Packaging Design and How it Relates to Consumer Choices and Adherence to Medications

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Spring, 2020

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

Taking medication is a routine practice in the United States with nearly 3 in 5 adults having to take at least one prescribed medication per day. This is a practice that is consistently becoming more common as the number of people taking five or more prescription medications doubled from 2000-2012(*Medication Adherence*, 2017). Furthermore, a similar growth has been seen in the over-the-counter (OTC) medication industry with the average U.S. household spending $338 annually on these products(*Statistics on OTC Use*, n.d.). With an increasing dependency on pharmaceutical products, it is important to understand the factors that play a role in consumer adherence and preference when deciding which to purchase.

The technical portion of this project looks to address the issue of medication adherence by providing an easier, more convenient way of taking medicine on the go. The first goal of this project is to determine the shortcomings of current portable pillbox designs available to consumers. The second goal is to design a novel pillbox that can fit into a standard wallet that maximizes pill carrying capacity while also maintaining a level of concealment for the user to address the shortcomings.

The STS section will explore the aesthetics and physical design of pharmaceutical goods and how these depend upon consumer preference in addition to patient adherence to a medication. For OTC medicine, marketing teams for the drug company tailor the design to appeal to potential buyers through a variety of design factors that will be discussed further later on. In terms of prescription medicine, pharmaceutical companies do not tend to worry about how the packaging looks and most of the focus is functional in addition to the mandated informational sections.

Packaging Design and How it Relates to Consumer Choices and Adherence to Medications (Comparing Packaging Designs Between OTC and Prescription Medications)

I. Background

This paper examines how both over the counter (OTC) and prescription medications are packaged and how these design choices relate to consumer preference. While both are effectively used to treat illness and improve patient health, each type is unique in how they are presented to the user. Prescription medications are often depended upon by patients to treat chronic illnesses or other more serious sicknesses. Despite their major importance for treatment of ailments, studies have shown that 20-30% of medications are never filled, and 50% of medications for chronic illness are not taken as prescribed (Viswanathan et al., 2012). As for OTC medicine, while not as vital in terms of saving lives, it serves a valuable purpose in providing most people a convenient, affordable way to treat minor illnesses. With differing uses and regulations for each of the two comes different styles and varieties of packaging. The Social Construction of Technology (SCOT) theory, which looks into the social context of successful ideas, will be used to analyze how companies use social influences in the design of medication packaging. This framework rests on the notion that successful innovation is more dependent upon overall social support as opposed to being the "true" best idea (*Social construction of technology (SCOT)—Stswiki*, 2018a). The rest of the paper looks to explore this framework and how it ties into the packaging choices made by pharmaceutical companies, as well as how these choices are influenced by patients and consumers.

Discussing packaging through the SCOT framework is a somewhat curious examination. As mentioned above, this framework looks at how a successful innovation is reliant upon social

support as much as, if not more than, the true quality of the innovation. However, in terms of packaging medication, you have two separate entities. First, there is the medication itself which is the idea or innovation. Then you have the package of the medication which is a separate component. In terms of garnering social support for consumer preference and use, the medication is dependent upon the package for a large amount of the social support it gains. Consumers looking to buy a new type of OTC medicine will base much of their decision on the brand package they see. For prescriptions, consumer preference is not the issue as doctors decide what medication the patient needs. However, the packaging of these medications matters as it can determine the frequency and ease of use for the medicine. Through a SCOT lens, we can look into how pharmaceutical drugs are adopted and how the packaging plays a major role for both prescription and OTC varieties.

