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Title: Improving Health Literacy through Effective Communication to Motivate People towards Better Oral Health

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Improving Health Literacy through Effective Communication to Motivate People towards Better Oral Health

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Improving Health Literacy through

Effective Communication to Motivate People towards Better Oral Health

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COM 480

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Introduction:

Health Literacy

Why is communicating dental health to the public so important? This is not only a personal interest of mine but something that affects all Americans across economic levels, professions, ages, and demographics. Globally, oral health care greatly affects people who may or may not have access to oral health knowledge. A recent government report showed that 75 percent of Americans have had some sort of dental work. That's nearly 240 million people (Reinberg, 2012). The majority of the population has had contact with a health professional, making communication between professional and patient critical, inside and outside the office. Professional oral health care is clearly relevant to a vast audience so it is crucial that communication is effective regarding upkeep in professional care and motivation for those not yet receiving dental care. The mouth allows humankind the essential abilities of nourishment and speech. Why and how to keep this vital body part healthy needs effective communication in order to motivate the general public to see a dentist consistently and take personal actions towards maintaining oral health.[1]

Although millions of Americans have had dental work, this does not ensure all of those patients sees his/her dentist regularly. Oftentimes other priorities take precedent. By effectively communicating the importance of dental health care, regular care can become a greater priority. Since maintaining oral health is fundamental for every person, effective communication regarding proper oral hygiene is vital. Those who are knowledgeable and trained, health care providers, have a duty to lower the numbers of people plagued by poor oral health care, through

[1] Defined by the ADA as a functional, structural, aesthetic, physiologic and psychosocial state of well-being and is essential to an individual's general health ar

increase in professional care and personal hygiene habits in these individuals, and this process begins with effective communication.

I want to assess what avenue of communication will most effectively convey the oral health message to the general public. Communication effectiveness can be measured in two ways. Firstly, effectiveness is measured by the action taken once the oral health information was communicated. The action taken after receiving the health message will determine the level of effectiveness the message had in motivating the person to action in order to improve their oral health. Therefore, the different forms of communication can be ranked by effectiveness through the measure of the magnitude of action taken by the oral health message receiver. This is a more difficult variable to assess. If the message was effective, it should provoke its audience into some form of positive action towards better oral care and therefore better oral health.

Secondly, communication effectiveness can be measured by the audience's ability to recall the oral health message communicated. The ability and extent to which the receiver of the health message can recall the information will measure the degree of effectiveness of that form of communication. Both of these forms of measurement require more elaborate test settings. However, for a preliminary assessment, I designed a standardized survey in order to measure the target audience's communication tendencies and habits. Action taken after administration of the health message and memory of that advice, are key ways to assess effectiveness of communication that could be further assessed in a lab setting.

However, this preliminary survey instrument will provide a baseline for the audience's exposure to communication channels and their perception of the trustworthiness of said channels. Giving mock scenarios regarding oral hygiene issues, the survey assesses which communication channel the participant will go to first if such concerns arise. This survey helps to narrow in on

the particular communication channel or channels that are more likely to have an effective impact on the audience's action towards better oral health based on the accessibility and credibility of the channel.

A healthy smile is known to improve confidence and overall success (British Dental Health Foundation, 2014). The 43 muscles it takes to smile contribute to what most people notice first about you. The British Dental Health Foundation collected research from various credentialed sources including the Adult Dental Health Survey (1978 and 2009) that involves data from England, Wales and Northern Ireland. They include the National Health Service (NHS) Dental Epidemiology Programme for England that conducted the Oral Health Survey of five year old children (2007-2008 and 2011-2012), as well as many more. Through their analysis and collection of various data they came to some general conclusions. An amazing 80 percent of people are more likely to talk to a stranger who simply smiles, and keeping that smile healthy is an individual's responsibility. Your teeth and smile are rated as the most important body features winning over body shape, height, hair, face and eyes. Your smile is the second most important attraction feature after personality. When looking for a significant other, your smile is at the top, outcompeting body, sense of dress and eyes (British Dental Health Foundation, 2014).

In stark contrast to the importance of the smile, nearly half of the population, 48 percent, are unhappy with their teeth according to the British Dental Health Foundation (2014). The Foundation says that only one in five people remembered the last time they changed their toothbrushes, yet it is important to change a toothbrush before it begins to look noticeably worn in which case it is already lacking in effectiveness. So if smiles are so important to us why don't we give more attention to them? This is where the job of public health and communications comes into play. There is a breakdown between the importance of oral health and the

effectiveness of conveying this importance in the oral health message. The partnership between health communications and the dental health world needs to be strengthened in order to motivate people towards action and urgency for better oral health care.

Literature Review

Health Communication

What is health communication exactly? Reinberg (2012) says it is the study and practice of communicating promotional health information, such as in public health campaigns, health education, and between doctor and patient. The purpose of disseminating health information is to influence personal health choices by improving health literacy (Reinberg, 2012). I want to find which channel of communication is most effective to improve health literacy, one that will in turn motivate action towards improved oral health. Many studies have linked a patient's health literacy to a variety of significant health behaviors, statuses, and outcomes (Schiavo, 2015). Therefore, if the health communications world can increase the general public's health literacy through effective communication, this can influence and motivate their decisions to take action towards improved oral health.

Health communication is an enormous interest of the health professional world especially because overall health is so relevant to today's culture. Recent recommendations to strengthen health communication have encouraged change at The Centers for Disease Control and Prevention leading to a five-year goal set for the agency. One goal of the CDC is to create a thoughtful framework in which managers view health communication as an integral prevention function. The prevention principle, to maintain health in order to prevent

onset of health problem versus fixing once the problems have begun, is a core principal in dentistry. Oral health communication must enhance the effectiveness of the health message in order to motivate individual to take prevention actions. A goal of the CDC is to update the mindset of the public health community to view health communication as a valued contributor to prevention. They will integrate communication strategies into program planning and implementation (Roper, 2015).

Health communications has become more and more relevant to our culture today and its importance continues to surge. It was allocated a chapter in the United States of America's Healthy People 2010 objectives for the first time: "In these objectives, set by the United States Department of Health and Human Services, health communication is seen to have relevance for virtually every aspect of health and well-being, including disease prevention, health promotion and quality of life" (Rimal, Lapinski, 2009). A channel of communication or mix of channels can be used to reach a target audience, and then it is necessary to choose a message format to fit those channels using a public service announcement, brochure, commercial, etc. Communication format affects the content and delivery of the message. After determining the specific message most important to the prevention program, the message format must be crafted specifically to motivate the target audience (Roper, 2015).

Research Question

In order to evaluate this topic of communication effectiveness I plan to base my research around three main research questions. One: what are the channels of communications adults go to when seeking information for oral health? Two: which channels of communication, relaying

health information, do adults find most credible and are therefore are more likely to respond to. Three: which channels of communication do adults find most accessible? To this end, I developed a survey to evaluate which avenue of communication would most effectively communicate the oral health message.

Selecting a particular communication channel in order to relay a particular message is imperative in conveying the oral health message to the public. The message can be significant and true, but unless it is communicated in an effective manner with effective placement to the greatest number of people, it will have no use.

Where to say the message?

Determining the optimal combination of channels through which to send a specific health message is based on multiple factors. Firstly, one must take into consideration the information habits of the target audience which includes the sources from which the targeted audience seeks and receives news, information, and entertainment. Researching this factor will expose which channels are credible and accessible to the target audience.

Secondly, the concept of the message must be considered in order to determine which channel to use, whether it is sensitive information or maybe requires more lengthy and in-depth explanation. Thirdly, the timeline and budget for the communication channel is taken into account when actually executing the oral health message in order to determine what is realistic for the business (Roper, 2015).

Deciding which communication channel to use is critical; however, one must consider using multiple channels together, which may increase effectiveness of the oral health message. Using a combination of different but appropriate channels takes advantage of strengths of each channel and minimizes the risk of a single channel missing a portion of

the audience. Using multiple channels increases the opportunities for the target audience to be exposed to the message a sufficient number of times to absorb and remember it (Roper, 2015). Once a channel is chosen, a message must be repetitively relayed to the target audience in order to be effective. Communication experts feel that mass media is helpful in influencing individuals but that it must be cumulative through repetition. Bush and Buller (1991) said, "Through sheer repetition, mass media are believed to provide an effective means of imparting the latest scientific information to large groups of people (29)."

Oral Health Message

Communication regarding health in general is a very prominent and popular focus. The importance of oral health needs to be more effectively communicated to Americans so they are more motivated to take action towards improving oral health. The 2013 Gallup-Healthways Well-Being Index showed that one-third of Americans did not see their dentist in 2013 (Bushak, 2014). If the oral health message is more effectively communicated it is possible that this number can decrease by motivating Americans to see their dentist through more effective communication. The percentage of adults in the U.S. who saw a dentist in 2008 was 65.7%, and in 2013 this number hardly budged to 64.7%, showing that dental attendance has not improved and has actually worsened slightly (Bushak, 2014). Therefore the effectiveness of communicating the importance of dental visits has not improved and this is why we need to investigate how to improve the effectiveness of communicating this message so we can see a direct correlation in an increase in dental visits. The efforts to visit a dentist have not improved, strongly suggesting a breakdown in effective communication to motivate patients to see their dentist.

This 2013 Gallup-Healthways survey shows a correlation between frequency of dental visits and income level, however Bushak (2014) said, “A good number of people may also simply be unaware that oral health can impact on the rest of their body.” Periodontal disease can cause the body to be susceptible to systemic diseases or further spread of infection throughout the body. “It has become increasingly clear that the oral cavity can act as the site of origin for dissemination of pathogenic organisms to distant body sites.” (Li, Xiaojing, et al., 2014). Periodontal disease can predispose an individual to cardiovascular disease by the abundance of gram-negative species present in periodontal disease patients. The increase in both fibrinogen and white blood cell count is seen in periodontitis patients and is a feature of those at risk of cardiovascular disease (Li, Xiaojing, et al., 2014).

Poor oral health, among many other factors, has been linked to heart disease, diabetes, rheumatoid arthritis, and stroke. Research shows that those who suffer from gum disease are twice as likely to develop coronary artery disease (Bushak, 2014). Their research suggests that gum disease correlates to higher risk of developing coronary artery disease. Missing some or all teeth, or the loss of significant amounts of bone and tissue around your teeth, may increase risk of stroke (Yoffee, 2012). The positive effect of a healthy mouth on the overall health of the body is greatly supported by research, but this message must be more effectively communicated to the general public to motivate an improvement in oral health care.

The oral health message is simple; maintenance of good oral health is of critical importance because it will have an overall positive impact on overall health. Bushak (2014) says that the mouth is constantly crowded with bacteria and some of these germs can make their way into the bloodstream, causing infection and diseases. This is why daily brushing and flossing is

so important to manage these bacteria. The Mayo Clinic suggests brushing teeth twice a day, flossing, and eating a healthy diet, along with regular dental checkups (Bushak, 2014). This basic health message needs to be effectively communicated to the public so more Americans are motivated to take action towards achieving and maintaining better oral health. This message may be one you have heard before, but the difference is the scientific data that support it. This foundational research needs better communicated and interwoven into the health message so it resonates with people. Why brush for two minutes and why not one? Creeper crawlers multiply in my mouth all night? My healthy mouth may not only affect only me but the health of my baby due to an early birth? The health message not only needs to spread to those who may not be educated on it, but it needs to be elaborated on, expanded and packaged in new ways. This same old oral health message can take on a new face to motivate Americans, and those around the world, in a new way.

The American Dental Association says people who are at high risk of developing periodontal disease, or gum disease, should have more frequent dentist appointments, whereas low-risk people should at least visit their dentist yearly (Bushak, 2014). Increasing the effectiveness of communication will increase audience motivation to take action towards better oral health, and one of those actions include more frequent dental visits.

For more than a decade Centers for Disease Control and Prevention and the National Cancer Institute have defined health communication as "the study and use of communication strategies to inform and influence individual decisions that enhance health." Health communication and social marketing may have some differences, but they share a common goal, which is to create social change by changing people's attitudes, external structures, and/or

modify or eliminate certain behaviors" (What is Health Communications, 2011). It is important that communication channels create social change and thereby influence an individual's action towards better oral health. Health communications is linked closely with marketing and advertising, as both are channels to spread the oral health message. I examine different channels of communication to apply the most effective method to communicate important oral health messages to the public. The goal is to use effective communication to create social change by changing people's attitudes, external structures, and/or modify or eliminate certain behaviors regarding oral health to influence individual's attitudes and motivate them to enhance oral health.

Oral Hygiene Recommendations

In order to maintain proper oral hygiene one must know the recommended oral hygiene regimen. This information is then supported by factual research grounded in science that can motivate people towards maintaining this oral hygiene regimen. The American Dental Association (ADA) defines the following as good oral hygiene. It includes brushing twice a day with ADA-accepted fluoride toothpaste for two minutes, daily flossing and eating a balanced diet limiting between-meal snacks. They also stress the importance of visiting regularly a professional for cleanings and oral exams. Flossing removes bacteria and food particles that can linger between teeth and under gums in which toothbrush bristles cannot reach. Flossing removes plaque, responsible for tooth decay and gum disease, from tooth surfaces. A toothbrush should be replaced every three to four months or when bristles are beginning to fray and children's brushes often need replaced even sooner (Brushing Your Teeth, 2016).

