The Case of the Missing Red M&M's: A Study of Public Perception on Artificial Food Coloring and Manufacturer Response

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Since the 1900's, many American food manufacturers used artificial dyes to enhance the appearance and attractiveness of processed foods (Hisano, 2016). As the use of food dyes increased, more scientific studies investigated the adverse health effects of the dyes. Consequently, American consumers grew weary of the stigmas regarding the healthiness of the colorants and avoided foods with strange coloration (Burrows, 2009; Oplatowska-Stachowiak & Elliott, 2017). A prime example of this public hysteria is when the fear of Red Dye No. 2 resulted in the disappearance of red M&M's in the 1970's (Melina, 2011). Various scholars studied the attribution of food color to perceived flavor and quality in an attempt to understand the divergence of public opinion towards food coloring. While these scholars focus on the association of color with flavor and healthiness, they do not take into account the impact that the characteristics of the technology itself had on evoking polarized public opinion. Understanding how the perception of artificial food coloring as "unnatural" molded public attitudes towards the controversial technology allows for a comprehensive analysis as to why public responses were polarized. I will explain how the characteristics of artificial coloring combined the cultural categories of nature and culture in order to reveal how the technology's "unnatural" qualities generated divergent responses. To frame my analysis, I will draw on Martijntje Smits' monster theory, which attributes polarized attitudes towards new technology to the perception that it fuses two discrete cultural categories to produce an "unnatural" and "monstrous" technological hybrid. Specifically, I will demonstrate that the disappearance and reappearance of red M&M's in the late 1970's were due to the changing interpretations of the combined cultural categories of nature and culture, resulting in three sequential public perspectives of red M&M's: "monster embracing," followed by "monster exorcism," and return to "monster embracing."

Background

Mars, the company that created M&M's chocolate candies, originally produced red, yellow, violet, green, and brown M&M's colors ("M&M's," 2020). However, a series of studies showing how Red Dye No. 2 caused fetal death in rats caused public fear towards red food coloring, leading to a historical panic known as the "Red Scare" (Liebig, 2017; Schumm, 2014). Despite containing the less controversial Red Dye No. 40, Mars removed red M&M's from production due to the combination of media/consumer outcry and the abundance of caution by the FDA (Melina, 2011). Instead of explaining to the public that red M&M's did not contain the denigrated dye, the company ceded to public anxiety of red food, and replaced the red color with orange M&M's as shown in Figure 1 (Melina, 2011; "M&M's," 2020). Later in the year, *Science* released an article discrediting the red dye studies claiming that the laboratory was mismanaged and that the results were invalid, easing some public discomfort (Boffey, 1976a). Ten years later when the panic subsided, Paul Hethmon, a freshman at the University of Tennessee, started the Society for Restoration and Preservation of Red M&M's as an initiative to bring back the red M&M's from his childhood (Vicars, 2015). Eventually, consumer demand pushed Mars to bring back red M&M's and rebranded the colored chocolate candies.

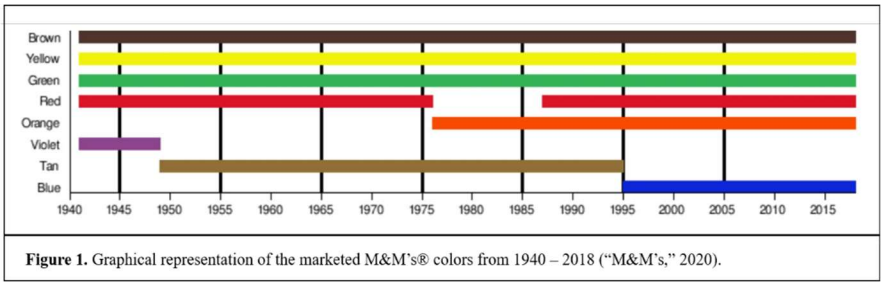

Figure 1. Graphical representation of the marketed M&M's® colors from 1940 – 2018 ("M&M's," 2020).

Literature Review

Scholars often agree that added colors increase the attractiveness of food and influence the perception of flavor and healthiness to consumers. As a result, there is an industry trend to remove synthetic colors from food products and replace them with more natural colored food (Oplatowska-Stachowiak & Elliott, 2017). Many studies have analyzed how industry choices in

food colors influences perception of flavors and, consequently, public opinion of possible health effects from these colorants. However, these scholars do not provide insight into how the perceived qualities of the technology itself caused polarized public perception.