II. Overview

i) Label Requirements

While there are some overlapping desired features for both types of packaging, the one common criterion present on all medications are information and uses regarding the drug. For OTC medications, the Food and Drug Administration (FDA) is the primary reviewer of the labeling and in 1999 published the OTC Drug Facts Label regulation. This requirement follows the nutritional labels seen on food packages but displays information such as active ingredients, purpose, uses, warnings, dosages, and inactive ingredients (Research, 2019). On the prescription side, all medicinal packages are regulated by state and federal law. The information required for these include patient name, quantity of the medicine, dosage, and instructions for how often to take the medicine. Moreover, the dispensing pharmacy will typically provide more details in the Patient Medicine Information (PMI) such as instructions for use, side effect warnings, and

possible drug interactions (*How to read prescription drug labels—Be Medwise*, n.d.). This labeling is vitally important as it familiarizes the user with the most relevant information to ensure proper and safe use of the medicine. This requirement is also the starting point in which marketers and manufacturers will build around to provide the rest of packaging that is desired for the product.

ii) OTC Drugs

In the U.S. alone, there are nearly 100 different classes of OTC drugs which can range from pain relief to weight loss remedies (*OTC (Over the Counter) Drug Database*, n.d.). This industry has been steadily growing in recent decades with the average revenue per capita rising from $58.04 in 2012 to $79.08 in 2019 (*OTC Pharmaceuticals—United States | Statista Market Forecast*, n.d.). Along with this rise came an emphasis on label graphics, something that was not prioritized as much 25 years ago in the industry. Over time, many drugs that were previously available only through prescription completed the product life cycle and made the Rx to OTC switch. Manufacturers soon realized that packaging and branding of the drugs could influence consumer choice at the moment of purchase and give a competitive advantage in the market (*20 Years of OTC Packaging*, 2013). If consumers were looking for a generic pain relief remedy and had a variety of options to choose from, companies wanted to draw the person into their product through its packaging. This becomes especially true when the number of competitors grows which is the case today with over 100,000 OTC products in the healthcare market (*FAQs About the Regulation of OTC Medicines*, n.d.). For the past few decades, pharmaceutical marketing teams have sought to innovate their packaging designs to maximize consumer interest when making a purchase.

iii) Prescription Drugs

Prescription drugs, on the other hand, have been a key component of our healthcare system providing patients a means of staying healthy and mitigating illnesses. Still, adherence to prescription medicine is an overlooked issue that puts a strain on the healthcare industry costing billions of dollars each year. Research conducted on this problem has not provided any clear solution to fix this seemingly solvable problem. However, many pharmaceutical companies have begun to innovate package designs in attempt to encourage proper use for the patient. Where the OTC drug packages want to get the consumer to buy the product, prescription drug containers want the consumer to actually use the medication. With no doctor around to guide the drug usage, the only interface between the patient and drug is the package in which it comes in. Anything that is confusing or difficult to handle with the package will have an effect on the patient's attitude and likelihood of proper usage. Research has shown that the way in which a drug is packaged can have a positive impact on treatment outcomes and overall adherence (Schneider et al., 2008).

III. Packaging Design Factors

Getting into the specific packaging strategies of OTC drugs, we will see how marketing teams use visual appeal in order to distinguish themselves from the competition along with other functional aspects. How these packages are designed in a way to appeal to as many consumers as possible so that it will secure the purchase and generate revenue. Packaging for OTC medicine is similar to an array of other products that come in a package and want to draw the consumer in as they walk down the store aisle (e.g. cosmetic products). Consumer psychology is a vast field and will not be completely explored in this essay as it is too expansive, however, we will discuss some of the deciding factors that play a role in influencing consumer thoughts and opinions.

Some of these factors that marketing teams manipulate to design aesthetically appealing packages include color, shape, font, images, etc. A study by Martin Reimann shows that consumers are willing to pay more for something that is different and visually pleasing to them. Researchers found that people experienced a “reward” response in the brain when looking at attractive packaging, even before it is purchased (Reimann et al., 2010).