There are numerous efforts to raise public awareness on oral hygiene. Why is so much money, effort, and time put into publicizing such simple tasks as brushing and oral hygiene habits? It is because the effects of good oral hygiene are so important to the state of one's overall

health that the message is worth much effort to get across. How can this message be amplified? I think it is the use of scientific, factual and numeric values that are inserted into public service announcement that can properly motivate people to better understand the actual affect their hygiene habits can make. Factual evidence has been found to enhance the effectiveness of advertisements (Perrien, et al.,1985). The Attention, Interest, Desire and Action (AIDA) marketing tactical strategy is fundamental to effective communication. I think a slogan conveying recommended oral hygiene habits paired with a punchy piece of factual data can more effectively grab attention, promote interest, create a desire and promote action (Changing Minds, 2016).

I have collected my own scientific data in a basic area of oral hygiene that is already definitive in its benefits; brushing. Although it is already well-known that brushing kills bacteria in the mouth I would suggest that providing the numerical value of bacterial reduction is a way to make the message more concrete and shocking to motivate the public. Providing evidence of the bacteria living in the oral cavity, paired with the significant numeric drop in bacterial count after brushing, is a good simple baseline example of an advertisement that could appear on a public service poster or office flyer. It can grab attention and promote an interest in the creepy crawlers in your mouth. It can then create a desire to eliminate them and motivate action to brush, floss and improve hygiene habits to kill these exposed bacteria.

It is well-known and common knowledge that proper brushing reduces bacteria in the mouth. Labs evidently have tested the bacterial reduction of toothpaste on a microbial level in order to market their effective; however my point of interest is how accessible these numbers are to the common person. It may sound odd that the main accomplishment of toothpaste, to kill bacteria, is nowhere specified on the product itself. There is no indication of bacterial reduction

or the amount of bacteria reduced on a toothpaste package or an oral rinse bottle. If numeric data regarding bacteria were presented more clearly so it can become a more circulated and recognizable fact, I propose it would encourage people to want to decrease the bacteria in their own mouth. They could clearly see the effective outcome of their brushing habits. Individuals can tangibly grasp this oral hygiene recommendation because it is grounded in numerical support. This communication intertwined with scientific research can create more effective comprehension and health literacy and therefore increased motivation toward better oral health. Bush and Boller (1991) structured an AIDS campaign to promote action towards AIDS prevention that lasted three years from 1987 to 1989. Results suggest one of the crucial roles advertising plays is building an awareness of facts (Bush and Boller, 1991).

This is just one example, highlighting brushing and bacterial reduction, to show how health communicators can reinforce health messages by embedding scientific research within the oral health message itself to increase its effectiveness. Grounding public health messages with scientific support is one way to improve the platform of the oral health message. The finished message must then be conveyed in the most effective communication channel. These two-powerhouses paired together, the most effective message conveyed in the most effective channel, can create the most powerful communication between health professionals and the public to promote greatest action. This same model can be transferred to other messages in oral hygiene or general public health. To place an emphasis on brushing I provide personal data through conducting an experiment that measures bacterial reduction after brushing once a day.

Using this numerical data to reinforce brushing is only one aspect of good oral hygiene. It is simply a model for all other aspects of health in which the science community can provide

more support when relaying a health habit one should pursue, such as flossing, regular dental visits, being proactive in preventative care, starting early check-ups with children and so on.

One outlet dedicated to public health is the organization entitled, National Dental Hygiene Month (NDHM), whose goal is to increase public awareness on the importance of maintaining good oral health. These professionals agree with the ADA in that brushing twice a day for two minutes, flossing daily as well as rinsing with an antimicrobial mouth rinse is the ideal oral hygiene regimen (ADHA, 2015). They also recommend chewing sugar-free gum. Some hygienists refer to this as the "Daily 4," and encourage patients to make these daily habits.

The American Dental Hygienists Association (ADHA, 2015) says it will "benefit not just their oral health, but also contribute to improved overall health." The ADHA stress that the two minutes given to brushing is crucial to maintaining a healthy mouth: "Research shows two minutes is the single most important method for reducing plaque and preventing cavities, gingivitis and other plaque-related diseases." Flossing removes plaque and food particles while an oral rinse is important to prevent gingivitis. An oral rinse takes care of all the other aspects of the mouth not touched by brushing and flossing. Teeth make up less than half of the mouth, so maintaining the rest of the oral cavity is crucial. Gum is recommended to stimulate more saliva which helps to neutralize plaque acid and provides tooth strengthening benefits. Each aspect of this oral hygiene regimen plays its own important role in the overall health of the mouth and, therefore, body (ADHA, 2015).

In recent results from the Delta Oral Health and Well-being Survey, it was found that 69 percent of Americans brush their teeth at least twice a day. This still leaves 30 percent who are not brushing for the recommended amount. Of the approximately 318.9 million people in the United States that leaves nearly 100 million (95,670,000) not brushing twice a day or maybe not

at all. In 2014 nearly a quarter of Americans, or 23 percent, confessed to having gone two or more days without brushing their teeth at all, suggesting that the 30 percent that are not brushing have other poorly adopted habits that can accumulate to very poor oral health and disease. An even higher proportion of adults between 18 to 24 years old, 37 percent, have gone two or more days without brushing (Delta Dental Plans Association, 2014).

The numbers grow even larger when we investigate further into the recommended oral hygiene regimen. Survey results show that only 4 out of every 10 Americans floss once a day, 41 percent of the population leaves nearly 131 million people missing a key aspect to oral health maintenance and miss cleaning one-third of their tooth surfaces. Twenty percent of the nation never flosses at all. The Delta Dental survey not only gave numbers of Americans participating in good oral hygiene habits but also the connections between these habits and health. Delta Dental Plans Association (2014) shows a "strong relationship between flossing daily and reporting good oral health" as well as the connection between oral health and overall well-being. The vice president of dental science and policy, Dr. Bill Kohn, DDS, says the survey demonstrates this crucial link (Delta Dental Plans Association, 2014).

The American Academy of Pediatrics (AAP) recent consumer survey in 2015 found 73 percent of Americans would rather go to the grocery store than floss. A shocking 80 percent said they are unhappy with their smile. However much of the preventative care and aesthetic dental care of today could help to make patients more happy with their healthy smiles. But this possibility needs properly communicated to patients. Many don't know the direct correlation between oral care and other symptoms that affect the rest of the body. "There is evidence that severe periodontitis is also a risk for developing atherosclerotic plaques [plaque build-up in arteries], which can cause strokes and heart attacks (Yoffee, 2012)." 60 percent of people are

unaware that a sore jaw or jaw pain combined with chest pain is a major signal of heart-attack, especially in woman. This knowledge can be more widely disseminated and accessible through effective health communication and awareness (Family Gentle Dental Care, 2008).

The British Dental Health Foundation found that 47 percent of their survey respondents regularly skip night time brushing "despite all the warnings for the twice a day brushing (Dental Plans, 2011)." That means we need to re-evaluate how we are conveying this oral health information because of a lack of motivation towards better oral health. What channel of communication is most effectively reaching the public and in what ways must the information be presented to motivate their habits? One possible adjustment in public service announcements could be the addition of more numbers and facts grounded in science and research that are presented in friendly and clear ways. To make this union, a marriage between intriguing advertisements grounded in scientific research (Perrien, et al.,1985).

In July 2015, the Delta Dental Association announced in a press release that 31% of parents in the United States said children ages 6 to 12 had to miss school due to dental problems. Maintaining a good oral hygiene regimen goes far beyond the immediate and obvious associations of a healthier mouth but it can affect a child's time in school and parent's time off work to get their kids to a dentist when pain arises. Six percent of parents say their child missed three or more days of school. Following up these statistics are tips on how to keep your child out of the dental chair which all return to the core of a good oral hygiene regimen with brushing twice a day for two minutes, flossing once a day, limiting snacking and seeing a dentist regularly. Prevention is key when it comes to dental health and that comes from a hygiene habit that starts at home (Delta Dental Plans Association, 2015).

The Centers for Disease Control and Prevention (CDC) provide statistics from a survey in 2013. Poor oral health is not only a threat to children when developing healthy teeth and healthy habits but poses a threat throughout our lifespan when maintained. The CDC reports that nearly one-third of adults in the United States have untreated tooth decay. That is not only decay, but one that is persisting due to lack of care and has the potential to cause much greater disease and infection. It is interesting that nearly one-third of Americans do not brush twice a day and one-third of Americans have untreated tooth decay raising the question of whether they are related. Gum disease, or gingivitis, was found in one in seven adults 35 to 44 years of age with one in every four adults 65 years and older having gum disease. Nearly 25 percent of all adults have experience with some type of facial pain within the last six months from the time of this study (Adult Oral Health, 2013). The core of today's dental health is preventative care, to avoid these pains, which starts with the oral hygiene message.

The more science learns about oral health and how closely it is connected with the overall body, the more effort should be poured into public awareness and knowledge; the two should have a positive correlation. The more the science community learns of the benefits of good oral hygiene and the risks of poor oral hygiene, the more awareness should be raised to motivate the public. Foundations like the ADHA, the ADA, The British Dental Health Foundation, the AAP and many more are dedicated to raising public awareness to promote healthy habits.

Promoting Awareness of the Oral Health Message

The British Dental Health Foundation is dedicated to promoting awareness for better oral health. One of its annual campaigns is the National Smile Month, ranking as "the largest and most effective annual reminder of the importance of good oral hygiene (British Dental Health Foundation, 2014)." They base their passion from startling statistics that motivate them to raise

awareness and prevent oral pain and disease. The foundation reported that one-third of all children starting school have tooth decay. This is a huge number of children that are at risk for further disease. We may prevent this pathway altogether through better habits. Nearly 25 percent of all adults confess they have not visited a dentist within the last two years. The Foundation reports that three out of every 10 adults suffer from regular dental pain while over four-fifths of the population has at least one filling. Therefore it is clear that oral hygiene affects every person and dental work affects all people whether having experience with it or those in need of it. These numbers are to stress the importance of good oral health which can prevent much of these difficulties as well as associated health problems that include diabetes, heart disease, strokes, pneumonia and premature birth (British Dental Health Foundation, 2014).

Why is raising public awareness so important? It is important because healthy smiles are important, healthy bodies are important and healthy people are important and therefore it becomes a personal matter with the patient and their personal hygiene. No one can force a person to attend a dentist or brush regularly, but what we can do is help people become intrinsically motivated to want to do these things themselves for their own well-being. Not because it benefits the dentist and their business but because it benefits that individual's overall health and life.

A survey done in the United Kingdom showed that although 60 percent of people said they floss regularly, the quantity of floss sales actually accounted for a much lower figure at only 5 percent. This suggests that perceived oral hygiene routines may be much higher than actually routine maintenance. People will form habits whether good or bad, and public health professionals have the power to shape habits. In 2014, the British Dental Health Foundation found that 42 percent of adults were brushing but lacked all other aspects of the health regimen. One in three has never flossed and only 50 percent go to the dentist every 6 months. These are

vital aspects to oral health that are completely ignored. Twenty-seven percent of adults admit they go to a dentist only when a problem arises, missing all preventative treatment (British Dental Health Foundation, 2014).

Suggestions from the health community are rooted in factual evidence. It is our job as the health community to unearth this data, sometimes embedded in research, to bring it to the surface for the public to take hold of and make personal. Data needs exposed to be common and accessible. Take, for example, the fact that bacterial amounts decrease significantly after brushing. There are thousands of creepy crawlers in their mouth with over 500 to 650 bacterial species making a home in their personal oral cavity (Landers, 2016). Is this common knowledge? People must actively research to find these sorts of facts. In serving the public, health professionals need to make these health points more readily accessible. Health communicators cannot wait for the public to come to them, they instead must go to the public. These attention-grabbing facts help to decorate a sometimes repetitive and boring message, like, brush your teeth. Evidence exposing creeper crawlers in the mouth helps take brushing from a distant recommendation dictated by professionals to a much more personal action. Through effective communication, healthy hygiene habits can transfer from the mouths of dentists and health professionals suggesting and endorsing it, into the hands of the patients and individuals to empower them to want to do it.

The ADA says that only half of Americans floss daily, with 18.5 percent not flossing at all. Between the ages of 65 and 74 years old, 24 percent of men and 27 percent of woman have had all of their natural teeth extracted. The main reason for this extensive care is the lack of preventative measures. Between the ages of 35 and 44 years, 52 percent of men and 45 percent of woman suffer from gingivitis, which is a startling percentage (Sun Valley Pediatric Dentistry,

2014). To motivate Americans towards better oral hygiene habits as early as possible can prevent this cause of decay, tooth and bone loss, declined health, and expense in the future. Further, we need to reframe this idea around oral hygiene from simply brushing and flossing, to keeping your teeth into your 70s and having a positive preventative impact on such common diseases as diabetes. The dentistry of today is rooted in longevity, and that starts with preventative care.

Avenues of Communication

The avenues of communication I plan to measure for effectiveness are broken into seven categories: Firstly through verbal communication via dentist or other health professional; through literature communication via magazines, newspaper articles, or books; through social media communication via Facebook, Twitter, and Instagram; through internet communication via research on a website, blog, or scholarly article; through television communication via commercial, public service announcement, or news; through marketing communication via billboard or public sign; through radio via portable or stationary device.