One study claims that people's food color choices are unconscious and that the color chosen affects the perception of quality. In the survey conducted, scientists analyzed public perception of food manufacturers switching to "natural colors," despite the lack of regulatory acknowledgement of naturally existing colors (Downham & Collins, 2000). The study showed that a strawberry color indicated to consumers a high quality product, while an artificially bright or wash out product indicated poor quality and an inferior product. This result shows that food color choices made by the company and influence public perception of the healthiness of a certain product.

Another study found that specific food colors link to certain flavors and perceived taste, as in the case of Crystal Pepsi, a colorless soft drink. The product was created to appeal to consumer demands of banishing food coloring from soft drinks. However, the product did not succeed because different people attributed different tastes to the clearness. Many people trying the new Pepsi said that it tasted like lemon lime soda but none of these flavors were part of the ingredients (Magoulas, 2009). This shows that the brain is trained to associate certain colors and taste, and it is difficult to change these preconceived notions; ultimately showing how Pepsi's choice in color affected public perception of the drink.

These scholars have paved the way to understanding how industry choices in labeling and marketing certain colors in their product can affect consumer perception of a food flavors and quality. They even discuss how various food colors set out by manufacturers play a role in a general trend towards consumer preferences for more natural products. While these scholars

focus on the association of color with flavor and quality in understanding public opinions of artificial food coloring, many fail to explain how the characteristics of the technology itself caused public dissent; thus, it does not fully capture the reasoning behind contradictory attitudes. In the analysis that follows, I will explain how the perception of artificial food coloring as "unnatural" played a role in generating polarized public opinions about the technology.

Conceptual Framework

Martijntje Smits' monster theory explores the cultural domestication of new technology. Often, the introduction of a new technology into society invokes public discomfort resulting in polarized public views of the technology (Smits, 2006). Central to monster theory is the metaphorical comparison of emerging technology to Frankenstein's monster which illustrates the dangers of new technology. In Mary Shelley's novel, Frankenstein's monster symbolizes an out of control technology that disrupts world order and represents a technological creation that defies the creator's autonomy. Consequently, Doctor Frankenstein abandons his monstrous creation, just as our society rejects new technology, out of fear. This reaction arises when an idea does not fit into current cultural categories whereby people understand the world. Cultural categories are collective, symbolic reconstructions that form a preconditioned perception of an idea; in other words, they are binary classifications of the world (Smits, 2006). Examples of these categories include man and woman, organism and machine, nature/natural and culture/unnatural, life and death, human and animal. New technology frequently meets public uneasiness because it fits simultaneously into two mutually exclusive categories resulting in ambiguity and "unnaturalness." According to Smits' theory, the ambivalent introduces feelings of fascination or fear, our reaction to things we cannot understand or control. Technologies that introduce

ambiguity also elicit strong polarizing reactions, either passionately for or against the technology, resulting in the label "monsters."

Smits categorizes the public reaction towards plastics into four styles of monster treatment: (1) "monster exorcism" explains why people perceive technology as unnatural and intimidating, (2) "monster embracing" depicts why some groups might praise the technology, (3) "monster adaptation" suggests how technology can change to fit into existing cultural categories in response to public perceptions, and (4) "monster assimilation" shows how both the technology and cultural categories evolve and allow the technology to be domesticated into society (Smits, 2006). While controversial technology often encounters concurrent styles of monster treatment, Smits argues that polarized responses do not need to be simultaneous, but may be presented sequentially.

Smits' monster theory offers a productive framework for analyzing the disappearance and reemergence of red M&M's. Specifically, I will evaluate the causes of polarized responses to red artificial food coloring because this technology was perceived as fusing the cultural categories of nature and culture. I use "nature" to refer to elements and behaviors perceived as belonging to the natural world while "culture" includes artifacts of human engineering, creation, manipulation, and design that otherwise do not exist in nature or naturally. In the analysis that follows, I will use monster theory to explain the polarization of public perception towards artificial food coloring by first examining the "monster embracing" perspective. Then I will explain how public interpretation of the fusion of cultural categories shifted with new information, resulting in the "monster exorcism" followed by the return of the "monster embracing" viewpoints.