Color is the most important aspect for visual processing, and a lot of research has gone into emotional responses associated with certain colors and is a major part of company marketing. Obviously, not everyone is going to share the same opinion and response with every color, so it is important to note that generalizations must be made in this area. We have heard of these before with notions such as red is a bold and passionate color, blue harbors trust and peace, or yellow is the happiest color. How to choose the best color for your product can be a challenging endeavor. Research has shown that predicting consumer perception to the color of the product is far more important than the color itself (Fernández-Vázquez et al., 2011). Colors give brands a personality and portrays information to the consumer. Overall, choosing the right color is the first step for essentially every company looking to brand their product/package for sale.

Aside from color, aesthetic packaging must also take into account the shape, material, and typography/images present. Shape and material often go hand in hand for OTC packaging, and the styles used are similar across the board. Important considerations companies must take into account are whether or not the solid medication should go in a plastic bottle. If so, will this bottle further be put into another paper box to have displayed on shelves. Or will the pills go into something completely different such as a blister package. After a product has gained the attention of the consumer, the obvious next step for the consumer is to pick up the package. To

appeal aesthetically, companies will want to design a package that feels good in the hands of the consumer to evoke that same reward response in the brain. In terms of typography and images, the aesthetic appeal is similar to color in that it is a visual appeal that is being sought after. The way words and pictures appear on a package can give insight into brand personality (Munyaradzi Mutsikiwa, 2013). The other key component here is that typography matters not only in terms of appearance, but also with what words are actually included. Being able to covey the right amount of information in an aesthetic fashion without overwhelming the consumer can help gain an initial interest in the product. For example, a study conducted on OTC sales in a retail setting showed that consumers will identify the type of OTC drug they want by looking at the symptoms for treatment (Aker, n.d.). Similar to what we will discuss with prescription drugs, OTC medications will sometimes include functionality components such as child proof tops or the aforementioned blister packaging. While these are part of the packaging design overall, we will see how it is far more important to consider for the prescription side.

Consumer preferences and what individuals see as a an aesthetically pleasing package varies greatly among different demographics and personalities. While it is a difficult claim to substantiate, some researchers would say that package appearance can have a greater impact on consumer decisions than advertising. Tying this back into the SCOT framework, it is apparent that the success of an OTC drug is not necessarily based on the effectiveness of the drug itself, but the effectiveness of the packaging to gain a consumer interest, or social support. It must be noted that the package is not 100% responsible as some people will base decisions on other factors such as doctor recommendation. Still, for those who go to the store to find something to treat a given ailment, consumers will rely on their own limited knowledge along with brand knowledge and packaging styles. Take ibuprofen brands for example. At this point in time, there

are two main brands of ibuprofen in retail: Advil and Motrin. Why did these win out as the favorites for minor pain treatment? Is it because they are objectively the best way to treat pain? Or maybe their brand and package is so recognizable at this point that it is impossible for new competitors to enter the market.

IV. Discussion

The implications of such a system are the most familiar and recognizable OTC drugs being purchased as opposed to which one is the best objectively. Say a new pain-relieving drug came out that was more effective than all current OTC pain relievers. While it may be the best technology, it may not be able to gather the social support needed to stay in the market and compete with the current technologies (drugs) despite being the better option. This is in line with the SCOT theory in undermining technological determinism and showing how social support is an equally important, if not bigger factor, in the adoption of a new technology. Knowing this, drug companies may put as much money as possible into the branding of their product to beat out the competition as opposed to putting funding toward drug research and development.

While OTC is packaging is aimed to be aesthetically pleasing, prescription medication has turned in the direction of designing packages to be more functional and user friendly. As stated previously, medication adherence is a burden in the U.S. health system and can cost money as well as patient wellbeing. Sometimes, the reason for poor adherence can be tied to financial reasons and not being able to fill the prescription. However, the more prevalent reason is that it is difficult to access and dispense the proper dose as well as remember proper dosing times (Forcinio, n.d.). This makes sense based on the population of daily pill users being on the older side, as well as the fact that many of these users have 3 or more medications to keep up with. Because of this, pharmaceutical companies have looked into finding ways to alleviate these

issues by making pill packages that can better facilitate proper intake. The five general pharmaceutical packaging criteria are as follows: containment, protection, presentation, identification, and convenience (*Recent trends and future of pharmaceutical packaging technology*, n.d.). These are more or less similar to OTC medicine, however, the points of emphasis differ greatly. OTC will put a greater effort into going above and beyond in the presentation and identification areas. Meanwhile, prescription packaging has really looked at maximizing convenience and other criteria to make drug intake easier for the user.

