

PERCEPTIONS OF PRODUCT SAFETY AS  
INFLUENCED BY PRODUCT LABELS  
FOR COSMETICS

By

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## CHAPTER I

### INTRODUCTION

As a society it is possible in the United States and in many other developed countries to cure most diseases, mechanically irrigate fields, harness raw materials to use as fuel, and even travel to the moon. Not all of these advances are without adverse side effects though. C.P. Snow, a scientist and writer, once told the *New York Times* (2003), “Technology...is a queer thing. It brings you great gifts with one hand, and it stabs you in the back with the other.” Earth’s environment is having trouble “keeping up” with its ever-advancing and expanding inhabitants. Over the last five decades, humanity has noticed, through the efforts of environmental advocates, that the environment is paying a price for technical progress. Mother earth is suffering from tragedies like oil spills, land, water and air pollution, and warming trends that seem to be occurring more often and seem to be more acceptable, or at least met with more apathy, every day (Colborn, Dumanoski and Myers, 1997).

More recently, a connection between the declining human health condition and these very same technical advances has been questioned. For example, not only is pollution affecting earth’s land, freshwater and animal kingdom as Rachel Carson documented in her 1962 book, Silent Spring, that awoke the nation, but synthetic chemicals, the ones that have been manufactured to make the Western lifestyle more manageable, are sneaking into the most delicate bodily systems and silently killing

(Colborn, Dumanoski and Myers, 1997). The authors of Our Stolen Future traced the 50% drop in male sperm count and the dramatic rise in female hormone-related cancers and endometriosis over the last few decades to “synthetic chemicals that mimic natural hormones, upsetting normal reproductive and developmental processes” (Colborn, Dumanoski and Myers, 1997). As a woman strives to meet society’s expectations for beauty and success, she is unknowingly bombarding her fragile human body with chemical invaders that confuse the intricate systems that keep her body strong and healthy.

Potentially harmful chemicals line the shelves at local supermarkets and drug-stores packaged as essential cosmetics, everyday toiletries and pampering beauty products. Chemicals, such as the fluoride in several toothpastes that affects the thyroid, hide in attractive packages on an aisle where consumers are not allowed by society’s standards to rethink the everyday use of such products. Other culprits include Mineral Oil found in women’s make-up that prohibits the proper release of toxins through the skin, various phthalates in soaps, cosmetics and hair products that ruin the reproductive system of the male fetus, and even color pigments and fragrances in various products that deplete the amount of oxygen in the body and cause other Central Nervous System effects including depression (Vance, 2000).

Some of the most elusive toxins are hiding in products right under the consumer’s nose. For example, of the 19 label-listed ingredients of a well-known baby shampoo, Johnson’s® Softwash™, eight of them are named in at least one, if not more, harmful-to-health categories according to Dr. Christine Farlow (2001), author of Dying to Look Good. More specifically, this product contains four possible carcinogens, 15 possible



skin, eye and/or nervous system irritants, and three ingredients that are known to cause internal damage. Yet, the product's label includes words such as, "Specially designed to gently clean," with "...gentle conditioners and natural silk proteins", "Allergy tested," and "Gentle...as pure as water". This product's label claims to be "Best for you" and more importantly, "Best for baby". Although the harmful ingredients are listed right on the label by their chemical names, does the average consumer question the safety claims of the product's household-name, trusted manufacturer? The product is on the shelf at the supermarket, several other mothers use it, and it claims that it is not only safe, but safer, than other products. What more would a mother want for her newborn?

It is one issue to sell products with potentially harmful chemical ingredients to consumers who have been fairly educated about the products and have weighed their personal costs versus benefits, but it is a different issue altogether when manufacturers use bright and colorful packaging that makes safety claims about the product that are a "stretch" to say the least. Labels were originally designed to educate the consumer on the benefits, contraindications, proper usage and ingredients in a product. Thus, an unsuspecting consumer feels they have done their part in educating themselves and protecting their families by simply reading the label. Unfortunately, as Judi Vance (2000), indicates in her book, Beauty to Die For, governmental loopholes in the regulation of labels allow manufacturers to disguise, mislead and ultimately misinform the average consumer. This may create a sense of false security regarding the safety of the product.

## **Purpose**

The purpose of this study was to explore consumer attitude regarding the safety of cosmetic products directly related to the information given, or omitted, on the label of that product. Consumers were asked several questions regarding their perception of safety when it comes to their cosmetic products. By completing this survey, consumers were giving their attitudinal opinion of whether or not a product is safe, and comparatively, which product is safer for their personal use. Analysis of their opinions consequently showed the importance of truthful product labeling regarding consumers' perception of the safety of a product.

## **Rationale**

With advertising that bombards the viewer through the television screen with suggestions of happiness stemming from cosmetic products such as “getting closer” to loved ones with certain toothpastes and being more attractive to the opposite sex with certain deodorants, consumers must arm themselves with the information needed to protect the health of their families from these seemingly harmless allegations. According to the Food and Drug Administration’s Cosmetic Labeling Guide - Regulations on Labeling (1991), a cosmetic manufacturer may use any ingredient or raw material and market the final product without governmental approval. Labels were created under the Fair Packaging and Labeling Act to convey “...appropriate directions for safe use and/or warning statements...” and this information must be “...prominent and appear in the proper location on the label.” However, as The Consumers Union Guide to Environmental Labels (2002) points out, there are no standards for keywords that signify a safer product found on labels. A study completed at The Ohio State University showed

that consumers often make their food choice purchases based on front label health claims and endorsements (Teratanavat et al., 2003). In light of all this information, it is possible that cosmetic consumers also depend on virtually unregulated labels for health information on the products they use.

The question must be asked, “Are labels giving consumers a false sense of security regarding the safety of their cosmetic products?”

### **Hypotheses**

This study was developed to answer the following research questions.

- 1) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “natural” as being safer than products where this keyword is omitted?
- 2) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “hypoallergenic” as being safer than products where this keyword is omitted?
- 3) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “dermatologist-tested” as being safer than products where this keyword is omitted?
- 4) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “organic” as being safer than products where this keyword is omitted?

To answer these research questions, the following null hypotheses were tested:

- 1) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “natural” and a product whose label does not indicate this characteristic.
- 2) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “hypoallergenic” and a product whose label does not indicate this characteristic.
- 3) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “dermatologist-tested” and a product whose label does not indicate this characteristic.
- 4) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “organic” and a product whose label does not indicate this characteristic.
- 5) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “natural” and a product whose label does not indicate this characteristic.
- 6) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “hypoallergenic” and a product whose label does not indicate this characteristic.
- 7) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “dermatologist-tested” and a product whose label does not indicate this characteristic.

- 8) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “organic” and a product whose label does not indicate this characteristic.

### **Delimitations**

This study had the following delimitations:

- 1) The participants were all female because of the design and focus of the study.
- 2) The participants were all 18 years or older.
- 3) The participants were all able to read and comprehend English.
- 4) The participants were all able to read the questionnaire on their own.
- 5) The participants all lived and/or worked in or were visiting the Tulsa area.

### **Limitations**

The research in this study may be limited by the following:

- 1) The participants were asked to self-report their attitudes and perceptions.  
Therefore the study is limited by the honesty in self-reporting.

### **Assumptions**

The following assumptions were made in this study:

- 1) It was assumed that the participants would make an honest effort to truthfully and mindfully complete the survey.
- 2) It was assumed that calling conscious attention to the wording on the labels would not skew the perception of the participant in any way.
- 3) It was assumed that a consumer would choose products that they perceive are safe for use.

## **Definitions**

The following terms were used in this study with specific meaning. The functional definitions are discussed below.

- 1) In this study, a “cosmetic product” was meant to include all products supplied by the Cosmetics, Beauty Supplies and Perfume Stores in the US as defined by the Market Research Reports by IBISWorld - United States Industry Analysis. The major products include: Hair care, color cosmetics, skin care, fragrances, bath and shower, oral hygiene, men’s grooming, deodorants, sun care, and baby care (IBISWorld, 2005).
- 2) In this study, a “safe” cosmetic product was considered a product that would not cause any type of harm, to any person, of any age, even if the product is used incorrectly. More specifically, a safe product does not contain harmful chemicals, or a toxic mixture of ingredients.
- 3) In this study, the expression “natural”, when found on a label, was a general claim that the product is made from the environment and that nothing artificial or synthetic has been added. There is no industry standard definition for the term. There is currently no organization certifying this claim and the manufacturer is not free from its own self-interest (Consumer’s Union, 2002).
- 4) In this study, the expression “hypoallergenic”, when found on a label, was a general claim that implies a product will be less likely to cause allergic reactions. There is no industry standard definition for the term. The FDA does not require manufacturers to substantiate this claim (Consumer’s Union, 2002).