Analysis

Monster Embracing

Since its birth in 1941, M&M's were met with a "monster embracing" perspective in the United States because the vibrant candy shell fused the distinct cultural categories of nature and culture. In an interview, confectionery expert Beth Kimmerle used a "monster embracing" point of view in order to reminisce on the joy that M&M's brought to American soldiers during World War II. She notes that the "bright colors of the sugar exterior made a simple candy into a whimsical chocolate cheer from home" (Fantozzi, 2019). Kimmerle uses the term "bright colors" to speak to the categorical fusion of the natural (colors) and the cultural (bright). In fact, some consumers are drawn to M&M's because the colors emulate the tones of fresh produce. For example, one user in a public forum states that their favorite M&M's colors are red and brown because it reminds them of their grandmother's garden, referring to how the "red color… hint[s] at strawberry or cherry or beetroot" (Chaitanya, 2014; Prezuiwf, 2017). This implies that the iconic colors of M&M's are comparable to the natural hues of fruits and vegetables, making the artificial food coloring part of the nature category. On the other hand, food scientist Otto Hunziker explains that synthetic food dyes used in M&M's are "generally more stable and stronger… in their intensity" compared to natural food dyes, and that "while the color of natural dyes faded when exposed to direct sunlight, synthetic dyes were less vulnerable to light." The "stronger intensity" and less vulnerability to light highlights the idea that artificial food coloring is unlike natural dyes because of its persevering characteristics, indicating that the technology also belongs to the culture category.

Kimmerle responds to this fusion of categories as a monster embracer. For instance, she uses the word "whimsical" to show the enthusiasm and amusement for the brilliant M&M colors,

despite the somber historical context of World War II. As historian Warren Susman notes, the artificial dyes in M&M's "made possible a world of color never seen before" (Hisano, 2016). Susman highlights the excitement for a novel application of artificial food coloring to chocolate when he notes that the colors were "never seen before." Therefore, the "unnatural" colors of M&M's were met with exuberance due to its unconventional, yet imaginative combination of the nature and culture categories, leading this technology through the "monster embracing" phase.

Monster Exorcism

In the 1970's, new studies showing that Red Dye No. 2 caused fetal death instigated public fear to the fusion of cultural categories with a "monster exorcism" perspective. A comment by Jacqueline Verrett, an FDA biochemist working on the red dye research studies, exemplifies the monster exorcist viewpoint towards artificial food color during the time. When discussing the results of the scientific food dye studies, she remarks that the "[Red No. 2] dye was associated with a significant number of fetal [rat] deaths… confirming some of the Russian results," implying that the red color found in many foods, such as M&M's, is "the abortion pill you may not want" (Boffey, 1976b). The term "abortion pill" describes the two cultural categories in which the artificial colorant fuses: nature (abortion) and culture (pill). In this case, abortion describes the nature category because it occurs spontaneously without intentional intervention (also known as a miscarriage) and can occur in nature to most organisms (Weatherspoon, 2019). On the other hand, the pill describes the culture category because it is a medical technology "produced by biomedical research" and human manipulation (Boston University, n.d.). In this case, the categorical combination of nature and culture of red food dye is viewed as a negative characteristic, depicting the hostility towards artificial food coloring. The red color, which was once appraised for its "unnaturalness," is perceived as a deficit rather than a

benefit. The new information caused a shift in public interpretation of the fusion of the cultural categories nature and culture, resulting in the artificial food coloring to be viewed from the "monster exorcism" perspective.

Additionally, the creator of M&M's, Mars, also took on a monster exorcist viewpoint after the release of the new Red Dye No. 2 studies. In response to public resistance against red food coloring, Mars decided to pull M&M's from the market. According to Mars, "the red candies were pulled from the color mix… to avoid customer confusion" (Smith, n.d.). While the M&M's did not specifically contain Red Dye No. 2, Mars took the initiative to eliminate the color from its chocolate brand. The claim to "avoid customer confusion" shows Mars' acknowledgement of public monster exorcist perception towards red food coloring; thus, public fear and aversion of red food coloring due to its merging of cultural categories caused red M&M's to be banished from the market.

