substantial influence (Burton & Kees, 2012; Chandon & Wansink, 2007).

Of course, there are also differences in calorie needs and wants that affect choices. For instance, twenty-year-old construction workers or high school athletes visiting a fast food restaurant for lunch may see a low calorie meal as insufficient for their specific dietary needs. They may use labeling to help identify a set of high caloric items required, given their daily activity level and caloric expenditure. Given the variety of motivations for food consumption (maximization of taste, value, convenience, emotional comfort), there are many segments of consumers for which calorie labeling is very unlikely to have intended effects.

Future research can consider the very refined, select segment of consumers who may be impacted by in-restaurant calorie labeling. The conceptualization
regarding when and how disclosures are effective suggest possible four-way or higher interactions (e.g., caloric expectations x motivation x situation (time pressure, social) x disclosure) that may be considered. Calorie labeling is likely to positively affect the few rather than the many, and this presents intriguing research possibilities that can be explored.

Related to the preceding, situational variables such as the presentation of items and calories, the relationship of nutritional content to other critical evaluation attributes (price, perceived taste, size), and time pressure may all be interrelated in their effects (Parker & Lehmann, 2014). While the legislation requires that calorie labeling be used for chain restaurants and vending machines, at this point it appears it will also include a broader set of retailers, such as prepared food at grocery stores, convenience stores, take-out-only chains, and such. However, how the aspects of the legislation affect very different venues, such as buffets, fast food chains, casual dining table service restaurants, vending machines, and other venues covered will be of interest to numerous constituencies.

Also, as noted previously, one may consider across each type of venue the nature of the target market. Because goals and motives vary, interest in the nature of effects for the segment of twenty-year-old athletes relative to the segment of sedentary, overweight forty-five-to-sixty-five-year-old consumers suffering from heart disease will differ dramatically. Studies that have shown some increase in general calorie consumption probably mask significant differences for very refined segments. As with FOP labeling, how the required disclosures affect the modification and new product offerings of restaurant chains is of substantial interest.

In sum, while most of the market-based studies have focused on broad calorie consumption effects for the restaurant patron population (Kiszko et al., 2014), when the law is finally implemented, research should consider higher-order moderating effects (Burton & Kees, 2012) and longer-term consequences for consumers and firms.

Beyond Tobacco and Nutrition: Other Applications of Disclosures and Warnings

While we view tobacco and food as areas in which disclosures and warnings can have a broad impact on population well-being, there are other very important domains in which disclosures and warnings can have an important impact. One such area is consumer finance. Financial disclosures (e.g., mandatory mortgage loan disclosures, credit card disclosures, financial privacy notices) are a fundamental component of consumer protection policy for financial services (Durkin & Elliehausen, 2011). While financial disclosures are intended to provide consumers with basic information and facilitate comparisons among alternatives, sometimes there are unintended consequences (Navarro-Martinez et al., 2011). For instance, some research has documented
that these disclosures can overwhelm consumers with information presented in complex formats, which only further confuses consumers (Lacko & Pappalardo, 2010; Woodward & Hall, 2010). Research is needed to better understand how to develop financial disclosures that consumers pay attention to, understand, and use in their decision making (Garrison, 2012). Indeed, the literature lacks conclusive evidence on how financial disclosures impact decisions and outcomes, especially in light of contextual, market, and individual difference factors (e.g., financial literacy) outlined in Figure 20.1 (Blumenthal & Perry, 2012).

Another domain in which disclosures can have a significant impact on consumer decisions and well-being is direct-to-consumer advertising (DTCA) of prescription drugs. When drug companies market directly to consumers, the FDA requires that the marketer balance information about how the drug can help treat certain conditions with a mandatory risk disclosure (i.e., fair balance; Aikin, O’Donoghue, Swasy, & Sullivan, 2001). While DTCA risk disclosures are predicated on the assumption that consumers appropriately interpret this information to make informed decisions (FDA, 2009a), similar to financial disclosures discussed previously, research has found that risk disclosures in DTCA are often ignored (Menon, Deshpandi, Perri, & Zinkhan, 2003), can lead to overestimation of product risk (Cox, 2010), and can adversely affect product use compliance (Wosinka, 2005). Similar to the other domains discussed in this chapter, and consistent with Figure 20.1, DTCA risk disclosures can be impacted by emotions (Cox, Cox, & Mantel, 2010), individual differences (Ahn, Park, & Haley, 2014), background noise and clutter (Andrews, 2011), and expert (physician) advice (Frosch & Grande, 2010).

The final topic that will be addressed in the chapter deals with the array of disclosures, disclaimers, and qualifiers that are required for food and supplement claims. For instance, some foods that make nutrient content claims (e.g., “low fat”) are also required to carry a disclosure statement when that same food contains exceedingly high levels of another nutrient (e.g., “See nutrition information for sodium content”). For supplements, qualified health claims may make a statement that a product reduces the risk of a particular condition (i.e., coronary heart disease), but are also required to present a scientific certainty qualifier that the evidence behind the claim is preliminary, uncertain, or even unlikely to support the claim.

This domain is an excellent example of the difficulty of designing effective disclosures and warnings to communicate potential product risks without violating the rights of the marketer to communicate the benefits of its products. While there have been numerous studies to help inform the design of such food and supplement disclosures (Mason, Scammon, & Fang, 2007), federal agencies continue to struggle to develop effective disclosures. For instance, the FTC concluded that qualified health claims are not interpreted by consumers as intended (FTC, 2006). Much of the extant research suggests that the food and supplement disclaimer/disclosure environment is confusing to consumers.
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(Hasler, 2008) and sometimes can even result in the opposite of the desired effect (FDA, 2009b). As in the previously mentioned domains, and consistent with Figure 20.1, consumer research is critical in ensuring consumers pay attention to, process, and make appropriate decisions based on the information disclosures.