- 5) In this study, the expression “dermatologist tested”, when found on a label, was a claim that implies a product was tested by a dermatologist and shown to not cause any skin reactions. There is no industry standard definition for the term. The FDA does not require manufacturers to perform tests or to provide supporting evidence for this claim (Consumer’s Union, 2002).
- 6) In this study, the expression “organic”, when found on a label, was a claim that implies a product, and thus all of its ingredients, were grown or manufactured without the use of pesticides. There is no industry standard definition for the term. Unlike food items that indicate they are organic, cosmetic product claims are not backed by the National Organic Standards Board (Consumer’s Union, 2002).

## CHAPTER II

### REVIEW OF LITERATURE

The following paragraphs will more closely discuss the topics involved in this research. The history and use of cosmetics will be presented in order to relate the general public view regarding the use of these products. Specific chemicals in cosmetics that may be harmful will be discussed in order to validate the use of such research. Governmental regulations regarding cosmetics will be discussed in order to reveal the loopholes that exist in policy that leave the consumer virtually defenseless. Past research related to labeling and the perception of labeling will be presented. Finally, literature that supports the methodology this project is utilizing will be discussed.

#### **Cosmetic History and Current Application**

The cosmetic industry has a colorful history reaching back into early civilizations such as the society of the Egyptian queens and pharaohs who would adorn their eyes, face and hair with products that would mimic the youthful appearance of royalty and even deity. Today's recognized name brands have emerged from the practice of retaining a "pharmacist or manufacturing chemist" who created signature formulations for the rich and famous in the late 1800s (Geffken, 2001). Although early products, which contained dangerous chemicals such as lead, mercury and even arsenic, were all created to "enhance a woman's beauty", the products were separated into two categories: Paints and Cosmetics. Paints were thought of as "skin-masking" while cosmetics were "skin-



improving” substances (American Experience, 2001). A distinction had to be made because beauty was thought to be a “manifestation of goodness”, and not simply artificial artwork. Thus, cosmetics were thought to enhance, rather than create, beauty.

The cosmetic industry began as a woman’s door-to-door and mail-order operation with 450 trademarks registered by 1924. But in the late 1920s, the industry became a mass market, national system primarily run by men with production, advertising and distribution (*American Experience*, 2001). Advertising changed the way cosmetics were perceived. Instead of masking or creating artificial beauty, they were now accepted as a woman’s expression of femininity and individuality. Personal care was beginning to be a mainstream for all status of society and girls were prepared for this when their physical education teachers began to judge them on their hair, skin, muscle tone and general appearance (*American Experience*, 2001). After World War II, when many men returned to the workplace and women back to their homes, being beautiful was thought to be the woman’s job. An explosion of varieties, colors, and thus products, followed.

In the late 1960s the “natural” style was inaugurated as a form of individual expression but the ever-growing and expanding cosmetic industry was able to redefine the “natural” look as something best achieved through the use of cosmetics. Advertising has continued to remind women of their vulnerabilities and to sell them on improving their inequities. The woman’s search for allure, youth, maturity, or variety has carried the cosmetic business into a booming \$25 billion industry in the year 1999 (*American Experience*, 2001). “It seems that even in times of strife – if not especially during that time – consumers will be seeking ways to look and feel good,” the *Chemical Market*

*Reporter* (2001) stated shortly after the attacks on September 11<sup>th</sup>, 2001 when sales in the cosmetic industry were still growing.

Overall, the cosmetic industry is driven by the Baby-Boomer Generation who has the disposable income to try the new products that interest them through scientifically based advertising, but Generations X and Y have the largest influence over hair styling products because of their heavy use and jumbo-sized purchases (Lerner, 2001). In recent years though, according to Sauer (2001) the industry has seen a leveling-off of profits possibly due to many factors such as, "...margin pressures stemming from raw materials, foreign exchange, international competition and retail consolidation." Lack of innovation and new product development coupled with a struggling U.S. economy also challenge earnings growth. The largest cosmetic companies, Procter & Gamble, and L'Oreal USA had a combined market share of 19.5% in 2000 with 4,146 and 3,645 (in millions of dollars) respectively, in US sales.

### **Potentially Harmful Ingredients**

"According to John Bailey, Ph.D., director of the FDA's Office of Cosmetics and Colors, 'Consumers believe that if it's on the market, it can't hurt me,' and this belief is sometimes wrong" (Farlow, pg13). Consumers usually understand that what they put in their body affects their health, but what might not be as clear is that what you put on your body also affects your health. Many chemicals in cosmetics can be absorbed through the skin and have been detected in the blood stream reeking havoc on the most intricate bodily systems. Exposure may surface as a skin rash or irritation, but symptoms are not always apparent and internal damage is possible, if not inevitable.

“From 1978 to 1980, the FDA analyzed 300 cosmetic samples for carcinogenic contamination. 40% of the samples analyzed contained carcinogens. In 1991-92, they found that 65% of the cosmetic products sampled contained carcinogenic contaminants” (Farlow, pg12). Carcinogens are just one type of health issue though. Judi Vance (2000), in her book Beauty to Die For, discusses several chemicals in regards to their use in products and potential health risks to humans. Several examples are listed below:

- 1) Fluoride – “Used in most toothpastes to prohibit enzyme production. Although it is promoted to stop tooth decay, it is toxic to the body. Recent studies show this to be one of the top-ten worst contact allergens. This chemical is on the Health Canada, Product Safety Bureau *hit list*.” (pg184).
- 2) Mineral Oil – “Used in a wide variety of skin care products as an emollient. It is a petrochemical by-product. It seals the skin and floods it with moisture and prevents the skin’s natural respiration process. It is extremely comedogenic...May contain polycyclic aromatic hydrocarbons (PAH) which is mutagenic and the carcinogen anthanthrene.” (pg 205).
- 3) Phthalates (Group) – “Used as plasticizers in cosmetics, especially in nail products. They are well recognized as xenoestrogens and are testicular toxins.” (pg220).
- 4) DEA (Diethanolamine) – “This ingredient is widely used in many shampoo preparations. When DEA is applied to skin, known carcinogens can form.” (pg170).
- 5) Fragrances (Group) – “Used in practically all personal care products to mask the smell of the ingredients. Practically all fragrances contain toxic ingredients,”

(pg185). “Toluene, used as a solvent in many cosmetics was found present in every fragrance sample collected for a 1991 EPA report. Toluene is suspected to be cancer causing. It can cause liver damage, skin irritation and respiratory tract irritation. It was also found to trigger asthma attacks.” (pg42).

The FDA has outlawed a handful of chemical substances and color additives, but with these few exceptions, manufacturers are free to use whatever ingredients they would like without further FDA approval. Actual testing for harmful side effects for cosmetic ingredients is lacking. What little testing has been done have simply been tests on individual chemicals and not combinations of chemicals as they are used in cosmetic products according to Christine Farlow, D.C. (2001) author of Dying to Look Good. Certain chemicals act much differently when combined with other chemicals as they appear in products. The scientific lists of the harmful effects of cosmetic ingredients composed by concerned third-parties are available, but it remains the manufacturer’s duty only to list the substances they have chosen to keep using. It is up to the consumer to sift through the information and decide which cosmetics are least harmful to their family.

### **Government Regulation**

Today, several federal laws, state initiatives, and international regulations exist as hurdles for the cosmetic industry. Noncompliance for manufacturers includes fines, loss of business and even incarceration. Before 1906 though, when the US Federal Food and Drug Administration (FDA) was established, there was no standard to protect the public’s health and welfare. In 1938 this law was revised as the Federal Food, Drug and Cosmetic Act, which established regulations for cosmetic products and the ingredients that manufacturers used which excludes 7 specific ingredients which are prohibited (Faulke,

1994). Today, it is the manufacturer's responsibility to use ingredients recognized by the industry as safe and cross-referenced in the Cosmetic, Toiletry and Fragrance Association's International Cosmetic Ingredient Dictionary (Geffken, 2001).