1. Verbal Communication

The first category studied for effectiveness is verbal communication through direct conversation with a dentist or other health professional. Victoria Martin of Clinical Optimization told Jilard News: “Public education could help here. Dentists need to spread the word about just how important those annual dental visits are, not just for keeping your teeth white but to help prevent heart attacks and strokes” (Bushak, 2014). A study reported in the *Journal of Dental Hygiene* showed that a main way to increase literacy is for dental professionals to communicate in a clear, effective, and accurate manner (Schiavo, 2015). The conclusion was that millions of

American adults have health literacy problems which are not related to intelligence or education. Many factors play into how a patient understands and processes health and information at any time. The patient's health literacy rates have been linked to prognosis, compliance, and even mortality (Schiavo, 2015). Therefore verbal communication is critical between health professional and patient, and the effectiveness of this communication can radically impact how the patient responds by making decisions towards better oral health. Effective verbal communication can increase health literacy which can influence individual decisions.

Through personal experience as a clinical assistant in a dental office, I have seen many patients appear surprised when told important oral health information that is new to them, but common knowledge to the dental community. Patients are in disbelief when told simple facts about their mouth because they have been uninformed for so long. For example, periodontal disease is by far the most common oral infection and therefore it is constantly linked to other diseases (Li, Xiaojing, et al., 2014). Many patients experience inflammation of the gums and have periodontal disease but are completely unaware of their condition. Periodontitis involves the inflammation and destruction of the attachment apparatus of the teeth including the gums, periodontal ligament, root cementum, and the alveolar bone and is caused by the bacteria found in dental plaque. This destruction of ligament and bone leads to bone loss and the forming of periodontal pockets and bone loss is irreversible (Li, Xiaojing, et al., 2014).

Communicating these symptoms and complications more effectively could motivate Americans to more participate in preventative care, prioritize dental visits, and try to prevent periodontal disease in their own mouth. Bone loss is irreplaceable; this "final-sounding" information needs communicated through the most effective channel in order to motivate

preventative action. By revamping the way people think about their mouth, health communicators can effectively increase motivation and start seeing results through increased dental visits and better home care so bone loss can be prevented early.

Other oral health examples that can be more effectively communicated include the negative effect of juice and sports drinks on oral health, causing children an increased risk of cavities at an early age, and the fact that some headaches can be caused by grinding during sleep and can be prevented with a night guard. These concepts are repeated daily by hygienists and dentists once patients are in front of them, but are brand new concepts to patients. I believe that verbal communication is helpful in relaying oral health messages but not effective enough to get the oral health message to patients before they are sitting in the chair.

The oral health message needs better communicated in order to effectively motivate Americans to visit the dentist more, if at all. Research shows a third of Americans are not seeing a dentist (Bushak, 2014). Some are neglecting consistent dental care and instead need emergency room visits. Recently there has been an increase in emergency room visits related to dental issues, indicating that people are not getting the proper care for their mouth early on forcing them to emergency room relief.

According to the new report from the Pew Center on the States, more than 800,000 ER visits were toothaches and other dental ailments that could have easily been avoided **(**Kulkami, 2012). There are too many people attending the ER for dental reasons, showing a clear breakdown in the system. State Medicaid programs often target dental benefits as their first budgetary cut and this may be one factor forcing low-income patients from their regular checkups and bringing them into the ER. However, dental groups agree that ERs only provide

temporary relief for dental emergencies and often lead to recurring hospital visits. Therefore, the cost and risk ends up being higher for oral health problems that are ignored instead of being cared for by a routine dental visit and sometimes even prevented **(**Kulkami, 2012).

A more effective oral health message could motivate more Americans to visit the dentist more for both physical and financial benefits which would decrease the number of Americans visiting the ER for oral issues. Many times there is a difference in income relative to health care, but when evaluating number of cavities, Dr. Bruce Dyes said that children were getting nearly the same dental care regardless of family income (Reinberg, 2012). Therefore, financial factors that may deter people from proper oral care were eliminated in this data collection. The lack of financial correlations more clearly points to ineffective communication as a plausible cause for the poor oral care seen in this study. Experts say that skipping regular dental visits could press Americans to see a dentist later on with far more serious and costly tooth and gum problems (Marcus, 2009). "The message of the value of your teeth is not getting through," says Matthew Messina, consumer adviser for the American Dental Association and a dentist in Cleveland. "If people consider dental care a luxury item, they're shorting themselves. Prevention's always cheaper than fixing problems later" (Marcus, 2009). More effective communication will help to improve health literacy regarding oral health in particular which will influence individuals to make positive decisions to enhance oral health. By increasing the health literacy of individuals, I propose there would be an increase in their efforts towards prevention care.

One in five Americans have untreated cavities, with people aged 20 to 44 having the highest rate of untreated cavities at 25 percent (Reinberg, 2012). With more effective communication of preventative and restorative strategies I believe this high number can

significantly decrease. *Everyday Health* reported on epidemiologist[2] for the CDC and Prevention's National Center for Health Statistics, Dr. Bruce Dye. He says, "It appears that we haven't been able to make any significant strides during the last decade to reduce untreated cavities." With the technology surge, knowledge increase, and research expansion, it is mind-blowing that after 10 years, untreated cavities have not declined. Dental technology has undoubtedly improved which eliminates actual dental care itself as the source of this discrepancy. This leaves effective communication as a reasonable culprit. I believe more effective communication has the power to motivate Americans towards better oral hygiene, therefore reducing cavities, and the power to motivate them towards regular dental visits, therefore reducing untreated cavities.

Wilkes, et al. (2000), published in *Health Affairs Journal*, explains the concept of direct-to-consumer (DTC) advertising, which can take the form of television, newspapers, magazines and sources that bring health information straight to consumers. Proponents for DTC advertising argue that it serves an educational mission to inform consumers. Fifty-six percent of respondents in this Sacramento survey reported having read a pharmaceutical DTC advertisement carefully and completely. DTC advertising clearly motivates discussion between patients and their physicians about these pharmaceutical products.

This type of direct communication can drastically increase the health literacy needed to motivate people. Wilkes, et al. (2000) says, "The medical community also needs to develop a systemic, ongoing media literacy campaign to inform consumers of the

[2] The Occupational Outlook Handbook defines it as a public health professional who investigates patterns and causes of human disease and injury. They seek to reduce the risk and occurrence of negative health outcomes through research, community education, and health policy.

promotional nature of DTC advertising." From 1990 to 2000, DTC advertising became a major tool in promoting pharmaceutical products and at its best motivates consumers to pursue further information about the product or the disease in order to cure, prevent or help symptoms. This is the goal of the effective oral health message: to motivate individuals to pursue action towards health and prevention. The few studies on DTC advertising on the health care system show that the promotions influence consumers effectively, but there needs to be more studies on the clinical response to these messages (Wilkes, et al., 2000). This direct communication between professional and patient needs better integrated into settings beyond the professional office.

Long ago, in 1708 Boston's Nicholas Boone put the first advertisement for patent medicine into an American newspaper. Now, newspapers receive their greatest income from advertising. In the time of Boone, subscriptions generated the most revenue but patent medicine advertisers still spent the most money out of any other group of advertisers. Therefore, it is evident that the health community utilized newspaper mode of communication early. From 1989 to 1998, new advertisements and brand introductions increased dramatically; two-thirds of advertisements were for oral medications (Wilkes, et al., 2000).

2. Literature Communication

The second category studied for effectiveness is literature communication via print magazines, newspaper articles, or books. Most researchers recognize mass media — referring to newspapers, magazines, press releases — are an important influencing agent in society. However, the behavioral impact of such mass media is gradual and generally difficult to assess. Communication experts feel that the mass media is helpful in influencing

individuals but that information, to be effective and memorable, must be cumulative through repetition. Bush and Buller said, “In essence, most researchers now recognize that the mass media are indeed an important influencing agent in our society, but the behavioral impact of mass media exposure is gradual and generally difficult to assess (29).” Therefore, this suggests that repetition of effective oral health messages can make a significant impact overtime (Bush and Boller, 1991).

Mass media heightens the public sensitivity to health issues by transmitting specific information through credible and newsworthy channels. Advertising in these media channels are specifically mentioned as effective mass media tools to combat health problems. The common examples of health messages promoted through these literature communication channels include campaigns against drug use, smoking, and AIDS. Their particular study analyzed the significance of repeated copy points, repeated tag lines and repeated instances of a particular communicative form (Bush and Boller, 1991).

3. Social media Communication

The third category studied for effectiveness is through social media communication via Facebook, Twitter, and Instagram. Social media is an effective way to communicate health information. An article from the *American Journal of Public Health* shows that in 2013, 72% of online adults in the United States used social media and of these social media users 23% follow their friends’ personal health experiences or updates and 15% obtain health information from social media sites (Harris, Moreland-Russell, et al., 2014). A few studies examining social media interventions for promoting healthy behavior have shown evidence of success in encouraging small behavior changes. Between 2010 and 2013, Twitter usage among adults more than doubled to 18% of adults overall. These patterns of use suggest that Twitter may provide an important

channel for reaching traditionally difficult-to-reach populations including lower income, Hispanic, and non-Hispanic Black groups than their higher income non-Hispanic white counterparts (Harris, Moreland-Russell, et al., 2014). Social media may be a very effective channel of health communication, especially in an age when social media usage is rising.

Another working definition of the term is that health communication is the crafting and delivery of messages and strategies, based on consumer research, to promote the health of individuals and communities. This is a bit fuller definition with a broader goal in order to benefit the overall health of the community, and this starts with changing social norms through effective communication channels. Its objective is to promote changes in awareness, knowledge, attitudes, beliefs, and, if appropriate, changes in certain behaviors. These changes should support and be derived from the goals and objectives of the total prevention program (Roper, 2015). There is a great deal of data being collected with a relationship with social media offering a fast track in which the oral health message can become more successful and effective.

4. Internet Communication

The fourth category studied for effectiveness is through internet communication via research on a website, blog, or scholarly article. An article from the *Journal of Dental Hygiene* found that blogs were a good tool to engage students in discussions on oral health issues and peer-to-peer learning (Hanson, Kami, 2011). Therefore, engaging individuals in more discussion regarding the oral health message can influence social beliefs and attitudes towards it, which can then motivate actions toward prevention. Blogs and websites are another effective channel of health communication and their level of effectiveness should be explored further.

The Qualitative Discourse analysis in this study revealed evidence of critical thought and discourse throughout blog posts. The data suggests that the use of technologies such as the Internet and blogging, are a way to support peer-to-peer learning and foster critical discussion (Hanson, Kami, 2011). This channel of communication may be effective enough to increase health literacy and promote individual decisions towards enhancing oral health. The journal *Communication with the Public* published an article regarding viruses in the United States and the tactics of communication used to circulate important preventative information regarding these viruses. The U.S. Department of Health and Human Services (HHS) set up a website for the SARS outbreak in 2003 with information summaries and news releases (Stoto, et al., 2005). Such a website could considerably provide a model a model for oral health information sharing.

5. Television Communication

The fifth category studied for effectiveness is through television communication via commercials, PSAs, or news programs. In 1987, Warner stated that "public health professionals have begun to explore the potential of the medium as a tool for health education," and that exploration and usage has grown ever since. This permits immediate access to a mass audience as a cost-effective medium for health education. Its main advantage is its vastly greater frequency to reach groups that traditional health education techniques have not reached successfully (Warner, 1987).

One example: Television was used as a primary communication channel to spread a health campaign regarding AIDS prevention. The goal of this health message was to promote a response from the public, to motivate individuals towards AIDS prevention. This goal is parallel to that of the oral health message, which is to promote preventative action (Bush, Boller, 1991).

PSA's are most often used to disseminate pertinent information in a manner that encourages individual response to health-related issues. The U.S. Department of Health and Human Services (1983) said that PSA's are thought to be useful in generating awareness and heightening the public's sensitivity to health problems, in changing or reinforcing attitudes toward relevant behaviors surrounding the health problem. PSA's do offer some advantages in that they can be shorter in length and simpler than news shows or programming. This can make PSA's quickly and easily comprehensible, but they can also be dull. Their timing is often times random and may lack an intentional audience (Bush and Boller, 1991).

Message sensation value has been defined by Palmgreen et al. (1991) as "the degree to which formal and content audio-visual features of a televised message elicit sensory, affective and arousal responses," which is important when assessing which communication channel has the best message-sensation value. In a study by Palmgreen, PSA's and televised advertisements were assessed. Television programs, with much greater length had more opportunities for health messages both in and between programs. In some cases, these two communication formats— televised advertisements and PSA's— go hand in hand and when coupled together may enhance their overall effect. Priming is the ability of media to trigger a reaction in audiences. This may relate to a program eliciting a similar response to a commercial or PSA embedded in it and vice versa. Priming one form of communication format with another may enhance the effect of that oral health message. So the context in which a message is placed has been shown to affect attention to the message, to recall it, its likability, and then to act on it. Therefore often these messages can be linked together to make them more effective (Everett, Palmgreen, 1995).

With 71.1 billion spent on advertisement revenues in television, clearly a lot is put into advertising. The Statistics portal estimates a daily average of 300 minutes or 5 hours of television watching, which is a lot of opportunity to see advertisements (Statistics and facts about the television industry, 2015).