Reappearance of Monster Embracing

Most fear of red food coloring eventually subsided resulting in a shift of public interpretation of the fused cultural categories and initiated a movement to bring back red M&M's, transitioning the technology back to its "monster embracing" phase. The acceptance of red food coloring was initiated by a *Science* article claiming that the Red Dye No. 2 studies were false due to mismanaged experiments. According to the article, the laboratory was not properly supervised - experimental and control groups of rats were often mixed up and returned to the wrong cages, resulting in improper analysis (Boffey, 1976a). The release of new information tamed public alarm against red food coloring and allowed yet another shift in the interpretation of the fused cultural categories.

Ten years later, Paul Hethmon, who was credited with starting the petition to bring back red M&M's, expressed his disappointed feelings about the absent red M&M in an interview with the *Chicago Tribune*. He told the reporter that "it wasn't so much a matter of taste – all M&M's taste alike, regardless of color… It was like the difference between seeing 'The Wizard of Oz' in Technicolor and in black and white. You just don't want to picture the Yellow Brick Road in black and white. That's what M&M's were like without the red ones" (Greene, 1987) First, Hethmon juxtaposed the color of the candied chocolate and the perceived flavor, stating that M&M's "taste alike, regardless of color." While studies have shown that color is an important natural food-intrinsic sensory cue for setting people's expectations regarding the flavor of foods, Hethmon's comment implies that the M&M's colors did not coincide with the flavor (Spence, 2015). He acknowledges that the artificial colors of M&M's uniquely fuse the cultural categories of nature (the exhibited M&M's color) and culture (the unchanging perceived chocolate flavor).

However, some might think that specific M&M's colors are associated with distinct flavors because they believe that the candied shell is independently coated for each color, thereby disconnecting the claim that M&M's color and flavor are a fusion of cultural categories (Gereghty, 2012). This argument holds some truth as studies have shown that the association between the color of food and the perceived flavor, such as a yellow color indicating lemon, is a visceral human habit (Burrows, 2009). Yet this view fails to consider the production process of M&M's where each M&M's is created the same way, despite the color. In an episode of Food Network's *Unwrapped*, Mars gives a brief overview of how M&M's are produced. The video explains that a single batch of liquid chocolate is created and molded into the iconic M&M's lentil shape. Then, the M&M's are covered with a uniform sugar coating and then shellacked with tasteless artificial food coloring (Food Network, 2019). Logically, this shows that all

candied shells on M&M's are the same and possess indifferent tastes as a result of human manufacturing; thus, solidifying the argument that artificial colors in M&M's fuses the cultural categories of nature (color) and culture (indistinguishable flavor).

In his interview, Hethmon goes on to compare the missing red M&M's to a missing Yellow Brick Road from 'The Wizard of Oz', indicating an unappealing visual of "black and white." Through this analogy, he reasons that M&M's are dull and unappealing without the red variety, emphasizing the need for red M&M's to be included in the color palette. Hethmon's response to the fusion of categories shows a monster embracing ideology because he puts the red colorant on a pedestal by deeming it more important than the other colors in M&M's.

Shifts in M&M's Wrappers

The release of new information on Red Dye No. 2 influenced public perception of the unnatural fusion between nature and culture by the technology. Consequently, red M&M's encountered polarized reactions and underwent transitions through "monster embracing," "monster exorcism," and back to "monster embracing." Mars responded to shifts in public perception towards red M&M's not only by removing the color from its product, but also by changing the M&M's packaging. Mars' response to and validation of public opinion towards red dye can be captured through the transformation of the M&M's wrapper.

Figure 2. Mars – M&M's® Plain Chocolate Candies – red mascot pack – 1 3/8oz candy package wrapper – circa 1973-1975 (Liebig, 2017).

Before the FDA banned usage of Red Dye No. 2, Mars introduced the idea of an animated red M&M as the main mascot for M&M's chocolate. For example, Figure 2 shows the M&M's packaging used from 1973-1975 (Liebig, 2017). On the front of the package, a red M&M gestures and

smiles at the bolded “M&M’s” label. His mannerism implies that he is proudly showing the chocolate brand that he is part of, indicating that the red M&M is a major color component of the M&M’s brand. On the back of the package, the red M&M appears points at the phrase “The Milk Chocolate Melts in Your Mouth… not in Your Hand.” The phrase “Melts in Your Mouth” not only indicates that the red M&M is edible, but it also implies deliciousness for colored candies. This labeling strategy shows Mars’s support for public “monster embracing” views. By using the red M&M as its mascot and highlighting savory words, Mars encourages its consumers to embrace the color on the chocolates.