According to the FDA, "...labeling includes all written, printed, or graphic matter that appears on the product, its containers, or its wrappers, as well as any such matter that accompanies the product. Typically, materials such as promotional literature, product catalogs, and flyers fit this definition of labeling," (Faulke, 1994). The definition of labeling does not include advertising that appears in magazines, newspapers, or on television because this is covered by the Federal Trade Commission (Faulke, 1994). Under the Food, Drug, and Cosmetic Act (FD&C Act) and the Fair Packaging and Labeling Act (FPLA) the manufacturer must provide the consumer with the name and place of business of the manufacturer, packer or distributor; a truthful statement of the quantity of the contents in the product; and any directions for safe use and warning statements if needed, in a prominent and proper location on the label (Faulke, 1994).

With information that suggests several of the chemicals that are used as ingredients in cosmetics are harmful, one might think that manufacturers would, in an attempt at being ethical, simply not use the chemicals deemed harmful. But, the FD&C does not require cosmetics to be approved before they are marketed and sold to consumers. FDA regulation starts only after the products are in the marketplace, in fact it is the FDA's responsibility to prove in a court of law that a product is harmful if it wants to remove a product from the shelf. The Fair Packaging and Labeling Act, makes manufacturers list ingredients on the label of all cosmetics sold directly to the consumer. Unfortunately, there can be several synonyms for one particular chemical. For example,

Mineral Oil is also regularly listed on labels as “White Oil”, “Paraffin”, “Oil Mist”, “Vaseline”, “Petrolatum”, and at least 100 other forms, all referring to the same chemical (Vance, 2000).

In addition to the synonym issue, because the ingredients on the label are written in the language of chemistry, it would be difficult for the average consumer to check claims against the contents of a product. John Bailey, Ph.D., director of the Food and Drug Administration’s Office of Cosmetics and Colors admits that, “...most of us don’t recognize the names of the ingredients listed, but there’s no way to change that and still accurately identify the ingredients,” (Faulke, 1994). And to add to the confusion, many manufacturers use ingredients that they simply list as “trade secret” or “and also other ingredients” in order to protect their patented formula of the product. “Trade secrets, as defined by the FDA, and the ingredients of flavors and fragrances do not have to be specifically listed” (Faulke, 1994).

Dr. Bailey warns, “Image is what the cosmetic industry sells through its products, and it’s up to the consumer to believe it or not,” (Faulke, 1992). Allowing manufacturers to include words such as “Natural”, “Hypoallergenic”, and “Dermatologist-Tested” on the label of their products may seem like a welcome short-cut for those consumers who are concerned with safety in their cosmetics, but unfortunately this can work in reverse. Instead of doing their own research and deeming ingredients and whole products safe for their family, the average consumer may look solely for these key words displayed prominently on the label. According to the *Consumers Union Guide to Environmental Labels* (2005), the problem is that the FDA has not mandated definitions for these seemingly helpful expressions. In fact, other than the four expressions that are being

tested in this study, the following expressions, when found on labels, are not meaningful, verified or consistent either: “Alcohol Free”, “Allergy Tested”, “Biodegradable”, “Cruelty Free”, “Fragrance Free”, “No Animal Testing”, “No Synthetic Detergents”, “Non-Irritating”, “Sensitivity Tested”, and “Unscented” (Consumers Union, 2002).

In 1994, Judith Faulke wrote an article, published in the *FDA Consumer* and meant for the general public, explaining labels. She concluded, “Cosmetic labels are more than product advertising. They connect cosmetic science with consumer protection by providing a means for consumers to know what’s in a product and how to safely use it. A wise consumer will take the time to read the label to get the best value and results without incurring any of the possible harmful effects.” Her statement is true in an ideal world. Realistically though, even a well-educated consumer possessing a chemistry degree, armed with a chemical dictionary, eyeglasses for seeing the tiny print on the label, and lots of time and patience, would find the job of protecting her family daunting. Because of the loopholes in regulation including trade secrets and poor definitions, it is ultimately only an ethical responsibility for manufacturers to use safe ingredients. The FDA does maintain the Cosmetic Adverse Reaction Monitoring Database to keep track of adverse reactions experienced by users, but this database is not known to the average consumer, and thus only a small percentage of occurrences are reported.

### **Consumer Perception of Labeling**

Many studies regarding the perception of advertising and labeling have been completed recently. A 1989 study by Deturck and Goldhaber concluded that there are two reasons that a consumer reads the label on a product. The first reason is to form an impression of the product and the second is to remember anything important from the

label. Because the memory-set uses more time and energy in order to process what is said on the label, consumers most often read labels simply to form an impression of the product. They go on to point out that consumers may never even glance at the finer print of labels on the common household products they use everyday.

A 1996 study by Gerald E. Smith concluded that educated consumers are more motivated by positively framed advertising on labels while less-educated consumers are more motivated by negatively framed advertising on labels. Rossiter, Percy and Donovan (1996) identify 2 types of product categories for consumer purchase, informational products and transformational products. Informational products are meant to help the consumer avoid problems and transformational products are meant to enhance the consumer's life. In this study, cosmetics are identified as transformational products, and thus should be framed in a positive light. For example, by pointing out how one could better their relationship with their spouse if only they used this specific toothpaste. The toothpaste is meant to enhance the consumer's life and this is indicated on the label.

Labels on products are for the most part, standardized. However, one person may read a label and form one impression while another person may look at the same label and form a totally opposite opinion. For example, the 1996 study by Andrews and Burton concluded that older consumers do not understand the information given on nutritional product labels as well as younger consumers do. Additionally, it depends on how much outside information the consumer has leading up to the interpretation of the information given on the label. For example, a July 2000 article in the *FDA Consumer* by Larry Thompson noted that many consumers misinterpret the SPF number on the label of sunscreens. A higher number does not indicate that the consumer can stay in the sun that



much longer, however it is interpreted by the consumer in this manner and this ultimately can lead to a skin disease such as cancer.

A study done at The Ohio State University showed that consumers often make their food choice purchases based on front label health claims and endorsements (Teratanavat et al., 2003). However, they go on to say that consumers also take into account the nutritional details on the label when considering the health claims made on the label. Are the health risks associated with cosmetic use as widely known as the health risks in our diets? Can a consumer look at the finer print of a cosmetics product's label and discern whether the product is as the label claims?

### **Methodology**

The methodology used in this study will most closely follow the writings of Gay and Airasian in their text *Educational Research: Competencies for Analysis and Applications* (2003). They describe survey research, also known as descriptive research, as using a questionnaire to gather data in order to determine and describe the attitudes and opinions of certain people regarding specific issues. Gay and Airasian offer basic steps to follow while doing survey research which include: "Identify a topic or problem, review the literature, select an appropriate sample of participants, collect valid and reliable data, analyze data, and report conclusions" (pg278). First of all, when identifying a topic, it is important that the topic be in need of investigation and that it is "researchable", or one that can be researched through the process stated above. The topic must also be significant or make a contribution to the subject matter. Secondly, literature related to the research topic must be located and read. This literature allows the

researcher to be informed of the recent progress on the topic, as well as offering to the researcher reliable methodology and data gathering techniques.

Thirdly, a sample of participants must be selected. In order for the sample to most represent the population being studied, the participants must be selected in the most random manner as possible to the study. Gay and Airasian offer a step by step method to simple random sampling as well as charts for determining appropriate sample size and assigning possible respondents identification. Fourthly, valid and reliable data must be collected. There are instruments that have been tested and proved valid and reliable that can be used to collect and measure data, however, if an instrument is not available that measures what the study is testing, an instrument can be constructed by the researcher. For this study, attitude scales, such as the Likert Scale, which measure an individual's beliefs and perceptions along a numeric scale, were used in order to create a questionnaire. Specifically, the Likert Scale asks the respondent to mark whether they strongly agree, agree, are undecided, disagree, or strongly disagree with a statement related to the topic. Fifthly, data can be analyzed using the appropriate techniques for the instrument used. This study will utilize the chi square test for statistical significance. Lastly, conclusions can be drawn and reported.

The survey portion of this study will utilize the writings of Don Dillman and his Total Design Method presented in the book, *Mail and Telephone Surveys* (1978). Dillman's Total Design Method (TDM) is presented as a way to improve response quantity and quality to a survey or questionnaire. He presents a process that uses known respondent behavior as well as administrative implementation procedures. For example, in order to maximize the chance that a respondent will put effort into mindfully

completing the questionnaire, the researcher must minimize the perceived cost to respond, offer a reward for responding and establish trust that the reward will be delivered. More specifically, the questionnaire must not take too much effort on the respondent's part and must have some sort of positive outcome associated with its completion.