6. Marketing Communication

The sixth category studied for effectiveness is through marketing communication via billboard or public sign. Generally, a person in social marketing or health communications will create and use products, programs, or interventions as a means to promote health changes in individuals and communities. They use strategies and tactics based on science and consumer research. "Health Marketing" is another aspect in the realm of communication that should be considered when promoting a health message. It is a blend of multiple disciplines including the theoretical foundations of social marketing with the outreach communication strategies found in health communications (“What is Health Communications,” 2011).

Health communications as a means of influencing individual behavior to reduce risks in overall health was traditionally not well integrated into the CDC’s program but this is now a goal they are striving towards. One key aspect of the five-year plan they are currently implementing is developing a model for integrating marketing into program planning and design. This model is entitled The Health Action Model (Roper, 2015). Marketing, it appears, is taking an even larger role in communicating effective health messages.

7. Radio Communication

In 2013 there were nearly 160 million digital radio listeners in the U.S. listening to online radio at least once per month. The Statistics Portal (2014) projects that there will be nearly 192 million listeners in 2019, indicative that it is still impacting many of Americans. Radio is the second most powerful medium in the U.S. The Statistic Portal (2014) predicts that listeners of digital radio, which include desktop, laptop and smartphone devices, will account for 59 percent of the country's population in 2018. Remarkably, television is the only medium exceeding radio at a daily reach of 80 percent and is consumed by a broader audience on a daily basis. Although accessibility may be high, actual use is very different. Online radio is only used by 15 percent of American radio listeners, even though close to 49 percent of the U.S. population is reached by the internet (The Statistics Portal, 2014).

Current and Past Efforts towards Improving Health Literacy

This newer challenge to provide general health information to the general public is one the CDC is currently trying to tackle. The CDC is in the process of integrating health communication into their overall health program as a means of influencing individual behavior to reduce risks to health. The newly implemented goal to enhance communication has gained even more urgency as the CDC sees the weight of its importance in their overall purpose. The CDC is now using health communication as a prevention tool. Current data, as provided by Roper (2015), shows that a few subtle common health behavior changes can actually significantly decrease the nation's premature morbidity and mortality. This is a startling statement that may radically change health behavior if effectively communicated. Traditionally, the agency has communicated health information only to professional colleagues, the public health community, medical and scientific groups, through scientific

channels. However, the CDC wishes to branch out from this immediate circle of influence and so far, its primary avenue of communication have been through media (Roper, 2015).

Similarly, regarding the oral health message, I wish to move beyond this scientific community that has ready access to pertinent health information and see this branch out and extend readily into the general community. The scientific community is already in the know; this information needs to be effectively distributed beyond into the public. This is the CDC's current mission, and oral health message now needs a program to initiate effective communication to motivate public health.

In developing my survey I tried considering all aspects that will make it most effective. Roper (2015) says, "A comprehensive promotion plan should describe target audiences and channels, describe activities and events to promote and broaden the communication effort, describe mechanisms to store and track quantities of materials used and those remaining, describe logistical support for all of the above tasks, and provide an implementation timetable." Therefore, I took into account target audience, past habits, and accessibility and preferences to various communication channels to find the channels that can promote my distinct oral health message. Communication messages are conveyed through many appropriate media and organization channels; they can utilize times to support other elements of the prevention program (Roper, 2015).

I have collected data that will determine which channel of communication has the highest possibility of being effective. The impact and outcome evaluation seeks to measure the effects of the communication on the target audience. "Effective health communication activities will be an integral component of all programs designed to promote health, improve quality of life, and foster healthful environments." The CDC realizes the critical

importance of effective health communication and plans to accomplish this mission through increasing health communication activities leading to new research and evaluation of communication efforts. This is a mission the CDC is very recently committing to and is more prominent in the health community (Roper, 2015).

Stoto, et al. (2005) explains the importance of communication when educating the public on viral outbreaks. Effective communication is essential when educating the public to take steps to reduce the spread of infectious disease and to protect themselves. This public health communication effort, explained in the journal *Communication with the Public*, uses both public health in the media and direct communication using websites. Their goal creates a parallel analogy for the goal of oral health communication. In educating the public, prevention is a key goal when communicating the oral health message. Similarly to dental health objectives, the public health communication effort focused on raising awareness of the disease and encouraging the public to take protective measures against infectious diseases (Stoto, et al., 2005). Their prevention plan was molded to grab attention, develop interest and promote desire in hopes to lead to action.

In 2003, a department was developed during the SARS outbreak strictly to promote health messages. The goal of this program was to change simple habits of the public (Stoto, et al., 2005). This is much like the goal of the dental community, to promote simple change though an effective oral health message, to instill simple changes in everyday habits that can lead to a healthier body and life. The oral health message involves maintaining good oral hygiene, daily brushing and flossing, regular dental visits, and preventative action.

Analogously, the state health department distributes information regarding simple habits towards better health, including hand washing and respiratory precautions. The department distributes this information in paper form to busy public locations including colleges, highway rest stops, and community organizations. The state health department utilized various channels of communications to spread preventative efforts. To alert the public about Hepatitis A, the department used the radio, television and print advertisements to circulate the message rapidly. The West Nile Virus campaign is an example of how communicating one risk message can raise concerns about others. Therefore an oral health campaign can help to promote awareness regarding multiple supporting messages (Stoto, et al., 2005).

Raising awareness about one pertinent or more dangerous oral health issue, such as periodontal disease, can then raise awareness and interest into other oral health habits, infections, and preventative measure and concerns. It is critical the oral health campaign is not only communicating a message effectively, but the accurate message to produce the desired results. “While increasing awareness is one goal of public health communication campaigns, motivating behavior change can be another critical goal and one that is difficult to achieve (Stoto, et al., 2005).”

Renaud, et al. (2006) describe a model of mechanisms that lie behind the influences of media on health behavior norms; a simple linear model of direct influence on individuals’ health behavior. Recent studies have suggested that the processes through which media influences health behaviors are actually far more complex (Renaud, et al., 2006). This supports the immediacy in which we must act to study and promote health communication,

not enough has yet been understood on effective health communication and how to utilize it properly and fully.

Renaud (2006) gives a conceptual model of how the media influences the emergence and maintenance of social norms that can contribute to shaping health behaviors. Renaud says we lack a comprehensive understanding of how media contributes to and shapes the social norms that influence these determinants, and how they interact with macro-level factors to influence health and well-being at the community level. Media-based usage promoting health and well-being generally focuses on the direct relationship between media intervention and individual behavior versus using media to reshape the social environment. (Renaud, et al., 2006). Using the correct media outlet to disseminate the oral health message is key to its effectiveness in reshaping norms and perceptions of health as a whole.

Reshaping Social Norms

There is a critical distinction to make; whether the oral health message aims to target individuals or broader social norms. Based on Renaud's study, oral health messages should aim to change and reshape the social norms and understanding of oral health which will then propel individuals into behavior towards better health. But Renaud (2006) argues that it starts with influencing social mores to promote a culture of health. Renaud (2006) alludes to the power of a much larger force shaped by the influence of multiple communication channels: "Media are defined very broadly as elements of communication systems that contribute to shared understandings of health through the flow of information. These communication systems include mass entertainment, information, and instructional/educational systems."

This definition encompasses all of the channels of communication I am interested in exploring. Entertainment can include social media, internet, and television. Information includes literature and marketing. Instructional and educational can include verbal instruction and guidance from professionals. Yet many of these categories can overlap and used in sync to amplify the message. It is imperative that media works towards changing health-related norms. “From our point of view, literature focusing on advocacy does not have such a broad prospect of the whole process. Indeed, a large *media advocacy* concept-based literature defines advocacy as ‘the set of skills used to create a shift in public opinion” (Wallack et al.). Wallack agrees that media is an essential tool available to achieve advocacy through shifting the pillars of public values.

These effective norms mobilized by the common social agents need to be promoted by means of changing the perception of the norms (Renaud, et al., 2006). It is critical that the oral health information, which is already circulating throughout the dental and health community, becomes effectively communicated beyond the scientific sphere into the public. This study displayed a positive loop model that showed communication including news, public affairs, shows, advertising, sitcoms, and other entertainment media can contribute to the positive loop by characterizing the behavior in ways that tend to amplify its prevalence. They state that opinion leaders and specialists can play pivotal roles in the life cycle of norms. Mediated health messages are often communicated by celebrities, journalists, health authorities, and other individuals who have media coverage. Using TV interviews, news coverage, talk shows, gives an indirect social influence that can really impact social norms ad behaviors (Renaud, et al., 2006).

It is not just about getting the message out there, but this message must take on a particular format and then promoted on a specific platform to most effectively motivate people. This motivation occurs through changing social beliefs and norms to shift what people value as important. The effectiveness of the communication channel can be determined through measuring health literacy regarding the importance of oral health and then through the action taken afterwards. Health literacy should increase and follow through action towards improving oral health should also increase to ensure the communication channel is effective in its purpose. The goal of my study is to evaluate which channel of communication or channels will most effectively communicate the oral health message to motivate the general public towards improving oral health.

Pairing Dentistry and Communications

Scientific Foundation

Research was conducted in the microbiology laboratory at Albright College in order to obtain numerical data regarding bacterial growth to support a fundamental oral hygiene recommendation: brushing. A question regarding the specific variable, bacteria count, was used in the communications survey conducted regarding oral health and communication habits to investigate the participant's reaction to that particular piece of data. The laboratory data was collected with a larger objective in mind. The ultimate goal is to one day insert the findings from this experiment into a public health message to enhance effectiveness.

The bacterial samples collected and assessed are meant to strengthen the oral health message to more effectively promote brushing. The research conducted is an example of a

direct link between the scientific knowledge that is foundational to the health message and the communication avenue used to convey the health message. This experiment provides just one of the many examples to be pursued when linking scientific research with oral health communication. This brushing data is a small insight into the vast collection of recommendations made by the heath community to promote oral health.

In order to relay a health message and motivate people to improve their oral health we must provide them a health message that is rooted in science and data, which is where the scientific aspect of this research comes into play. If the scientific data and facts are presented to the patient in an effectively communicated way, this health message can motivate towards better health. But this message is rooted in science. According to Perrien et al. (1985) the factual content of advertisements is affective: "On the basis of our experiment, we can state that advertisers react positively to the factual content of advertisements" (Perrien, et al., 34). Therefore, the experiment conducted is meant to provide awareness of the scientific foundation, for brushing, that should be integrated into the oral health message.

Oral Health Experiment

Hypothesis

My hypothesis is that there will be a significant decrease in bacterial growth (resulting in lower absorbance) from the pre swab before brushing teeth versus the post swab after brushing teeth. This hypothesis was supported in this study. There was found to be a significant decrease in bacterial growth after brushing by a 5-fold reduction.

Methods

Throughout each procedure, consistency was maintained at best during each trial. Before the start of each new week a control swab was taken in which a sterile swab was cultured to ensure growth from outside sources and proper growth media was accounted for. The experiment was designed to examine effectiveness of once a day brushing on bacterial reduction. Data was collected for a total of 6 weeks to refine the protocol and solidify results. The protocol was altered from week 1 and 2 after getting contradictory results. The same protocol was used for weeks 3-6 resulting in 4 complete weeks of data collection. Week 1 and week 2 showed contradictory results and protocol was altered to eliminate error. The remaining weeks showed desired results. A week consisted of 4 days, whether in sequence or non-sequential, and the same oral hygiene routine was maintained throughout the week.

Basic protocol consisted of a pre swab, before brushing teeth, and a post swab, after brushing teeth. For every sample, the same location in the mouth was used consistently to avoid error based on variation of bacterial growth in different locations of the mouth. The gum line of facial side, lower right quadrant was used and swabbed back and forth a total of 10 strokes (one direction counting as one stroke). At the start of the experiment and after every 2 weeks, test subjects were given a new soft-bristle tooth brush and new tube of Colgate fluoride recommended toothpaste.

The two test subjects, myself and a male Albright student (with IRB approval), did not brush teeth the night before. To simulate as common of a morning routine for the average person as possible, both subjects woke up, did not brush teeth, and ate breakfast. A swab was collected between 7:30 a.m. and 8:00 a.m. each morning. Subjects brushed teeth with a manual toothbrush

for 2 minutes with toothpaste. A swab was then taken after brushing. Each swab was placed into a test tube with Tryptic Soy Broth[3] (TSB) using sterilization technique, flaming with Bunsen burner. Samples were placed into 37 degrees centigrade incubator for growth.

For week 1 of experiments, tubes were incubated overnight for a full 24 hours to be read the next morning using a spectrophotometer[4] between 7:30 a.m. and 8:00 a.m. The readings were collected in absorbance units; the measure of the amount of light absorbed by a material. Most bacteria require at least 18 hours for growth. However, week 1 provided conflicting results and showed an increase of bacteria from pre to post brushing samples. This data contradicted the hypothesis and well-known result of brushing, causing a re-evaluation of protocol. During week 1, the toothbrushes were stored in a plastic zip lock pouch provided by a dental office. It was possible this airtight seal may be causing increased bacterial growth that may contribute to the higher bacterial readings after brushing. The possibility of the contaminated brushes may explain the bacterial count increasing after brushing. Therefore, tooth brushes were moved to an open beaker for storage so they could have air contact to adjust for this contradiction. Other than this alteration, week 2 protocol remained the same. However, week 2 results remained unchanged still showing increase in bacteria contradicting the hypothesis.