Conclusion

Across the different domains discussed in this chapter, it is clear that warnings and disclosures are an important regulatory tool for policy makers to impact consumer health and well-being. Federal laws and regulations mandate warnings and disclosures on product packaging, at the point of purchase, and/or in advertising to protect consumers from potentially dangerous products. For some issues, there appears to be strong empirical support for a specific direction that would result in positive consumer and social outcomes (e.g., stronger cigarette warning labels in the United States). However, for most issues reviewed in this chapter, more research is needed to understand the optimum design of warnings and disclosures to facilitate consumer understanding and minimize unintended consequences.

The Model of Consumer Responses to Warnings and Disclosures offered in Figure 20.1 draws from a rich literature of consumer information processing (e.g., McGuire, 1980; Petty and Cacioppo, 1986; Rogers, 1975; Wogalter, 2006) to offer some of the key outcome variables, mediators, and moderators to consider when conducting warnings and disclosures research. These variables are important for researchers to consider given that developing effective warnings and disclosures requires a clear understanding of how consumers acquire, process, and use the information to shape their decisions. Particular attention should be paid to the potential moderating variables in the model. Consistent with marketing theory, any potential outcomes from exposure to a warning or disclosure will vary based on individual differences, situational factors, and consumer goals.

A considerable number of research questions are offered in this chapter, and we present an overview of some of these questions and issues in Table 20.1. Of course, for each of these questions there are potential moderating and mediating influences that may be considered and are of interest to consumers' well-being. Other questions could address effects across the various stages in our proposed model. While regulatory agencies are charged with crafting laws and rules to guide warning and disclosure policy, these agencies are limited in the research they are able to conduct. Thus, we hope this chapter encourages research from the academic community, which is critical to ensure that warning and disclosure regulation is grounded in well-designed empirical studies. Rigorous research using appropriate methodologies and relevant samples is important to ensure that warnings and disclosures have the greatest possible positive impact on consumer well-being.
Table 20.1 Overview of Some Current Warning and Disclosure Issues and Examples of Possible Research Questions.

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<tr>
<th>Warning and Disclosure Challenges</th>
<th>Possible Research Question Recommendation</th>
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<tr>
<td><strong>Graphic Health Warnings on Packages and in Advertising</strong></td>
<td>What types of warnings are most effective for persuading adolescent smokers and nonsmokers?</td>
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<td>Can the effects of graphic health warnings persist over time or are they prone to “wear out”?</td>
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<td>How effective are graphic health warnings at influencing actual long-term smoking behavior?</td>
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<td><strong>Warnings for Modified Risk Tobacco Products</strong></td>
<td>What are the trade-offs between effects of warnings on risks and use for MRTPs for adolescents and young non-users, relative to effects on smokers who may be attempting to curtail or eliminate cigarette consumption?</td>
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<td>How do consumers process “harm reduction” disclosures for MRTPs (e.g., will consumers understand these products to be “reduced” risk relative to combustible cigarettes or will they perceive them as completely “safe”)?</td>
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<td><strong>Electronic Cigarette Warnings</strong></td>
<td>What are the beliefs about risks associated with e-cigarettes compared to the objective research, and how would various warnings affect risk perceptions and usage?</td>
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<td>Can disclosures communicate the potential lower risk of e-cigarettes without the unintended consequence of attracting new or “dual use” tobacco users?</td>
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<td><strong>Front of Package Nutrition Disclosures</strong></td>
<td>Is there one specific FOP alternative that would most effectively aid consumers in identifying the most healthful product in a choice set? Does this FOP affect choice and consumption levels of segments differing in motivation and knowledge, goal states, and BMIs?</td>
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<td>Is there a hybrid system that maximizes benefits while minimizing weaknesses of a single evaluative or reductive system?</td>
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<td>Would a mandated system have an effect on product reformulations and new (more healthful) products, and is there a specific FOP alternative that would lead to the greatest level of more healthful reformulations?</td>
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<td><strong>Modifications to the Nutrition Facts Disclosure</strong></td>
<td>How do the combined and the individual recommended changes affect product perceptions and choices, relative to the current label? Which one change has the most substantial effect? Will consumers notice and act upon the inclusion of added sugars?</td>
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<td>Does moving the daily values (DVs) to the left of the label affect the accuracy of processing nutrients for those expecting them to be on the right?</td>
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<td></td>
<td>Do increases (decreases) in the serving size for specific products affect consumption levels?</td>
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<tr>
<td><strong>Calorie Labeling in Chain Restaurants and Other Away-from-Home Venues</strong></td>
<td>How does labeling affect choices and levels of consumption across item type, calorie expectations, consumer goals and motivation, situation, and consumer risk level?</td>
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</table>
As a final note for academics with a strong interest conducting research that impacts public policy and federal regulation, there are opportunities to partner with government agencies. Many agencies within the FDA such as the Center for Food Safety and Applied Nutrition (CFSAN) and the Center for Tobacco Products (CTP) are understaffed with researchers to address the issues that are raised in this chapter (among many others that are important for consumer welfare). These agencies regularly bring in academics for semester or year-long appointments as Special Government Employees. For those who are unable to commit to a semester or longer, there are various important government committees that welcome academic members (e.g., the FDA Risk Communication Advisory Committee and the White House’s Social and Behavioral Science Team). In our experience, agency officials welcome the help from the academic community in researching and understanding these very important policy issues.

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