An important component of a questionnaire is the questions themselves. For example, the questions must be interpreted by the whole population being studied in the same way, they must be specific, but not too specific and most importantly, they must be able to collect the information that is being tested in the study. The TDM uses a list of 16 questions in order to insure each question on the questionnaire is appropriate: 1) Will the words be uniformly understood? 2) Do the questions contain abbreviations or unconventional phrases? 3) Are the questions too vague? 4) Is the question too precise? 5) Is the question biased? 6) Is the question objectionable? 7) Is the question too demanding? 8) Is it a double question? 9) Does the question have a double negative? 10) Are the answer choices mutually exclusive? 11) Have you assumed too much knowledge? 12) Has too much been assumed about respondent behavior? 13) Is the question technically accurate? 14) Is an appropriate time referent provided? 15) Can the responses be compared with existing information? And 16) Are the questions too cryptic (pg 97-117)? These questions were used in this study in order to formulate the questionnaire.

Another important component of the questionnaire is its appearance. It is possible that a respondent may take one look at a questionnaire and not give another thought about completing it. To prevent this from happening, certain precautions must be taken. The

Total Design Method gives guidelines for everything from format and page layout to ordering of the questions and numbering. A questionnaire must look professional and give off the impression that this is an important and worthwhile study in order for the respondent to be encouraged to complete it. This study will utilize Dillman's TDM in order to maximize appropriate respondent behavior.

### **Summary**

The practice of labeling was initially created in order to convey important health and safety information to the consumer. However, with the loopholes in the regulations concerning labeling procedures, many labels may provide misleading information to the consumer. The question remains, how much stock does the average consumer put into the information printed on the label by the manufacturers of cosmetic products? Do consumers believe a product is safe simply because the manufacturer says it is or do they realize that the great design and pretty colors of a label are often hiding toxic chemicals?

## CHAPTER III

### METHODOLOGY

The following paragraphs will give information regarding the methods to be used in this research project. Specific methods regarding the respondents, instruments to be utilized, procedures, data collection and finally the statistical analysis will be given.

#### **Method**

In this study, the researcher utilized descriptive statistics in order to make a statement about the population being studied regarding consumer perception of safety in cosmetic products. By utilizing a 5-point Likert Scale adapted from a survey used by Gerald E. Smith in 1996, the perception of safety was collected from respondents. The results on the pilot test were tabulated and measured for statistical significance using Cronbach's Alpha reliability coefficient. The results of the final administration of the survey were tabulated and frequency of response was reported. In addition, a chi-square goodness of fit test was applied to test relationships between demographic variables and attitudes or knowledge. The details are discussed below.

#### **Research Questions and Hypotheses**

This study was developed to answer the following research questions.

- 1) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword "natural" as being safer than products where this keyword is omitted?

- 2) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “hypoallergenic” as being safer than products where this keyword is omitted?
- 3) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “dermatologist-tested” as being safer than products where this keyword is omitted?
- 4) Do demographic factors such as age and education influence the perceptions of consumers related to products that are labeled with the keyword “organic” as being safer than products where this keyword is omitted?

To answer these research questions, the following null hypotheses were tested:

- 1) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “natural” and a product whose label does not indicate this characteristic.
- 2) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “hypoallergenic” and a product whose label does not indicate this characteristic.
- 3) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “dermatologist-tested” and a product whose label does not indicate this characteristic.
- 4) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “organic” and a product whose label does not indicate this characteristic.

- 5) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “natural” and a product whose label does not indicate this characteristic.
- 6) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “hypoallergenic” and a product whose label does not indicate this characteristic.
- 7) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “dermatologist-tested” and a product whose label does not indicate this characteristic.
- 8) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “organic” and a product whose label does not indicate this characteristic.

### **Respondents**

The population that was studied in this research consisted of any woman who regularly uses cosmetic products. In order to promote serious response to the survey, respondents were limited to those who are 18 years of age or older. Therefore, eligible respondents were identified as any female cosmetic product consumer of 18 years or older. In descriptive statistics, it is common to sample 10 to 20% of the population, but because the population being studied here is so large, at least 50-75 useful surveys were necessary to be collected to assure acceptable response for analysis.

Random selection of respondents is vital to this research because a random sample will represent the population better than a nonrandom sample. Therefore, any

woman in the study area, regardless of appearance, who was shopping in a public store where cosmetics are sold was approached and asked to participate.

### **Instrument Selection**

A 1996 study by Gerald E. Smith utilized a 7-point Likert Scale survey in order to conclude that educated consumers are more motivated by positively framed advertising on labels while less-educated consumers are more motivated by negatively framed advertising on labels. In this study, the consumer perception of product safety when these positively or negatively framed phrases are put on the label is in question. The survey used in the 1996 study can be adapted for use in this study. For example, instead of a 7-point scale, a 5-point scale will be used in order to allow for a smaller sample size. The adapted survey will also use Dillman's Total Design Method for construction and administration.

### **Procedures**

The researcher sought approval from the Oklahoma State University Institutional Review Board in order to work with human subjects. Approval from several public stores in the Tulsa area was also needed in order to administer the survey on site. The survey was tested for validity and reliability in a small pilot test. Data collection then began. After a number of surveys were collected, the results were tabulated and a statistical analysis was done. From this analysis, statements about the population being studied were made.



## **Data Collection**

After approval from the IRB (see item 1 in Appendix) and permission to administer the survey from public store managers where cosmetics are sold, and upon completion of the pilot test and revisions of the survey, the researcher stood in the cosmetic aisle or section and verbally asked all women passersby to participate in a short survey. The assenting woman was handed a clipboard with the survey and a writing utensil. The front page of the survey explained the usefulness of the study. There was also a statement indicating that turning the page and completing the survey was assenting to participate. After 10 or more surveys were collected, the researcher repeated this process at other locations. Data were entered into a spreadsheet where tables and calculations were made.

## **Statistical Analysis**

To test the null hypothesis that no difference exists based on age or on education level in consumer perception of safety between labels that include keywords and labels that do not include those keywords, raw data from the survey will be entered into a spreadsheet. For each keyword being tested, there is a question where the respondent is given three misconceived definitions and 1 true statement regarding of the keyword or phrase when seen on a cosmetic label. Demographic questions regarding age and education level were also asked. Cronbach's alpha was calculated in order to test the internal consistency reliability of the survey. As correlation between items on the survey increases so does the calculated Cronbach's alpha.

For the keywords being tested, there were two groups of questions, one which when answered "Agree" meant that the respondent felt labels that include that specific

keyword indicate a safer product, and the other group which when answered “Agree” meant the respondent felt the specific keyword when shown on the label did not indicate a safer product. The responses to these two groups of questions were summarized in a 2x5 and 4x5 bivariate cross-tabulation separately for each keyword.

Percentages were calculated to make general statements about the sample population easier to see in the table. But in order to make a statement about the population being studied, the frequency distribution will have to be used to compute chi square, a non-parametric test of statistical significance. Using the formula,  $N$  (the total number of respondents for that question) multiplied by the total in that column, divided by the total for all columns, each cell's expected frequency can be calculated. Then using the formula, the difference between the observed and expected frequencies squared, divided by the expected frequency, chi square can be calculated for each cell. The sum of each cell's chi square is the table's chi square. Then the degrees of freedom can be calculated using the formula, the number of rows in the table minus one, multiplied by the number of columns in the table minus one. Using an alpha of 0.05 ( $p < 0.05$ ), the table's chi square can be compared with the appropriate distribution of chi square, a standard table found in most statistical analysis texts. If the table's chi square is more than the indicated chi square found in the literature, then the null hypothesis can be rejected and the claim that keywords on labels have a relationship to the consumer's perception of safety for the product can be made.

## CHAPTER IV

### FINDINGS

A pilot study was conducted in order to test the internal consistency reliability of the survey. The survey was administered to ten females above the age of 18 who lived in the Tulsa area. Interviews with each respondent regarding comprehension of each question took place. One minor problem with the survey was identified. Question 12 regarding respondent's year of birth was skipped and respondents only circled their age range. This omission was fixed by bolding the text in that part of the question, thus making the question more noticeable. After interviews, Cronbach's alpha was calculated at 0.954 which indicated high internal consistency. So after the minor change in font, the survey was deemed reliable.

The rest of this chapter will discuss the findings of this research. First, the demographics for the respondents of the usable questionnaires will be presented. Secondly, each question's descriptive statistics will be reported including the respective respondent frequencies and percentages. Thirdly, chi-square analysis will be presented. And lastly, the hypotheses will be revisited.