Another alteration was applied for week 3 to account for this incongruent data. Because bacteria can grow very quickly, it was proposed that perhaps the bacteria that was eliminated and killed during brushing, are actually given enough time in incubation to grow back by the reading

[3] A culture broth to grow aerobic bacteria

[4] Apparatus for measuring the intensity of light as transmitted or emitted (at a certain wavelength) by particular substances in solution

the next morning. It was enough time for the bacteria to completely repopulate even after being removed from brushing. Therefore, the bacterial amount in the post swab (that should be lower) has enough time to grow back and level out with the bacterial amount in the pre swab (which should be significantly higher), therefore presenting similar bacterial amounts. As seen in the data presented in week 1 and 2, bacterial counts for pre and post brushing are very similar, supporting bacterial growth did even out due to extended growth time in the overnight incubation. There is a maximum or cap that bacterial growth reaches and then levels off. The results suggest both tubes reach this leveling point in the overnight incubation.

To account for this error, bacterial readings were taken much early so the bacteria did not have a full 24 hours to grow. Instead, the bacterial growth would be stopped early to catch the growth at levels that are most true to the actual pre and post bacterial amount found in the mouth. The pre swabs were still taken between 7:30 a.m. and 8:00 a.m. each morning, but samples were allowed to incubate for no more than 8 hours. Samples were read between 2:00 p.m. and 3:30 p.m. in the afternoon. Halting bacterial growth at this time showed a much greater difference between readings because the post swab did not have enough time to catch up in growth with the pre swab's high initial bacterial count. Therefore, once this error was accounted for, there was an expected drop in bacterial growth between the pre and the post brushing samples.

An extraneous data point was presented on Dec. 1 not fitting the decreasing trend between pre and post. One key difference was made for this sample. The samples were taken out of incubation still within 8 hours between 2:00 p.m. and 3:30 p.m., however instead of reading samples immediately they were placed into the refrigerator. This change in temperature was meant to stop bacterial growth. Readings could then be done the following morning while still

measuring the difference in growth at the time it was taken out of incubation. The decreasing trend between pre and post was expected to be maintained. However, taking the samples out of the incubator and placing them in the refrigerator still resulted in enough growth by the following morning that the bacterial amounts in pre and post samples leveled off again.

The prediction made regarding time for growth interfering with absorbance levels was confirmed through adjusting protocol, and this alteration made a significant change in results supporting the hypothesis and expected results. The same protocol was conducted again for weeks 4-6 resulting in a total of 4 weeks of data points to solidify trends. These trends sis support the hypothesis. There was in fact a significant decrease in bacterial amount from pre to post swab regularly demonstrating stability in the protocol.

Results

There was a significant decrease in bacterial count from pre brushing to post brushing indicated by both test subjects. Results from weeks 3-6 were averaged together. Test subject 1 indicated an average drop in bacterial count from 0.351313 to 0.0798 (Figure 1) showing a 4.4 plot-fold bacterial reduction. The t-test indicated there was a significant reduction in bacterial count from pre to post brushing ($t=3.358$, $p<0.05$). Test subject 2 indicated an average drop in bacterial count from 0.4461 to 0.1431 (Figure 2) showing a 3.31174 plot-fold bacterial reduction. The t-test indicated there was a significant reduction in bacterial count from pre to post brushing ($t=4.220$, $p<0.05$).

Figure 1.

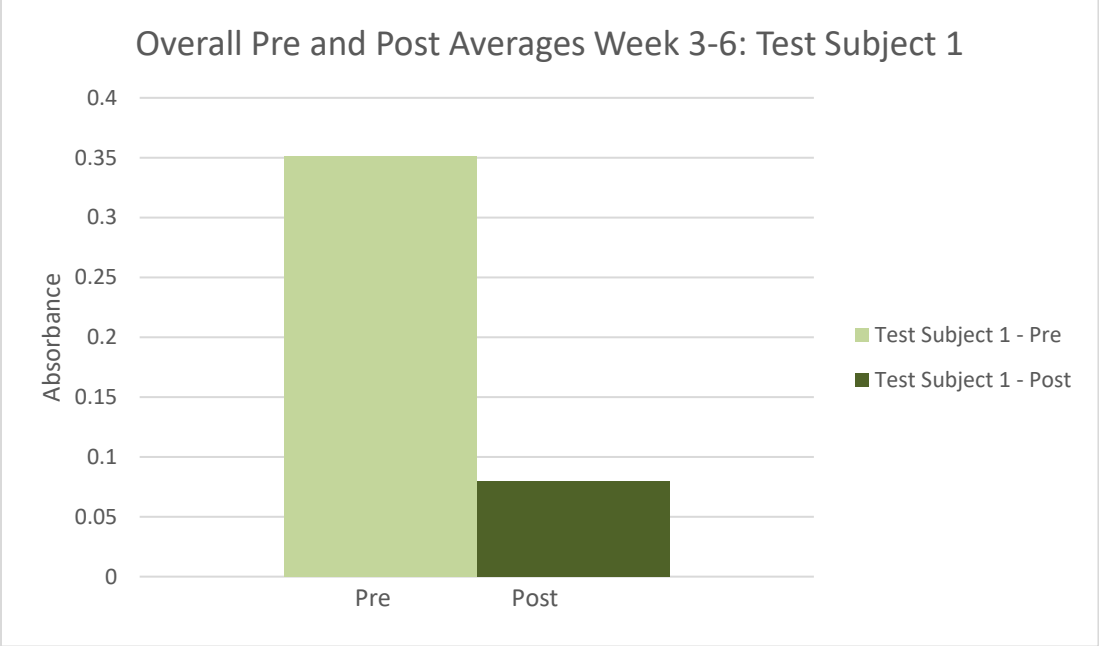
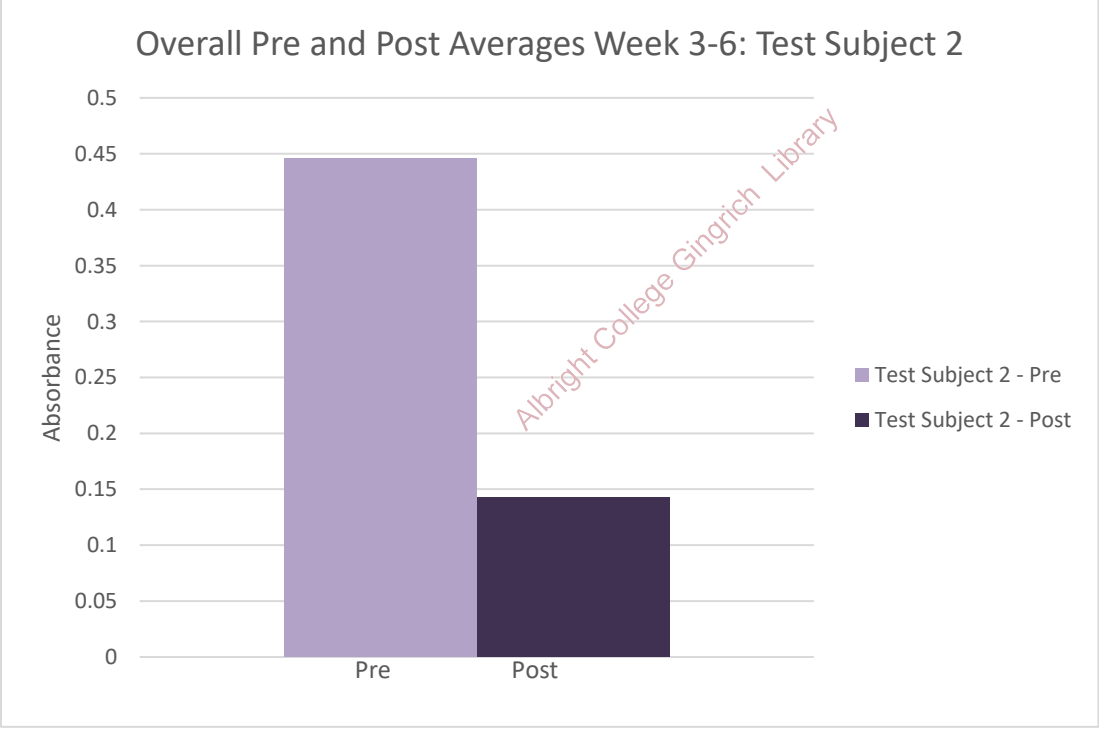


Figure 2.



Communications Survey

Survey Goal

I developed a survey to evaluate which avenue of communication is most effective in relaying the oral health message. Selective communication channels are imperative to getting the oral health message to the public.

I considered all aspects that will make the survey most effective. I collected data that will determine which channel of communication has the highest possibility of being effective. The target audience is very wide, excluding children. Therefore it includes all age ranges above 18 years old to seniors. I will investigate the audience's past habits and common channels of communication they already look to for information.

Survey Format and Plan

Using Survey Monkey I distributed a questionnaire including closed ended questions with yes or no answers and multiple choice answers. The first section of the survey instrument is closed ended questions regarding background information about the audience. The answers are in multiple choice formats. This provides relevant information about the respondent's personal demographics. The second section is regarding the oral health history of the audience and this too has a multiple choice answer set and many yes no questions.

The third section regarding the communication channels is to gain a baseline of which channels are most credible and accessible to the audience already. This is to gain an understanding of the audience's current habits and exposure to communication channels. The

questions regard each individual channel. Each answer set is identical. It has various increasing ranges of hours for the client to indicate in which they spend each week with each source of communication. The repetition in answer options is to help the reader facilitate through the survey quickly and efficiently. Hopefully, as the reader becomes more familiar with the answer set, the questions will be easily understood and quickly responded to. They are more likely to answer more accurately based on comprehension level.

The last section of the survey instrument is to test the audience's natural preference towards a particular communication channel. There are two sets of example questions regarding oral health that I tried to make most relevant and interesting for today's general public. The first set is for general medical oral health needs, and the second set is regarding cosmetics in oral health. The reader is given a general oral health question that they may be curious about or interested in, and they are asked to indicate which channel of communication they would most readily go to in order to find the answer to the pertinent oral health question. This will give a general average of which channel of communication the audience is naturally seeking out in order to answer their curiosity regarding oral health.

The answer set for each question in this section is, again, identical and repetitive, listing the seven channels of communication. This will help facilitate the reader through the survey section quickly to allow their brain to make similar decisions with repetition. The two distinct sections of topics also will allow me to compare whether the audience is seeking different channels of communication when asking about oral health information regarding strict medical needs versus cosmetic interests.

A specific question was adding linking my personal scientific data with the health message to assess whether the data point would more effectively motivate participants to take action to brush more. A question asked if participants were shown a significant decrease of bacteria in the mouth, would this increase the amount they brush.

Pretest

A pretest was done. The survey instrument was administered to three individuals of varying backgrounds to assess comprehension and clarity of the instrument. The three individuals included a young woman in her twenties with a master's degree, a male in his sixties with a doctorate degree and a housewife in her fifties that went to a trade school. The average time to take the survey was approximately seven minutes. Feedback was positive and the survey had a high level of comprehension. A few similar questions were asked regarding the same point along the survey revolving around several of the same questions. These inquiries were taken into account and adjusted.

After taking into consideration the feedback from the pretest three questions were edited so the wording was made clearer and more focused. A particular question had an incompatible answer set that was brought to my attention. The verb in the question was consequently altered to ask the question more accurately. Overall I think the pretest was a success and showed beneficial results when given to the more massive target audience. The survey was administered from February through March of 2016. Results were analyzed and interpreted using SPSS to further this field of research. Correlations, Cross tabs and a T-test were conducted.

Target Audience

I engaged a diverse set of demographics for this study outreach to diverse groups in order to seek a broadly representative sample. I wanted a wide range in audience to most accurately represent the public. Age range includes 18 years and older. The only exclusion from this survey are children for whom parents make decisions that are relevant to my study. The survey asks the reader where they found the survey and with what organization, group, etc. are they affiliated. I also asked whether or not participants have dental insurance which may affect their use of dental care.

Distribution

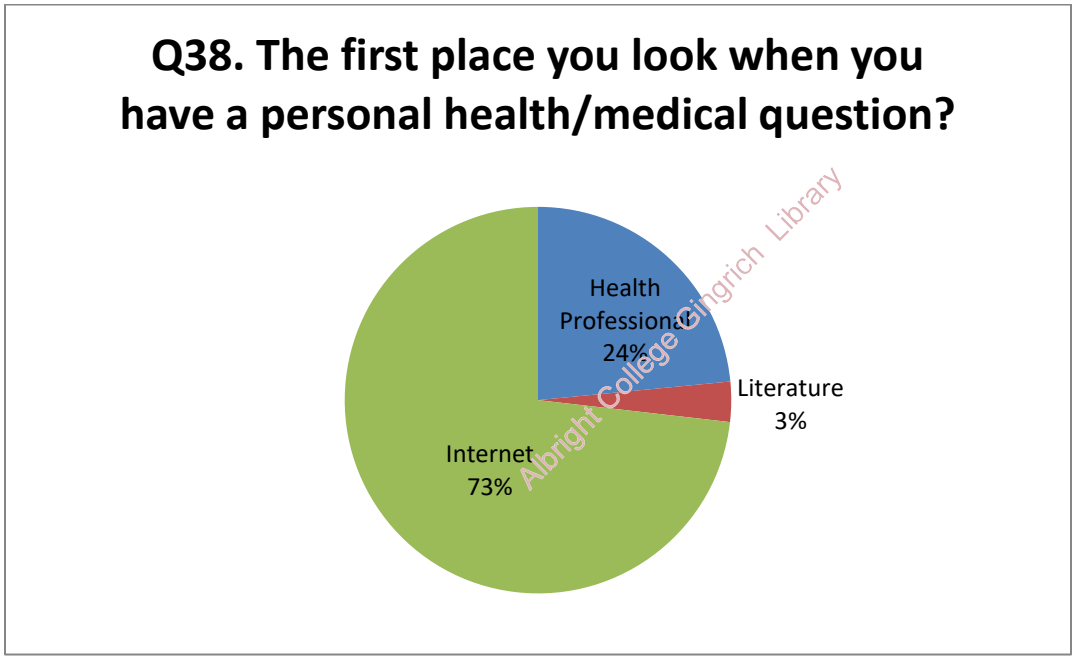
I utilized the day-time Albright student body via e-mail to capture a young adult audience ages averagely 18-22 years as well as the adult evening students. I accessed Albright faculty via e-mail through Professor Jon Bekken. This was distributed to about 700 adult ages 30-70 years old. I posted the link onto my personal Facebook page which has access to a wide age range and demographic group. I promoted the link through a church function.