Figure 3. Mars – M&M’s® Plain – 1 1/4 oz candy package – 1978 (Liebig, 2017).

In 1976, the FDA banned Red Dye No. 2 causing public chaos and obsession in avoiding foods containing red colors. As a result, Mars removed their red M&M mascot to maintain consumer purchases (Liebig, 2017). For example, Figure 3 shows the M&M’s packaging in 1978, two years after FDA banned the red dye. Notice that the package is missing the red M&M mascot from the front and back of the package. Additionally, the slogan that was in the previous packaging (Figure 2) is no longer on the wrapper. This marketing technique results from the public “monster exorcism” perspective towards red food coloring. The removal of the red M&M mascot and slogan reassure consumers that M&M’s are still safe to eat and validates the hostile feelings towards red food coloring.

Ten years later, after the panic around red coloring declined, the efforts of Paul Hethmon brought back the red M&M's in the popular chocolate brand (Vicars, 2015). Mars released its holiday M&M's consisting of red and green colors in order to reintroduce the red M&M, as seen in Figure 4. The coupon shows that that holiday M&M's packaging contains mainly red and green colors.

Figure 4. NEW! M&M's® Holidays – 20-cent coupon – Red's Return – newspaper circular – Christmas 1985 (Liebig, 2017).

On the green package, the M&M's label is contained in a red box while on the red package, the label is contained in a green box. By pairing the green and red M&M's, Mars was able to take advantage of the classic holiday color duo and reintroduce red M&M's with the spirit of "monster embracing."

To add on, the M&M's chocolate packaging changed drastically after the holiday collection compared to the original packaging, as seen in Figure 5A. On the front of the package, a bright yellow design immediately draws attention to the words "Even More COLORFUL." The term "COLORFUL" is capitalized to emphasize the images of the colored M&M's below the word. A careful analysis of the M&M's pictured in the design shows the red M&M front and center. This strategy is Mars' attempt to appeal to its consumers and show that they support public "monster embracing" perspectives for red colored chocolates. On the back of the package, the white box labeled "EVEN MORE COLORFUL!"

Figure 5. (A) Mars – M&M's® Plain – Even More Colorful – Return of Red – 16oz chocolate candy package – 1986. **(B)** M&M's® Milk Chocolate – 1.69oz candy package wrapper – 2010. (Liebig, 2017)

includes a phrase that notes, “By popular demand, we’ve [Mars] added red pieces to our product. More colors make “M&M’s Chocolate Candies even more enjoyable!” (Figure 5A). Using the words “by popular demand” Mars claims that it was the consumers who revived the red M&M through the “monster embracing” viewpoint. Additionally, Mars shows that the inclusion of “more colors” make the chocolate “even more enjoyable,” emphasizing the importance of red M&M’s and encouraging the “monster embracing” view. Modern M&M packing utilizes the red M&M as the main mascot. This is seen in Figure 5B where the animated red M&M is the centerpiece of the chocolate wrapper, indicating public acceptance of red food coloring in M&M’s and bringing the monster idealization to a full circle.

Conclusion

Public perception of artificial food coloring, particularly Red Dye No. 2, encountered a polarizing shift due to initial studies bringing awareness of the potential health risks and later studies discrediting the claim. In the case of the mysterious disappearance and reappearance of red M&M’s, the evolving spectrum of public perception towards the “unnatural” fusion of the cultural categories of nature and culture is clearly demonstrated. When Mars first introduced M&M’s, the “unnatural” qualities of the chocolate candies were met with enthusiasm as it was a creative approach of applying color to chocolate, showing a “monster embracing” perspective. However, new information from the “Red Scare” studies in the 1970’s shifted public interpretation of the categorical fusion from excitement to resentment and terror. The chain of fearful reactions turned people away from artificial red food coloring, causing Mars to ban the red M&M; ultimately, reflecting “monster exorcism” views. Then, an article discrediting the red dye studies dwindled public fear towards red artificial food coloring over the next ten years, resulting in yet another change of public perception towards the margining of cultural categories.

Consequently, consumer demand brought the revival of red M&M's exhibiting the "monster embracing" attitude towards artificial food coloring. This perspective drawn from monster theory explains the causes of polarized public response to artificial food coloring and allows for a comprehensive analysis of how the characteristics of new technology influences public attitudes by fusing two discrete cultural categories.

Word Count: 3797

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