#### **Demographics**

After data collection, there were 100 usable questionnaires that will be considered in this data analysis. Of those 100 respondents, 100% were female. Age and education

level were the only two other demographics required and their breakdowns are as follows:

	<b>Frequency</b>	<b>Percentage</b>
<b>1975 &amp; After</b>	23	23
<b>1974-1965</b>	29	29
<b>1964-1955</b>	23	23
<b>1954 &amp; Before</b>	25	25
<b>Total</b>	100	100

**Table 1: Birth Year of All Respondents**

	<b>Frequency</b>	<b>Percentage</b>
<b>No College Degree</b>	51	51
<b>With College Degree</b>	49	49
<b>Total</b>	100	100

**Table 2: Education Level of All Respondents**

Note: The survey allowed for the following answers on Questions 12 and 13 regarding age and education respectively:

Question 12: “18-25”, “26-35”, “36-45” and “46-60”. This question also asked for the respondent to write in their birth year.

Question 13: “High school diploma or GED”, “Some post-high school education (vo-tech, military, etc.”, “Some college, but without a degree”, “College baccalaureate degree” and “Graduate degree”

In order to force subgroups into more equal numbers allowing for a more meaningful statistical analysis, these original subgroups were abandoned and the respondent’s answers were recoded into the following categories:

Question 12: “1975 & After”, “1974-1965”, “1964-1955” and “1954 & Before”

Question 13: “No college degree” and “College degree”

## Descriptive Statistics

Question 1: How educated would you say you are concerning the safety of the cosmetic products you use?

Discussion: In all subsections of respondents, the majority of them felt they were “Somewhat Informed” to “Informed”.

	Very Well Informed	Informed	Somewhat Informed	Uninformed	Total
<b>1975 &amp; After</b>	3	6	9	5	23
<b>1974-1965</b>	2	5	15	7	29
<b>1964-1955</b>	2	9	9	3	23
<b>1954 &amp; Before</b>	5	6	12	2	25
<b>Total</b>	12	26	45	17	100

Table 3: Frequencies for Question 1 vs. Birth Year

	Very Well Informed	Informed	Somewhat Informed	Uninformed	Total
<b>No College Degree</b>	8	10	25	8	51
<b>With College Degree</b>	4	16	20	9	49
<b>Total</b>	12	26	45	17	100

Table 4: Frequencies for Question 1 vs. Education

Question 2: Would you pay extra to buy a cosmetic product that was safest for you and your family to use?

Discussion: 93% of respondents agreed that they would pay extra for a safe product.

	Yes	No	Total
<b>1975 &amp; After</b>	22	1	23
<b>1974 – 1965</b>	28	1	9
<b>1964 – 1955</b>	20	3	23
<b>1954 &amp; Before</b>	23	2	25
<b>Total</b>	93	7	100

Table 5: Frequencies for Question 2 vs. Birth Year

	Yes	No	Total
<b>No College Degree</b>	48	3	51
<b>With College Degree</b>	45	4	49
<b>Total</b>	93	7	100

Table 6: Frequencies for Question 2 vs. Education

Question 3: “Dermatologist-Tested” definition –

Discussion: 65% of all respondents incorrectly chose an answer indicating a false definition of the phrase “Dermatologist-Tested” instead of correctly indicating that the phrase does not necessarily mean anything specific related to the product.

	<b>Incorrect</b>	<b>Correct</b>	<b>Total</b>
<b>1975 &amp; After</b>	12	11	23
<b>1974 – 1965</b>	23	6	29
<b>1964 – 1955</b>	16	7	23
<b>1954 &amp; Before</b>	14	11	25
<b>Total</b>	65	35	100

Table 7: Frequencies for Question 3 vs. Birth Year

	<b>Incorrect</b>	<b>Correct</b>	<b>Total</b>
<b>No College Degree</b>	33	18	51
<b>With College Degree</b>	32	17	49
<b>Total</b>	65	35	100

Table 8: Frequencies for Question 3 vs. Education

Question 4: If the 2 products cost the same, I would rather buy lotion that says “Hypoallergenic” on the label than a product that does not.

Discussion: 92% of all respondents were either neutral on the subject or disagreed to some degree thus indicating that they did not feel that the word “Hypoallergenic” indicated a safer product.

	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
<b>1975 &amp; After</b>	4	6	9	4	23
<b>1974 – 1965</b>	1	14	11	3	29
<b>1964 – 1955</b>	2	8	8	5	23
<b>1954 &amp; Before</b>	1	5	8	11	25
<b>Total</b>	8	33	36	23	100

Table 9: Frequencies for Question 4 vs. Birth Year

	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
<b>No College Degree</b>	3	15	17	16	51
<b>With College Degree</b>	5	18	19	7	49
<b>Total</b>	8	33	36	23	100

**Table 10: Frequencies for Question 4 vs. Education**

Question 5: “Hypoallergenic” definition.

Discussion: 71% of all respondents incorrectly chose an answer indicating a false definition of the term “Hypoallergenic” instead of correctly indicating that the phrase does not necessarily mean anything specific related to the product.

	<b>Incorrect</b>	<b>Correct</b>	<b>Total</b>
<b>1975 &amp; After</b>	16	7	23
<b>1974 – 1965</b>	21	8	29
<b>1964 – 1955</b>	18	5	23
<b>1954 &amp; Before</b>	16	9	25
<b>Total</b>	71	29	100

**Table 11: Frequencies for Question 5 vs. Birth Year**

	<b>Incorrect</b>	<b>Correct</b>	<b>Total</b>
<b>No College Degree</b>	40	11	51
<b>With College Degree</b>	31	18	49
<b>Total</b>	71	29	100

**Table 12: Frequencies for Question 5 vs. Education**

Question 6: I do not care if my cosmetic products say “Organic” on the label or not.

Discussion: 83% of all respondents were either neutral on this subject or agreed to some degree thus indicating that the word “Organic” did not indicate a safer product.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
<b>1975 &amp; After</b>	3	6	9	4	1	23
<b>1974 – 1965</b>	2	9	15	2	1	29
<b>1964 – 1955</b>	3	6	9	4	1	23
<b>1954 &amp; Before</b>	2	8	11	3	1	25
<b>Total</b>	10	29	44	13	4	100

**Table 13: Frequencies for Question 6 vs. Birth Year**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
<b>No College Degree</b>	5	13	25	7	1	51
<b>With College Degree</b>	5	16	19	6	3	49
<b>Total</b>	10	29	44	13	4	100

**Table 14: Frequencies for Question 6 vs. Education**

Question 7: “Natural” definition.

Discussion: 60% of all respondents incorrectly chose an answer indicating a false definition of the term “Natural” instead of correctly indicating that the phrase does not necessarily mean anything specific related to the product.

	<b>Incorrect</b>	<b>Correct</b>	<b>Total</b>
<b>1975 &amp; After</b>	15	8	23
<b>1974 – 1965</b>	22	7	29
<b>1964 – 1955</b>	10	13	23
<b>1954 &amp; Before</b>	13	12	25
<b>Total</b>	60	40	100

**Table 15: Frequencies for Question 7 vs. Birth Year**

	<b>Incorrect</b>	<b>Correct</b>	<b>Total</b>
<b>No College Degree</b>	36	15	51
<b>With College Degree</b>	24	25	49
<b>Total</b>	60	40	100

**Table 16: Frequencies for Question 7 vs. Education**

Chi-square = 4.862, df = 1, p = 0.027

Question 8: I buy “Dermatologist-Tested” cosmetic products whenever possible.

Discussion: 78% of all respondents were either neutral on this subject or disagreed to some degree thus indicating that the phrase “Dermatologist-Tested” did not indicate a safer product.



	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1975 & After	1	9	9	3	1	23
1974 – 1965	0	6	15	7	1	29
1964 – 1955	1	4	8	9	1	23
1954 & Before	0	1	12	9	3	25
<b>Total</b>	2	20	44	28	6	100

Table 17: Frequencies for Question 8 vs. Birth Year

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
No College Degree	1	8	22	16	4	51
With College Degree	1	12	22	12	2	49
<b>Total</b>	2	20	44	28	6	100

Table 18: Frequencies for Question 8 vs. Education

Question 9: “Organic” definition.

Discussion: 75% of all respondents incorrectly chose an answer indicating a false definition of the term “Organic” instead of correctly indicating that the phrase does not necessarily mean anything specific related to the product.