There were 200 participants of the survey with about 73% female and 28% male. Despite attempts to collect a diverse audience, participants did not show as much range as I would have liked. There were no significant relationships identified based on demographics with the exclusion of ethnicity which will be further addressed in the conclusion. For more details regarding the specific demographics of this study please see attached appendix.

Communications Survey Results & Discussion

My survey was designed to evaluate which avenue of communication is most effective to communicate the oral health message. In order to evaluate this topic of communication effectiveness my research is based around three main research questions. Question one: what are the channels of communications adults go to when seeking information for oral health? Out of the seven information channels, including health professional, literature, social media, internet, television, marketing advertisement and radio, only three were indicated. The study reveals that the majority, at 73%, go to the Internet as their first source when seeking health/medical advice. Only 24% seek information from a health professional (dentist, hygienist, pediatrician, etc.) while 3% go to a literature source (Figure 1).

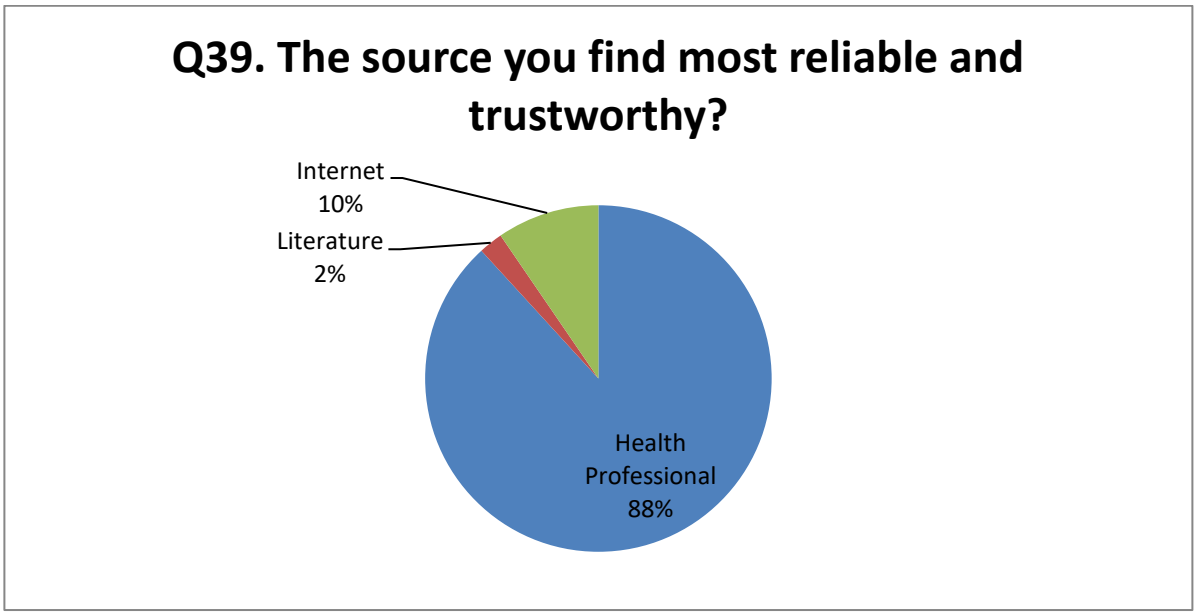
Figure 1.



Question two: which channels of communication, relaying health information, do adults find most credible and are therefore are more likely to respond to. Based on the results of this

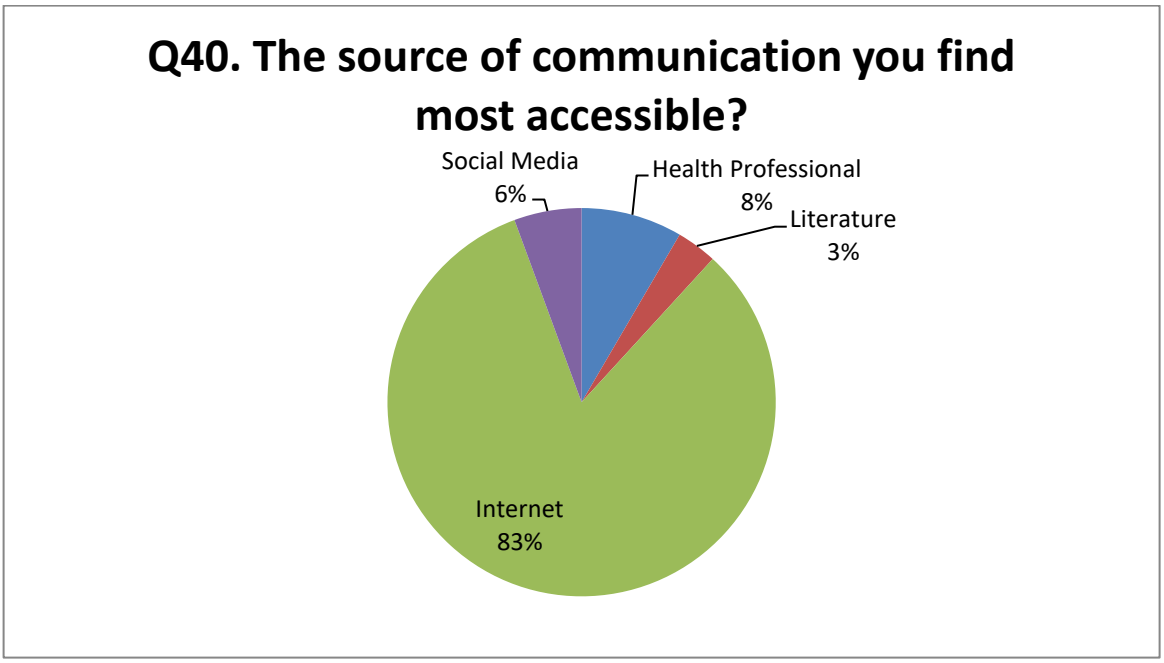
survey, the majority of participants, at 88%, indicated they find health professionals most credible while only 10% found the Internet most credible (Figure 2).

Figure 2.



Question three: which channels of communication do adults find most accessible? Based on the results of this survey, the majority of participants at 83% found the Internet most accessible while only 8% found health professionals most accessible (Figure 3).

Figure 3.

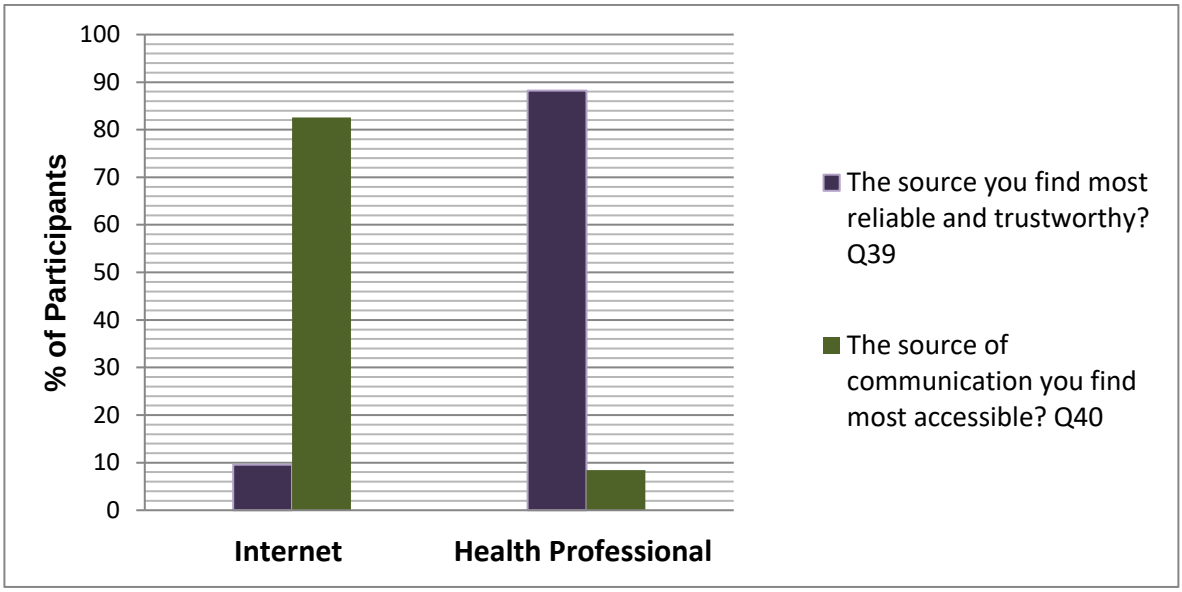


The results of this survey indicate a clear discrepancy between what communication channel participants find to be most trustworthy and what they find to be most accessible. Based on prior research, trustworthiness is core to the effectiveness of the oral health message. Firstly, trustworthiness is essential to one taking the advice given, and secondly it is essential to whether one will act on that advice.

The study reveals that trustworthiness was inversely related to accessibility (Figure 4). As the percentage of people who found health professionals most trustworthy increased, the percentage of people who found them accessible decreased. In the same manner, as the percentage of people who found the Internet most accessible increased, the percentage of people who found it most trustworthy decreased. The survey reveals that 83% find the Internet most accessible while only 8% find health professionals most accessible. However, only 10% find the Internet most trustworthy while 88% find health professionals most trustworthy (Figure 4).

Therefore, the majority of participants find health professionals most trustworthy and reliable while also finding them relatively inaccessible. The majority of participants find the Internet most accessible while also finding it lacking reliability.

Figure 4. *Inverse correlation between what participants found trustworthy with what they found most accessible.*

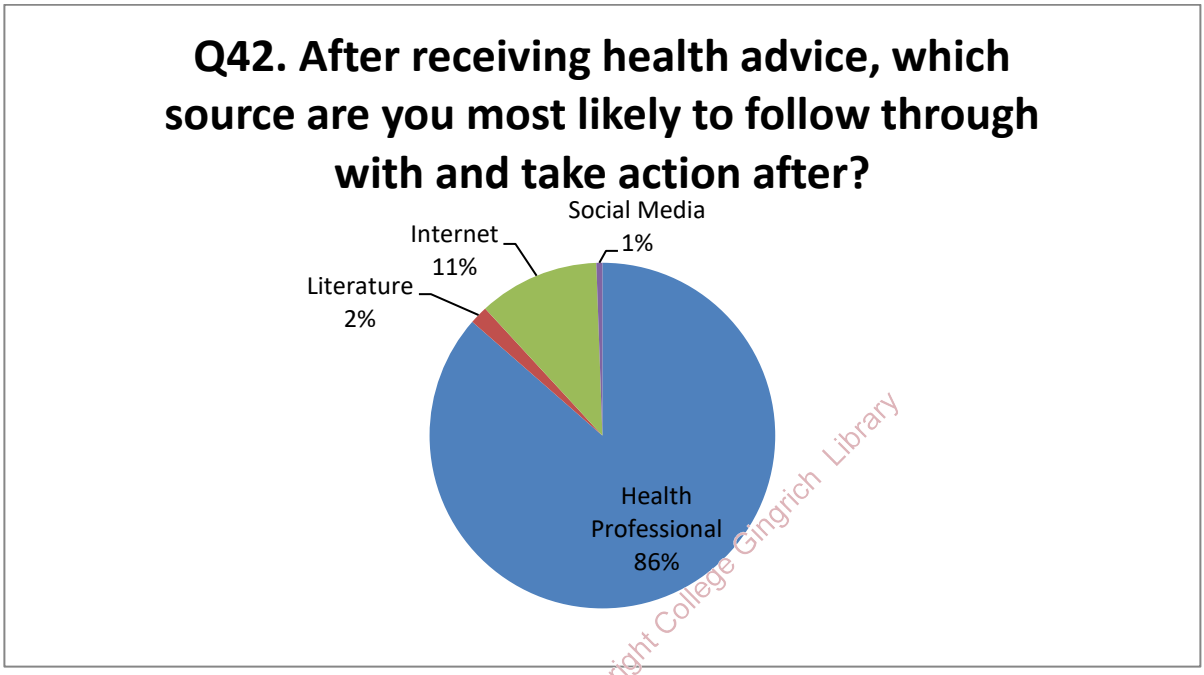


Credibility and accessibility are the two most critical components of reaching the public with a health message. People must not only have access to the source but also trust it in order to promote action. Accessibility increases the probability of one finding the message while trustworthiness increases the likeliness for people to take advice and act on the advice given. Although health professionals were found to be most trustworthy, they lacked greatly in accessibility; while the Internet was found most accessible but lacked greatly in reliability. The communication channel participants find most trustworthy and reliable dictates from where the oral health message should be given. The information channel participants find most accessible helps direct what channel should be used to administer the reliable and credible source of information. Based on the results from this survey, the oral health message should be conveyed

through health care professionals. Yet this trustworthy channel must also become the most accessible communication channel.