With no clear solution to solving adherence and creating the ideal drug package, a variety of approaches have come along to at least contribute to the cause. One of the main forms of packaging that has been around since the 1970's is the blister package where each pill must be popped out of a holder for use. These have been for decades and have served well in helping patients maintain a consistent dosing schedule with dates and times printed under each pill. A study in 2008 showed the success of blister packaging within an older population as their medication adherence was significantly improved with the functional packaging (Schneider et al., 2008). Some pharmacies have even gotten into patient specific packaging where all of their weekly pills are put into blister bubbles corresponding to each day. Other forms of drug reminder packages have been devised and used to help adherence such as built in sound alarms to get the patient to use it.

Smart packaging is another route that is being explored by pharmaceutical companies by integrating new and personalized capabilities. Some of these new features include temperature monitoring of the medicine down to the individual package level. Shock and GPS sensors are some other aspects being incorporated, especially in the overseeing of the shipping process. A company called Adhere Tech has explored specialty containers for certain medications that

provide patient specific feedback and monitoring of pill intake through an integrated system with the pharmacy (*AdhereTech*, n.d.).

Looking at how social support will determine the type of packaging that is most favorable, there are two distinct social groups on the side of prescription medication. The first are the patients, the user of the packaging and can provide the physician and pharmacist feedback based on their experience. The doctor, on the other hand, has the ultimate say in what the patient will be prescribed, so it can be argued the social context for the success of these drugs comes from two major stakeholders. With effective communication between both parties, the package/medicine that boosts patient use and experience should garner the social support necessary to make that the first choice in physician prescription.

Analyzing the differences in OTC and prescription drug packaging lends itself well to the SCOT framework that discusses the role of social context in terms of what technologies/products are successful. Rather than technological innovation following a linear succession of improvements, the technologies that ultimately win are a product of a complex process of co-construction between society and the technology. “Relevant social groups” will compete to control a design, and over time in a process called “stabilization” one of these groups (or two perhaps with a compromise) prevails with their design. The third feature of this theory is “interpretive flexibility” which holds that there is no best way to create a technological artifact, but rather a bunch of unique views based on the interpretations of the social groups (*Social construction of technology (SCOT)—Stswiki*, 2018b). SCOT is in opposition of technological determinism and counters with the claim that society and technology shape each other in both directions (*Social Construction of Technology | Encyclopedia.com*, n.d.).

The relevant social groups making the technology in this paper are the various drug companies both OTC and prescription. Each company in each group has its own approach in addressing the issue at hand, and this can be seen with the wide array of packaging designs that are present in pharmacies and with prescriptions. Opposition to this may argue that the current OTC packaging scheme is clearly the "best" technology, as there seems to be a general consensus on making an appealing package. SCOT proponents would counter with the fact that what is appealing is a completely subjective matter and varies throughout society. With consumer psychology being such an abstract field, there cannot be an ideal design, but rather one that appeals to the most people.

Finally, looking at how society interacts with these technologies can provide some insight into the future direction of pharmaceutical trends and packaging designs. While it seems like there has been stabilization in the OTC side with the packages following a similar design, will we discover a new design or feature that may have a greater appeal to the consumer. As for prescription, we seem to be far from stabilization as multiple relevant social groups are taking their own route in coming up with the future of drug packaging. It is also important to emphasize the fact that as a result of consumer preference and user experience playing such a big role in the success of drug adoption, the most effective drugs may ultimately fail due to lack of societal support.

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