	Incorrect	Correct	Total
1975 & After	18	5	23
1974 – 1965	24	5	29
1964 – 1955	16	7	23
1954 & Before	17	8	25
<b>Total</b>	75	25	100

Table 19: Frequencies for Question 9 vs. Birth Year

	Incorrect	Correct	Total
No College Degree	40	11	51
With College Degree	35	14	49
<b>Total</b>	75	25	100

Table 20: Frequencies for Question 9 vs. Education

Question 10: I would not pay extra for cosmetic products labeled “Natural”.

Discussion: 78% of all respondents were either neutral on this subject or agreed to some degree thus indicating that the phrase “Natural” did not indicate a safer product.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
<b>1975 &amp; After</b>	3	8	6	4	2	23
<b>1974 – 1965</b>	2	9	11	7	0	29
<b>1964 – 1955</b>	0	7	12	3	1	23
<b>1954 &amp; Before</b>	3	8	9	4	1	25
<b>Total</b>	8	32	38	18	4	100

**Table 21: Frequencies for Question 10 vs. Birth Year**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
<b>No College Degree</b>	3	16	21	8	3	51
<b>With College Degree</b>	5	16	17	10	1	49
<b>Total</b>	8	32	38	18	4	100

**Table 22: Frequencies for Question 10 vs. Education**

### **Chi-Square Analysis and Discussion**

The tables above show only one significant difference when using an alpha for test of significance of 0.05 ( $p < 0.05$ ). Question 7, regarding the correct definition of the word “Natural” showed a significant difference between education groups. More specifically, it shows that respondents with a college degree better understood the fact that “Natural” does not necessarily mean anything specific when seen on a label, while respondents without a college degree chose false definitions of the word instead. This difference was not seen for any other word or phrase tested between education groups, nor any word or phrase tested at all among age groups. There was no significant difference among age or education groups when asked about their agreeability to buying certain products whose label included the specific words and phrases tested.

## **Hypotheses Revisited**

Based on the analysis presented above, the following hypotheses could not be rejected.

- 1) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “natural” and a product whose label does not indicate this characteristic.
- 2) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “hypoallergenic” and a product whose label does not indicate this characteristic.
- 3) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “dermatologist-tested” and a product whose label does not indicate this characteristic.
- 4) There is no difference based on age of respondents in the perception of safety between a product whose label indicates the product is “organic” and a product whose label does not indicate this characteristic.
- 5) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “natural” and a product whose label does not indicate this characteristic.
- 6) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “hypoallergenic” and a product whose label does not indicate this characteristic.
- 7) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “dermatologist-tested” and a product whose label does not indicate this characteristic.

- 8) There is no difference based on education level of respondents in the perception of safety between a product whose label indicates the product is “organic” and a product whose label does not indicate this characteristic.

In order to reject any one of these hypotheses, there needed to be a significant difference between age or education groups on Questions 4, 6, 8 and 10 respectively. The Chi-Square analysis showed no significant difference between groups on these particular questions. The significant difference on Question 7, the definition for “Natural” only showed a difference for the understanding of the meaning of the word, not for the actual perception of safety for the product. Had there also been a significant difference on Question 10, the degree of agreeability for paying extra for a product that had “Natural” on the label, then Hypothesis 5 would have been rejected.

## CHAPTER V

### CONCLUSION

This chapter will discuss the conclusions drawn from the findings in the previous chapter. First of all, implications for this particular study will be discussed. Secondly, implications for society will be presented. And lastly, recommendations for further research will be offered.

#### **Implications for this Study**

The null hypotheses involved in this study could not be rejected, therefore the research questions, based upon this sample and this study, must be negative. This study showed that the average consumer may not understand that the specific keywords tested in this study have no specific definition accepted by the FDA. The confusion on this matter may lead the consumer to make false assumptions regarding the usefulness of cosmetic products that include these keywords. However, this study showed that these keywords alone might not make the average consumer perceive the cosmetic product as any safer for use by their family.

It is interesting to note that even though the average consumer may be misled regarding the product's usefulness indicated by the keyword, the average consumer is not misled into a false sense of security regarding the product's safety. The question might be raised, "Is the average consumer so educated on this topic that they are not misled by the simple presence of the tested keywords, or is the average consumer oblivious to the

health implications of certain cosmetic products and thus believes that one product is as safe as the next regardless of label statements?” Most respondents reported themselves as being “Somewhat Informed” to “Informed”, thus a follow-up study should include more specific questions regarding the respondent’s knowledge of health related issues and the source of the information the respondent reported possessing.

### **Implications for Society**

The education of the average consumer is of utmost importance regarding this issue. In deciding what manner society should be educated, it should be noted that the misunderstanding of definitions and the perception of safety is largely uniform across age groups and education levels. A blanket statement could be made that all age groups and education levels are largely confused regarding the definition of the keywords tested, with the one exception being that those with a college degree perhaps better understand the keyword “natural” does not mean anything specific. Therefore, educational opportunities should be widespread and diverse in order to reach all age groups and education levels.

Furthermore, an appeal should be made to the FDA for assigning a definition for the common keywords that are used on cosmetic product labels. Even though the keywords are seemingly not solely responsible for the perception of the safety of cosmetic products, they are misleading consumer regarding the product’s usefulness and thus should be mainstreamed. If nothing else, at least the consumer would be able to better compare products that possessed certain qualities that keywords currently indicate.

## **Recommendations**

After this study, one might raise the question that if these specific keywords are not particularly affecting the perception of safety for cosmetic products, then what factors do raise the confidence level of the consumer regarding cosmetic product safety? Further research into this matter should concentrate on factors such as household brand names, price and packaging, as well as store location and reputation. For example, would a product sold by a well known manufacturer at an above average price in an extensive, attractive package in a well known store in a desirable part of town be perceived as a safer product than a product sold by a little known manufacturer at a cheap price in a dinky, dingy package in a little known store in a less desirable part of town? Each one of these factors should be examined on its own for effect on consumer perception of safety. Furthermore, combinations of these and other factors, including specific keywords on labels, should be tested for effect on consumer perception.

## REFERENCES

Adibi, J. J., Perera, F.P., Jedrychoski, W., Camann, D.E., Barr, D., Jacek, R., et al. (November, 2003). Prenatal Exposures to Phthalates among Women in New York City and Krakow, Poland. *Environmental Health Perspectives*. 111 (14), 1719-1722.

Aldrich Chemical Company. (June, 1991). MSDS for Dibutyl Phthalate 99%. Milwaukee, WI.

American Experience. (2001). *People and Events – America’s Beauty Culture*.

Retrieved January 5<sup>th</sup>, 2006 from

[http://www.pbs.org/wgbh/amex/missamerica/peopleevents/e\\_beauty.html](http://www.pbs.org/wgbh/amex/missamerica/peopleevents/e_beauty.html)

American Liver Foundation. (2003). *Your Liver Treats You Right*. (Brochure). New York, New York.

ATSDR. (1995). Toxicological Profile for Diethylphthalate. Atlanta, GA: *Agency for Toxic Substances and Disease Registry*.

ATSDR. (1997). Toxicological Profile for Di-n-octylphthalate. Atlanta, GA: *Agency for Toxic Substances and Disease Registry*.



ATSDR. (2001). Toxicological Profile for Di-*n*-butyl Phthalate. Atlanta, GA: *Agency for Toxic Substances and Disease Registry*.

ATSDR. (2001). Public Health Statement for Di-*n*-butyl Phthalate. Atlanta, GA: *Agency for Toxic Substances and Disease Registry*.

ATSDR. (2002). Toxicological Profile for Di(2-ethylhexyl)phthalate. Atlanta, GA: *Agency for Toxic Substances and Disease Registry*.

Barr, D.B., Silva, M.J., Kato, K., Reidy, J.A., Malek, N.A., Hurtz, D., et al. (July, 2003). Assessing Human Exposure to Phthalates Using Monoesters and Their Oxidized Metabolites as Biomarkers. *Environmental Health Perspectives*. 111 (9), 1148-1151.

Blount, B.C., et al. (2000, October). Levels of seven urinary phthalate metabolites in a human reference population. *Environmental Health Perspectives*. 108 (10), 979-982.

Bond, B. (2003). *Detoxification/Purification Seminar*. (Brochure). Euclid, OH.

Burton, S., & Andrews, J. C. (1996). Age, Product Nutrition and Label Format Effects on Consumer Perceptions and Product Evaluations. *Journal of Consumer Affairs*, 30(1).