To strengthen the relationship between trust and likeliness to take action (or follow-thru), participants were asked what information channel they are most likely to respond to after receiving advice. The majority of participants at 86% indicated that after receiving health advice from a health professional, they are most likely to follow through and take action. Only 11% indicated likeliness of follow through after receiving information from the Internet (Figure 5).

Figure 5.



The follow-up question confirms the previous results and strengthens the relationship between trustworthiness and likeliness to act. The results of this survey support the proposed correlation between trustworthiness and communication effectiveness (Table 1). There is a significant relationship between trustworthiness and follow-up ($t= 0.57$, $p<0.01$). This relationship was reinforced with a very robust correlation with a .457 value. It indicated

significance at the 0.01 level. The communication channel participants find most trustworthy they are most likely to respond to, which was found to be health professionals. While on the other hand, the relationship between accessibility and follow-up attained no statistical significance ($t=0.116$, $p>0.05$).

Table 1.

Pair	Paired Sample Correlations	Correlation	Sig.
Pair 1	The source you find most reliable and trustworthy? & What information are you more likely to act on and respond to?	.570	0.000
Pair 2	The source of communication you find most accessible? & After receiving health advice, which source are you most likely to follow through with and take action after?	.116	0.125

The survey shows that participants are most likely to take action after receiving advice from the communication channel they find most trustworthy—health professionals (Figure 6). Conversely, participants are the least likely to take action after receiving advice from a communication channel they lack trust for—Internet—despite how accessible it is (Figure 7).

Figure 6: What participants found most reliable and trustworthy is directly correlated with what they were most likely to follow through with and take action after.

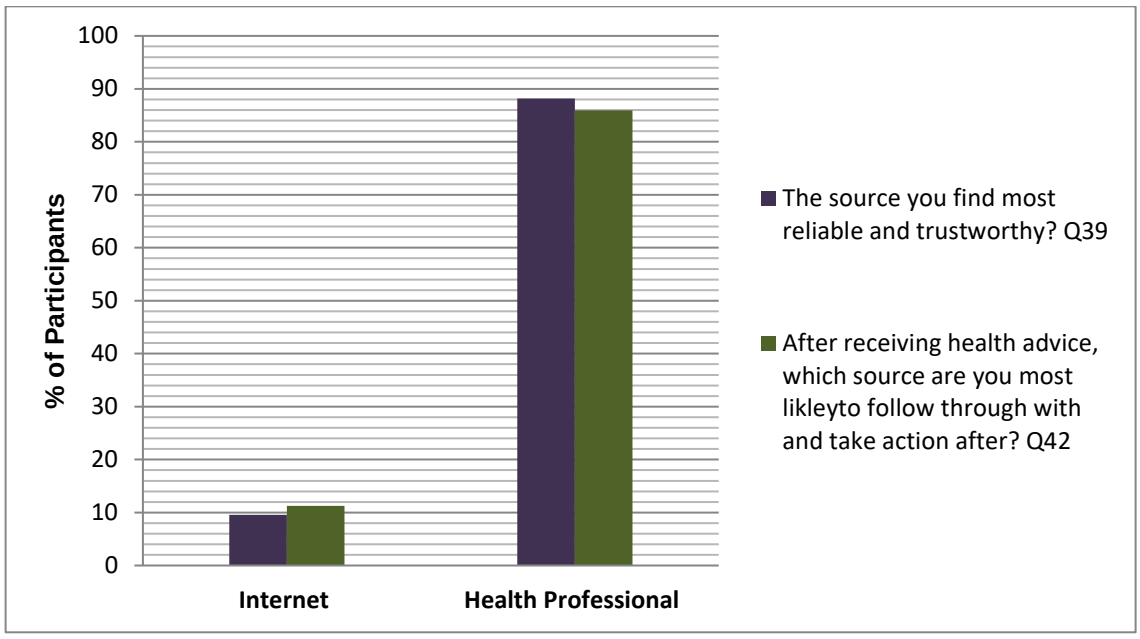
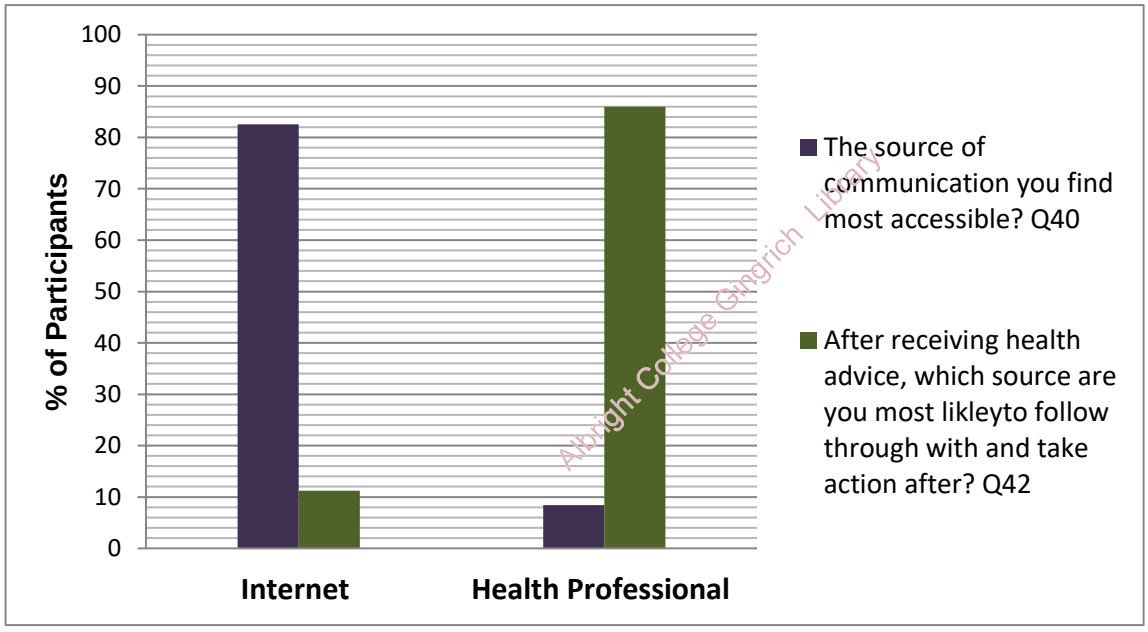


Figure 7: *What participants found most accessible is inversely correlated with what they were most likely to follow through with and take action after.*



Cross tab results also showed a robust relationship between trustworthiness and likeliness to act (Table 2), and lack of relationship between accessibility and likeliness to act (Table 3).

Table 3 cross tabs reinforced a strong relationship between the Internet and accessibility, yet still lacking relationship to follow-thru. The majority of participants at 157 found health professionals to be the most trustworthy communication channel. Out of that 157, 144 were more likely to take action after receiving advice from them; indicating a very strong relationship between trust and follow thru (Table 2).

Oppositely, out of the majority of participants (145) that found the Internet the most accessible communication channel, only 19 out of those 145 are likely to take action after receiving advice from their most accessible source; the Internet. However, 124 of those 145 participants, or 86%, that found the Internet most accessible indicated that they are still more likely to act after receiving advice from the health professional over their most accessible communication channel. Out of the 15 people that indicated the health professionals are most accessible, all 15 also indicated they are more likely to act after receiving advice from them. Therefore, 100% of participants that indicated health professionals as most accessible are also most likely to take action after receiving advice from those health professionals (Table 3). It is imperative that the majority of people finding health professionals most trustworthy and are therefore more likely to act after receiving their advice, are also finding health professionals the most accessible channel. A goal derived from these results is that health communicator's increase these 15 participants, or 12%, to the majority (ideally 100%) that find the channel most likely to follow thru with also the channel they also find most accessible. This is an ideal model: to aim for 100% compatibility between the channel people are most likely to respond to with the channel that is most accessible.

Table 2.

Count

		After receiving health advice, which source are you most likely to follow through with and take action after?					
		Health Professional (Dentist, hygienist, pediatrician, etc.)	Literature (Newspapers, magazines, books, brochures)	Social Media (Facebook, Twitter, Instagram)	Internet (Website, blog, scholarly article)	Marketing Advertisement (Billboards, signs, pamphlets)	Total
The source you find most reliable and trustworthy?	Health Professional (Dentist, hygienist, pediatrician, etc.)	144	1	0	11	1	157
	Literature (Newspapers, magazines, books, brochures)	2	2	0	0	0	4
	Internet (Website, blog, scholarly article)	5	0	1	9	0	15
Total		151	3	1	20	1	176

Table 3.

Count

		After receiving health advice, which source are you most likely to follow through with and take action after?				
		Health Professional (Dentist, hygienist, pediatrician, etc.)	Literature (Newspapers, magazines, books, brochures)	Social Media (Facebook, Twitter, Instagram)	Internet (Website, blog, scholarly article)	Total
The source of communication you find most accessible?	Health Professional (Dentist, hygienist, pediatrician, etc.)	15	0	0	0	15
	Literature (Newspapers, magazines, books, brochures)	5	1	0	0	6
	Social Media (Facebook, Twitter, Instagram)	8	0	1	1	10
	Internet (Website, blog, scholarly article)	124	2	0	19	145
Total		152	3	1	20	176

Therefore, survey results suggest that although participants are more likely to follow through with health advice from health professionals, they lack access to this communication channel in which they find most trustworthy. Instead, most participants indicated having greater accessibility to the Internet, which lacks trustworthiness and therefore is less likely to motivate action.

To reconcile this discrepancy, we must find a way to make the communication channel that is most trustworthy and most likely to promote action also most accessible. If the oral health message is conveyed through the health professionals, indicated most trustworthy, it can most effectively motivate people to take action towards better oral health. Therefore, when conveying an oral health message, health professionals have the potential to have the most effective communication to promote action towards better oral health.

This direct correlation strengthens the hypothesis that trustworthiness and reliability is essential to whether or not the public will listen to and respond with action to health advice given. Therefore, an oral health message must be disseminated through a communication channel that is most trustworthy and reliable in order to result in highest percentage of action taken towards oral health. As indicated by this survey, health professionals are the most trustworthy source of information and therefore the best information channel to disseminate the oral health message.

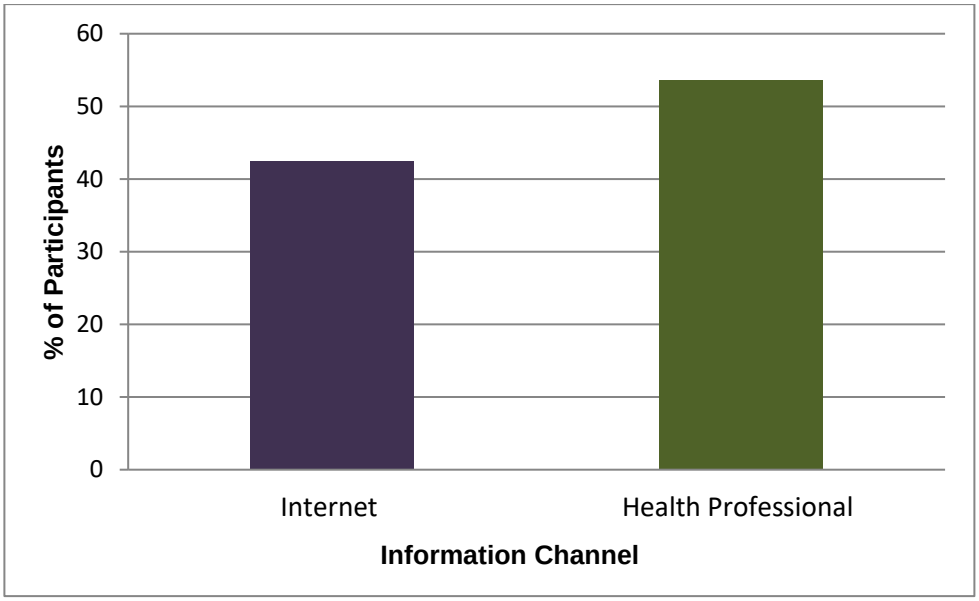
However, the opposite is true for the Internet. Most participants have the greatest access to the Internet yet are less likely to respond with action (Figure 7). Therefor there is disagreement between what people are most likely to respond to and what people have find most accessible. This raises the need to make most accessible the communication channel in which people find most trustworthy. This will increase the effectiveness of the oral health message by increasing the likeliness of the public to respond to advice given. Therefore, an oral health message must be disseminated through a communication channel that is most credible (health professionals) in a ways that is most accessible (Internet).

In summary, health professionals are therefore the communication channel participants find most trustworthy and reliable. Participants are most likely to take action after receiving advice from health professionals. By closing this gap between trustworthiness and accessibility, the oral health message has a much greater chance to be much more effective in motivating more Americans towards action. Therefore, by using an information channel that is both trustworthy and accessible, the oral health message can make the greatest impact to motivate Americans to take action towards oral health.

A series of example oral health questions were asked to assess what information channels participants go to first when seeking the answer to a real-life health scenario. This section was designed with common health questions to stimulate a natural response from participants. There is an important distinction to be made. This section does not determine where the participant actually went to find the advice (as the participant may or may not have access to the source).

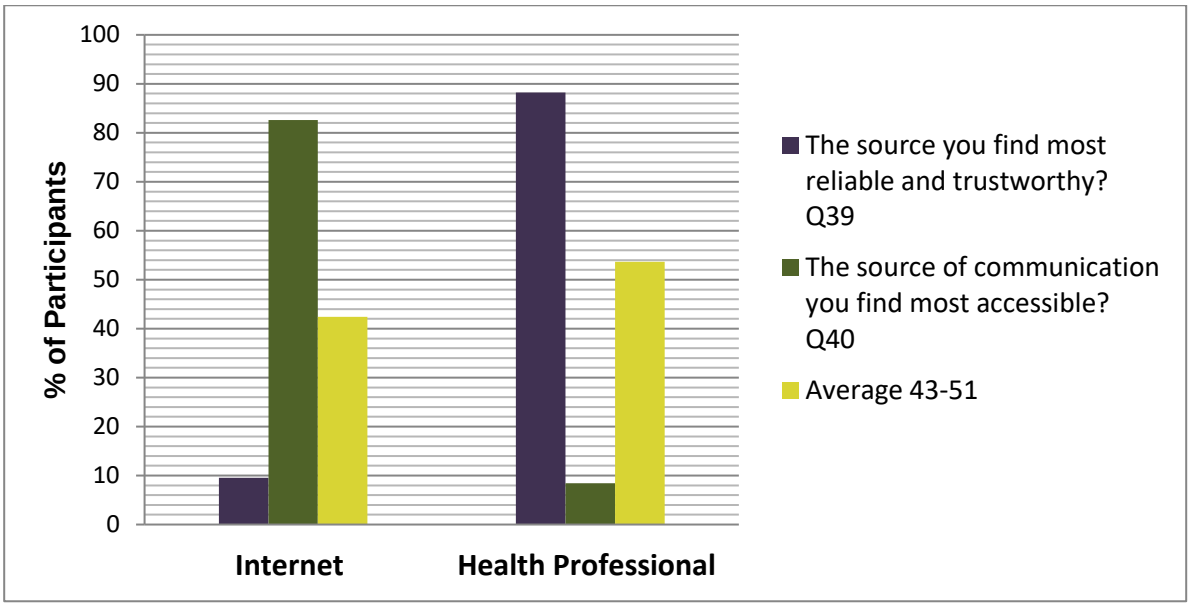
Instead this section more accurately judges where the participants prefer to seek the advice from. Again, the significant results significant fell between health professionals and the internet. On average between the nine questions, 43% of participants indicate seeking health advice first from the Internet while 54% indicate seeking advice from a health professional (Figure 8). Based on the results, health professionals are the communication channel in which the majority of participants prefer to receive health advice from.

***Figure 8:** Average of responses from the nine questions asking which information channel if real oral health concerns.*



These results strengthen the prior discrepancy between what communication channel participants find trustworthy and therefore prefer to seek health information, versus the channel in which they actually have access to. There is a gap between the channel in which participants prefer and the channel they have access to. The 54% of participants that said they would go to a health professional for advice first may or may not have access to do this. This number of participants is much higher than the 8% that found health professionals accessible to them. The participants that seek after information from health professionals on average at 54% is more similarly related to the 88% that find them most reliable and trustworthy (Figure 9).

Figure 9. The average channel taken from the mock-scenario questions 43-51 compared with the channel of trustworthiness and accessibility.

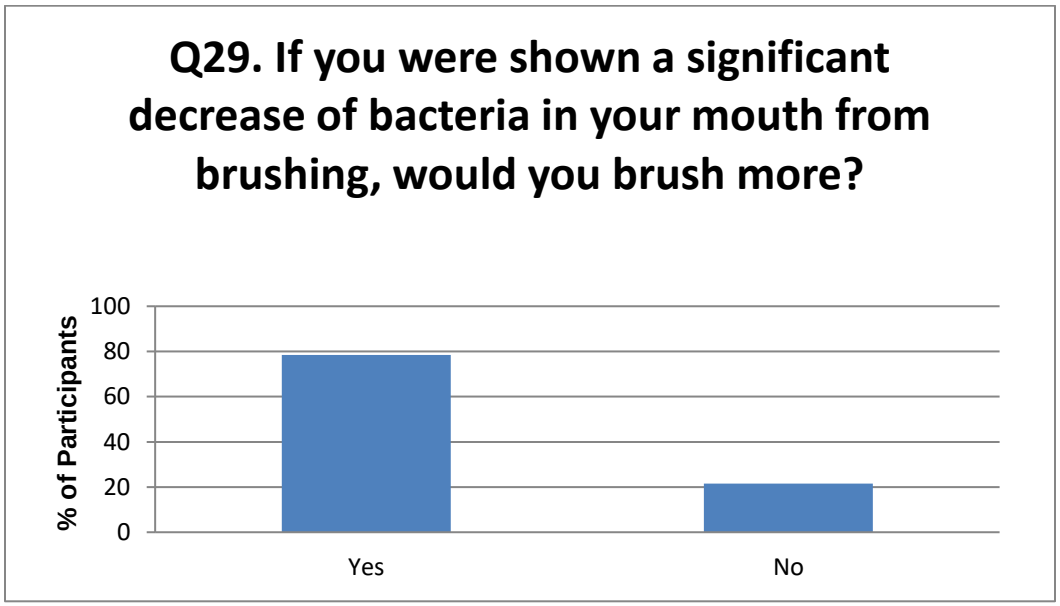


The direct correlation between trustworthiness of a communication channel and increased likeliness to follow-thru brings about another aspect of the oral health message. Once the most effective communication channel is found, one must then look at the format of the oral health message itself. Therefore the study was taken a step further to assess what type of information can be added to the oral health message to make it more effective. When a health professional (deemed most trustworthy and therefore most likely to motivate) administers the most effectively formatted health message, it can have the greatest impact on motivating people to take action towards better oral health. One proposal is to enhance the oral health message with scientific data.

In order to assess what type of scientific research had the ability to motivate Americans to take action towards better oral health, a series of questions were asked in regards to oral health recommendation paired with research data. This provided participants with factual evidence to back up advice. The first question is directly linked with my personal research conducted in the

lab regarding bacterial reduction: if participants are more motivated to brush if shown a significant decrease of bacteria in their mouth after brushing. According to survey results, 78% of respondents say yes, they would brush more, while 22% remain unmotivated (Figure 10).

Figure 10.



Based on the results of this study, all 7 questions showed the majority of participants were more motivated to action when oral health advice was paired with scientific data. The remaining six questions in this section involved various health advice (i.e. brush more, floss more, etc.) coupled with scientific data. An average of 73% of people were motivated to take action after provided some type of scientific data to back up the oral health information provided. An average of 32% of participants remained unmotivated. This majority supports that providing scientific data (in particular the decrease in bacterial growth post brushing) along with the advice to brush more (or other oral hygiene recommendation), can have a more effective impact on participants to motivate their action towards better oral health. Results support that oral health advice can make a much more effective impact when communicated with scientific research.

Conclusion

Further research is needed with a much larger sample size to support and reinforce patterns shown in these results. A larger audience, ideally a nationwide survey, would allow for evidence to solidify proposed relationships and correlations found in this smaller sample size. The relationship this study brought to light is the discrepancy between what information channel people find most trustworthy and what channel they find most accessible. There is a strong correlation between trustworthiness in health professionals and increased likeliness to act on health advice given by these professionals versus advice given by a less trusted source like the Internet. However, the study also showed that although health professionals are most trusted they are less accessible.

This research has emphasized a breakdown between the information channel in which people find most trustworthy and its accessibility. Therefore by aligning these two variables, trustworthiness and accessibility, I propose that people can be much more effectively motivated to take action toward oral health.

This study was only able to measure the target audience's communication tendencies and habits; however a more extensive study in a lab setting could provide more evidence on memory and action. The ability and extent to which the receiver of the health message can recall that information is a degree of measurement for communication effectiveness. These forms of measurement, however, require more elaborate test settings and methods in order to execute properly and receive the desired results. Measuring such habits, including action taken and memory recall after administration of the health message, could then be further assessed in future research.

Another direction of research is to pursue how to make the most trustworthy channels more accessible. Therefore, after an advertising format is designed to somehow make health advice from professionals more accessible, a study similar to this study can be administered to re-evaluate changes in results to see whether the channel that is most trustworthy is now also most accessible. The ideal results would show a direct and significant relationship between the information channels which participants find most accessible and most trustworthy. These relationships should also be correlated to what channel participants are most likely to respond to. Health professionals should be the majority in all three categories. This strong relationship is predicted across all three variables.

There are various ways in which the oral health message can be administered through more trusted channels of communication. One idea I propose is through an active blog with a credentialed doctor; the best case scenario is with the regular dentist one often sees and has already built trust with. There needs to be some type of open access through which people can gain access to their health professional (most trusted information channel) to receive advice so they can be most effectively motivated to take action towards better oral health. People may be able to ask questions through this portal in which the doctor would respond back within a reasonable time frame. This type of access to the health professional starts making the most trustworthy source of information more accessible, extending beyond the office.

The results of this study showed a slight significant correlation value of 0.218 between race/ethnicity with how regularly participants see their dentist. This indicates that Caucasians are more likely to visit the dentist versus other non-white minority groups. This relationship provides a target audience in which advertisers can try to focus to more effectively reach minority groups

with the oral health message. A communication tactic designed specifically to reach this demographic with the oral health message is one avenue that needs further explored.

Another future extension from this study is in regards to the actual message formatting itself. A format needs created that combines the criteria for an oral health campaign addressing what information goes into the message and what trustworthy information channel that message is administered through. Based on the results found, I suggest pairing some sort of scientific fact or research point with the oral health message to help increase effectiveness for follow through. The oral health message should contain a simple yet grounded statistic or data point. An advertising template may be designed to effectively couple oral health advice with scientific data. Then, this crafted message must be administered through a health profession deemed the most trusted source, and through an accessible communication channel.

In regards to pairing advice with scientific research, one may propose an advertising strategy in which health advice is administered alongside small yet effective scientific data. One example is a toothpaste bottle showing the numerical value of the decrease in bacterial amount. For example: An unbrushed mouth has 4 times the bacteria crawling around versus a brushed and bright smile. Or: When you forget to brush, there is a 400% increase of bacteria crawling around in your mouth! This combined advertisement strategy may enrich the oral health message and more effectively impact motivation to brush.

This paper was built on a foundation of research. Prior research knowledge helped to form the groundwork for effective communication and therefore built the essential pieces needed for an effective oral health message. These essential pieces include health literacy,

trustworthiness, accessibility and factual significance. Using a format that is shaped by these essential pieces, one can build and convey the most effective oral health message.

The purpose of this paper was to determine what communication channel is most effective in conveying the oral health message in order to motivate people to take action towards better oral health. This study has shown that the most effective channel of communication is that which is perceived to be most trustworthy by the public which is health professionals. There is a significant relationship between trustworthiness and increased likeness to act, and therefore recommendations from health professionals will increase the likelihood for the public to take the recommended course of action.

This study has also raised a challenge that health communicators must confront. Although health professionals are found to be the most trustworthy communication of channel, they lack accessibility. Accessibility to the Internet is much greater than that to individual health professionals. Since the internet is so much more accessible than the individual health professional, it is that much more imperative that they utilize the accessibility of the internet to reach the public with the oral health message. Their credibility paired with the accessibility of the internet through active blogs, chat rooms and ongoing Q&A will improve the reach and effectiveness of the communication to the public. The combination of the trustworthiness of the health care professional and the increased accessibility to the health professional through the Internet will enable the trustworthiness to be transferred to the public through the most accessible route.

Trustworthiness of the health care professional and the accessibility and reach of the Internet is the most effective way to transmit the oral health message to the public in order to motivate them to action towards better oral health. It is our responsibility as health

communicators to design the most effective oral health message and administer it through the most effective communication channel to motivate people to take action towards better oral health and therefore better overall health.

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Appendix 1.

Percentages are rounded when referred to here for the purpose of this discussion but remain at their exact numerical value for all graphs and tests conducted. There were 200 participants of the survey with about 73% female and 28% male. A majority of the responses came from the 18-29 year old age group at 70%, followed by 30-49 years old at about 20%, 50-64 years old at 11% and 65 years and older at only 1%. Although the older population is far underrepresented, the results provide a baseline for the young adult to middle-aged Americans.

The participating group indicated 70% white/Caucasian, 12% Black/African American, 5% Hispanic/Latino, 5% other and about 4% Asian/Pacific Islander. The primary language of the participants was English at 96%. Spanish was indicated as the primary language for 1.5% and 3% indicated other. Participants show a wide range of educational background. About 52% have some college education, 14% had a high school diploma/GED, 12% had a doctorate degree. 8% indicated having either an associate degree or master's degree. 4% had a bachelor's degree and 1% had vocational school. As for household income level, about 48% indicated $35-99,999 followed by 20% at $100-500,000 and 18% at less than $16,000. 14% reported income between $16-34,999 and only 1 participant was over $500,000.