Retrieved August 20, 2006, from Questia database:

<http://www.questia.com/PM.qst?a=o&d=5001633613>.

Carson, R. *Silent Spring*. Houghton Mifflin Company. New York, New York. 1962.

Colborn, T., Dumanoski, D., Myers, J.P. *Our Stolen Future*. Penguin Group. New York, New York. 1997.

Colon, I., Caro, D., Bourdony, C.J., Rosario, O. (September, 2000). Identification of Phthalate Esters in the Serum of Young Puerto Rican Girls with Premature Breast Development. *Environmental Health Perspectives*. 108 (9), 895-900.

Connor-Linton, J. Department of Linguistics, Georgetown University (2003). *Chi-Square Tutorial*. Retrieved October 4<sup>th</sup>, 2006 from Georgetown University website at: [http://www.georgetown.edu/faculty/ballc/webtools/web\\_chi\\_tut.html](http://www.georgetown.edu/faculty/ballc/webtools/web_chi_tut.html).

Consumers Union. (2002). *Consumers Union Guide to Environmental Labels*. Retrieved in June, 2005 from <http://www.eco-labels.org>

Crisp, T.M., Clegg, E.D., Cooper, R.L., Wood, W.P., Anderson, D.G., Baetcke, K.P., et al. (1998, February). Environmental Endocrine Disruption: An Effects Assessment and Analysis. *Environmental Health Perspectives*. 106 (1), 11-56.

Davis, B.J., Maronpot, R.R., Heindel, J.J. (1994). Di-(2-ethylhexyl) phthalate suppresses estradiol and ovulation in cycling rats. *Toxicologically Applied Pharmacology*. 128: 216-223.

Deturck, M. A., & Goldhaber, G. M. (1989). Effectiveness of Product Warning Labels: Effects of Consumers' Information Processing Objectives. *Journal of Consumer Affairs*, 23(1). Retrieved August 20, 2006, from Questia database:  
<http://www.questia.com/PM.qst?a=o&d=5000105825>.

Dillman, D.A. (1978). *Mail and Telephone Surveys: The Total Design Method*. John Wiley & Sons. New York.

Duty, S.M., Singh, N.P., Silva, M.J., Barr, D.B., Brock, J.W., Ryan, L., et al. (2003, July). The Relationship between Environmental Exposures to Phthalates and DNA Damage in Human Sperm Using the Neutral Comet Assay. *Environmental Health Perspectives*. 111 (9), 1164-1169.

The Editors of the *Chemical Market Reporter*. (December, 2000). Activists Target Phthalates in Personal Care Products. (Electronic Version). *Chemical Market Reporter*.

The Editors of *The New Atlantis*. Technology: The Great Enabler? *The New Atlantis*, Number 2, Summer 2003, pp. 110-111.

The Editors of *PR Newswire*. (November, 2002). American Beauty Association Reports Dibutyl Phthalate (DBP) Is Safe as Used in Nail Polish; Scientific Study Supports Expert Panel Conclusion. *PR Newswire*.

Ema, M., Miyawaki, E., Kawashima, K. (1998, September). Further evaluation of developmental toxicity of di-n-butyl phthalate following administration during late pregnancy in rats. *Toxicology Letters*. 87-93.

Environmental Working Group. (2003, July). *Health Effects of Dibutyl Phthalate (DBP)*. Retrieved January 4<sup>th</sup>, 2006 from <http://www.ewg.org>

Farlow, C.H. (2001). *Dying to Look Good: The Disturbing Truth about What's Really in Your Cosmetics, Toiletries and Personal Care Products*. KISS For Health Publishing. Escondido, CA.

Faulke, J.E. (May, 1992). "Cosmetic Ingredients: Understanding the Puffery". (Electronic Version). *FDA Consumer*.

Faulke, J.E. (May, 1994). "FDA Regulations on Labeling". (Electronic Version). *FDA Consumer*.

Fugh-Berman, A. (January, 1999). "Woman to Woman". (Electronic Version). *Natural Health*.

Gay, L.R., Airasian, P. (2003). *Educational Research: Competencies for Analysis and Applications*. (Seventh Edition). Merrill-Prentice Hall. Upper Saddle River, New Jersey.

Geffken, C. (January, 2001). A Regulatory Retrospective: The cosmetic industry does more than just make pretty faces; it must assure the safety of those it serves. (Electronic Version). *Global Cosmetic Industry*.

IBISWorld. (n.d.). Market Research Reports by IBISWorld - United States Industry Analysis. Retrieved on July 3<sup>rd</sup>, 2005 from <http://www.ibisworld.com/>

Jobling, S., Reynolds, T., White, R., Parker, M.G., Sumpter, J.P. (1995). A variety of environmentally persistent chemicals, including some phthalate plasticizers, are weakly estrogenic. *Environmental Health Perspectives*. 103:582-587.

Lancaster, L., Stillman, D. (2003). *When Generations Collide*. HarperCollins, New York.

Latini, G., DeFelice, C., Presta, G., DelVecchio, A., Paris, I., Ruggieri, F. et al. (2003, November). In Utero Exposure to Di-(2-ethylhexyl) phthalate and Duration of Human Pregnancy. *Environmental Health Perspectives*. 111 (14), 1783-1785.

Lerner, I. (September, 2001). Cosmetics and Personal Care Markets Remain Steady. (Electronic Version). *Chemical Market Reporter*.

Marsman, D.S. (March, 1995). *NTP Technical Report on Toxicity Studies of Dibutyl Phthalate*. National Toxicology Program – Toxicity Report Series Number 30.

Medford, L., C.N. (2003). *Why Am I So Grumpy, Dopey and Sleepy?* LDN Publishing. Tulsa, OK.

Medford, L., C.N. (2003). *Why Do I Feel So Lousy?* LDN Publishing. Tulsa, OK.

Mylchreest, E., Cattley, R.C., Foster, P.M.D. (1998). Male reproductive tract malformations in rats following gestational and lactational exposure to di(*n*-butyl)phthalate: an antiandrogenic mechanism? *Toxicological Science*. 43: 47-60.

Mylchreest, E., Sar, M., Wallace, D.G., Foster, P.M.D. (2002). Fetal testosterone insufficiency and abnormal proliferation of Leydig cells and gonocytes in rats exposed to di(*n*-butyl) phthalate. *Reproductive Toxicology*. 16:19-28.

Mylchreest, E., Wallace, D.G., Cattley, R.C., Foster, P.M.D. (2000). Dose-dependent alterations in androgen-regulated male reproductive development in rats exposed to di(*n*-butyl) phthalate during late gestation. *Toxicological Science*. 55: 143-151.

Ohtani, H., Miura, I., Ichikawa, Y. (December, 2000). Effects of Dibutyl Phthalate as an Environmental Endocrine Disruptor on Gonadal Sex Differentiation of Genetic Males of the Frog *Rana rugosa*. *Environmental Health Perspectives*. 108(12), 1189-1193.

Paulozzi, L.J., Erickson, J.D., Jackson, R.J. (1997). Hypospadias trends in two US surveillance systems. *Pediatrics*. 100(5): 831-834.

Paulozzi, L.J. (1999, April). International trends in rates of hypospadias and cryptorchidism. *Environmental Health Perspectives*. 107(4), 297-302.

Pickrell, J. (2002, July). Beauty products may damage fetal development. (Electronic Version). *Science News*.

Rossiter, J.R., Percy, L. and Donovan., R.J. "A Better Advertising Planning Grid." *Journal of Advertising Research* 31, 5 (1991): 11-21.

Safe, S. (2000, June). Endocrine Disruptors and Human Health – Is There a Problem? An Update. *Environmental Health Perspectives*. 108 (6), 487-493.

Sauer, P. (May, 2001). A Makeover for Personal Care and Cosmetics. (Electronic Version). *Chemical Market Reporter*.

Snow, C.P. *New York Times*. 15 March 1971.

Smith, G. E. (1996). Framing in Advertising and the Moderating Impact of Consumer Education. *Journal of Advertising Research*, 36(5). Retrieved August 20th, 2006, from Questia database: <http://www.questia.com/PM.qst?a=o&d=5001738352>

Swan, S.H., Elkin, E.P., Fenster, L. (2000, October). The question of declining sperm density revisited: Analysis of 101 studies published 1934-1996. *Environmental Health Perspectives*. 108 (10), 961-966.

Teratanavat, R., Hooker, N., Haugtvedt, C., Rucker, D. *Functional Food Labels: Experimental Evidence of the Role of Claims and Endorsement* – Presented at the International Research Conference on Food, Nutrition, and Cancer, Washington, D.C., July 17-18, 2003.

Thompson, L. (2000, July). Trying to Look SUNsational?. *FDA Consumer*, 34. Retrieved October 6, 2006, from Questia database:  
<http://www.questia.com/PM.qst?a=o&d=5002358059>.

Toppari, J., Larsen, J.C., Christiansen, P., Giwercman, A., Grandjean, P., Guillette, L.J.Jr., et al. (1996, August). Male Reproductive Health and Environmental Xenoestrogens. *Environmental Health Perspectives*. 104(S4), 741-803.

U. S. Food and Drug Administration - Center for Food Safety and Applied Nutrition - Office of Cosmetics and Colors. (October, 1991). *Cosmetic Labeling Guide*. (Brochure).

Vance, Judi. (2000). *Beauty to Die For: The Cosmetic Consequence*. toExcel Press. Lincoln, NB.



## APPENDIX

### IRB Approval

#### Oklahoma State University Institutional Review Board

Date: Thursday, February 22, 2007  
IRB Application No GU074  
Proposal Title: Perceptions of Product Safety As Influenced by Product Labels for Cosmetics  
Reviewed and Processed as: Exempt

**Status Recommended by Reviewer(s): Approved Protocol Expires: 2/21/2008**

Principal Investigator(s)

Lori B Oller  
2203 W. Crestwood Dr.  
Sperry, OK 74073

Lowell Caneday  
184 Colvin Center  
Stillwater, OK 74075

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The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

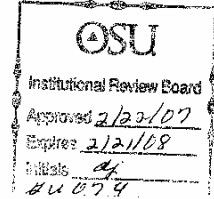
Sincerely,



Sue C. Jacobs, Chair  
Institutional Review Board

# Survey

## PERCEPTIONS OF PRODUCT SAFETY AS INFLUENCED BY PRODUCT LABELS FOR COSMETICS



This survey was designed in order to gather information about how consumers feel about the safety of the cosmetic products that they use and how keywords on the label might influence this decision. Please answer all of the questions. This survey should take 2-5 minutes to complete. If you wish to comment on any of the questions or qualify your answers, please feel free to use the space in the margins. You may also make comments and/or suggestions at the end of the survey. Your comments will be read and taken into account.

Your responses to this survey will assist in completion of a thesis at Oklahoma State University. You have been randomly selected to be included in this survey. Your responses will not be personally identifiable and will be treated in aggregate only. If you have questions about the research and your rights as a research volunteer, you may contact Dr. Sue Jacobs, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-1676 or [irb@okstate.edu](mailto:irb@okstate.edu)

By turning the page and continuing with this survey, you are agreeing to participate in this study. Thank you for your help!



If you have questions regarding this survey or would like a summary of the results, contact:

**Lori Oller**  
**PO Box 269**  
**Sperry, OK 74073**  
**918-857-5151**

**Please indicate your most nearly correct answer by circling the number of your choice.**

Q-1 How informed are you concerning the safety of the cosmetic products you use?

1	Very well informed
2	Informed
3	Somewhat informed
4	Uninformed

Q-2 Would you pay extra to buy a cosmetic product that was safest for you and your family to use?

1	Yes
2	No

Q-3 When I see the phrase "Dermatologist-Tested" on a cosmetic product label, I can be sure that:

1	A doctor thinks this product is safer than other products
2	This product will clear up my skin/Keep my skin clear
3	This product has been tested for safety and has passed those tests
4	The phrase "Dermatologist-Tested" on a label does not necessarily mean anything specific related to the product

Q-4 If the 2 products cost the same, I would rather buy lotion that says "Hypoallergenic" on the label than a product that does not.

1	Strongly agree
2	Agree
3	Neutral
4	Disagree
5	Strongly disagree

Q-5 When I see the word "Hypoallergenic" on a cosmetic product label, I can be sure that:

1	This product will not cause an allergic reaction
2	This product is safe for someone who has allergies
3	The word "Hypoallergenic" on a label does not necessarily mean anything specific related to the product
4	This product is safe for all skin types

Q-6 I do not care if my cosmetic products say "Organic" on the label or not.

1	Strongly agree
2	Agree
3	Neutral
4	Disagree
5	Strongly disagree

Q-7 When I see the word "Natural" on a cosmetic product label, I can be sure that:

1	All the ingredients of this product were grown, manufactured or processed naturally
2	The word "Natural" on a label does not necessarily mean anything specific related to the product
3	This product is safer to use than non-natural products
4	This product contains no pesticides

Q-8 I buy "Dermatologist-Tested" cosmetic products whenever possible.

1	Strongly agree
2	Agree
3	Neutral
4	Disagree
5	Strongly disagree

Q-9 When I see the word “Organic” on a cosmetic product label, I can be sure that:

1	The word “Organic” on a label does not mean anything specific related to the product
2	This product is safer to use than non-organic products
3	This product contains no pesticides
4	All the ingredients of this product were grown, manufactured or processed organically

Q-10 I would not pay extra for cosmetic products labeled “Natural”.

1	Strongly agree
2	Agree
3	Neutral
4	Disagree
5	Strongly disagree

Q-11 Please mark your gender:

1	Male
2	Female

Q-12 What year were you born? \_\_\_\_\_

Please mark your age:

1	18 – 25
2	26 – 35
3	36 – 45
4	46 – 60
5	60 or more

Q-13 Please mark the highest level of education that you have completed:

1	High school diploma or GED
2	Some post-high school education (vo-tech, military, etc.)
3	Some college, but without a degree
4	College baccaiaureate degree
5	Graduate degree

Is there anything you would like to tell us about cosmetic product safety or product labeling? If so, please use this space for that purpose.

Also, please add any comments you wish to make that you think may help us with future efforts to understand consumer perception of cosmetic product safety.

Your contribution to this effort is greatly appreciated.  
Thanks Again!

## VITA

Lori Beth Oller

Candidate for the Degree of

Master of Science

Thesis: PERCEPTIONS OF PRODUCT SAFETY AS INFLUENCED BY PRODUCT LABELS FOR COSMETICS

Major Field: Environmental Science

### Biographical:

Personal Data: Born in Tulsa, Oklahoma on November 20<sup>th</sup>, 1978 to Jack and Mary Jane Hill. Married Mr. Daniel Oller in December of 1999. First daughter was born in May of 2006.

Education: Graduated from East Central High School, Tulsa, Oklahoma, as class Valedictorian in May, 1997; attended Tulsa Community College while concurrently enrolled in high school and received Bachelor of Science in Environmental Policy with a Minor in Marketing Communications from The University of Tulsa, in May, 2001. Completed the requirements for Master of Science degree with a major in Environmental Science at Oklahoma State University in July, 2007.

Experience: 2 years with Enviryx in Tulsa, Oklahoma interpreting Material Safety Data Sheets for laymen. Currently, 2 years as a 6<sup>th</sup> Grade Science and Reading Educator for Tulsa Public Schools, Tulsa, Oklahoma.

Professional Memberships: Tulsa Classroom Teachers Association (TCTA),  
National Association of Realtors (NAR)

Name: Lori Beth Oller

Date of Degree: July, 2007

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: PERCEPTIONS OF PRODUCT SAFETY AS INFLUENCED BY  
PRODUCT LABELS FOR COSMETICS

Pages in Study: 57

Candidate for the Degree of Master of Science

Major Field: Environmental Science

Scope and Method of Study: Health issues may arise from the daily use of specific cosmetic products. The average consumer may not have the time to research each product, and thus may depend on keywords located on the product's label to indicate the relative safety of the cosmetic product. In order to test the hypothesis that there is no difference in the perception of safety of cosmetic products based on the presence of specific keywords on the product's label between age groups and education levels, a survey was designed, data randomly collected and a chi-square analysis was performed.

Findings and Conclusions: This study found that there were no significant differences among age groups and education levels regarding cosmetic perception of safety because of specific keywords located on the product's label. A large majority of all respondents misunderstand the fact that the keywords presented have no real definition accepted by the FDA. However, this same majority also indicate that the simple presence of these keywords on a cosmetic product's label does not necessarily indicate a safer product than a product without these keywords present on the label. It is imperative that education be widespread and diverse in order to reach all age groups and education levels regarding this issue.

ADVISER'S APPROVAL: \_\_\_\_\_

Dr. Lowell Caneday