

INSTILLING POSITIVE BELIEFS ABOUT ORGAN DONATION: AN
INFORMATION PROCESSING APPROACH

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DEDICATION

This is dedicated to my family, if it was not for you I would not be where I am today.

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by

GERARDO JOSE MOREIRA, M.B.A.

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EXTENDED ABSTRACT

The number of those seeking a kidney donation in the United States continues to increase while the number of donors is not growing at the same rate (U.S. Department of Health and Human Services USDHHS, 2010). The lack of donations is more prevalent in low health literate communities which suffer from misinformation and ultimately negative beliefs toward organ donation. Thus, it is important to understand how marketing efforts can effectively change individuals' beliefs about organ donation.

Drawing on the Self-Determination Theory and Schema Theory, I proposed that the effectiveness of health education programs, which is to motivate individuals to be involved with organ donation, can be increased by creating interventions that engage individuals' senses. I used the term sensory activation to capture the number of senses being activated (visual, auditory, and kinesthetic). I proposed that sensory activation is related to message recall and motivation. According to Schema Theory, sensory cues are batches of information that can be stored in memory, thus affecting recall. The more senses involved in an experience, the more nodes of information available for recall, and the higher the likelihood that recall will affect motivation structures. Thus, I hypothesized that the relationship between sensory activation and motivation is positive, and, yet, mediated by recall.

In addition, research findings in sensory marketing suggest that the relationship between sensory strength and recall should be stronger for individuals with low, rather than high, health literacy. Low health literate individuals lack the cognitive ability to understand and interpret the information provided, hence, sensorial information allows them to recall the message. For high health literate individuals, understanding the message is relatively easier, hence, the addition of sensorial cues may lead to disinterest. That is, high health literate individuals may disregard

additional sensorial information due to redundancy. Therefore, I hypothesized that the relationship between sensory activation, recall, and beliefs will be stronger for low, rather than for high, literacy individuals.

Lastly, Schema Theory suggests that individuals tend to simplify multiple information cues and form abstract knowledge structures. Instead of storing (and recalling) multiple information cues independently, individuals convert multiple pieces of information into abstract concepts. This abstraction process increases over time because it is easier to remember concepts rather than multiple batches of detailed information. Thus, I hypothesized that, in the long term, recall of specific information will be higher for individuals with high, rather than low, health literacy. High health literacy individuals can incorporate specific information into existing knowledge structures. Low health literacy individuals lack knowledge structures to further develop. Accordingly, low health literacy individuals will create an abstract representation of the experience. That is, low health literacy individuals will not remember specific information, but will remember the event in broad terms (abstractly). Consequently, overtime, the motivation will be stronger for high, rather than for low, health literacy individuals.

I tested my hypotheses by conducting a 3 (Sensory Strength: sight, sight + hearing, sight + hearing + touch) \times 2 (Literacy: low, high), between-subjects factorial design. Sensory activation was manipulated, while health literacy was measured. I conducted the study in three phases. Phase 1 included a questionnaire of health information, motivation, beliefs, learning styles, and psychological measures prior to the experiment. Phase 2 included the manipulation of sensory activation and a questionnaire including manipulation checks and dependent variables. Phase 3 included a follow-up questionnaire two weeks later.

This dissertation, although having non-significant findings, adds to marketing literature by involving information processing and testing the role of sensory cues in message recall and motivation. Also, this work sheds light on the interplay between individual differences and the cognitive processing of sensory cues. To practitioners, this study provides normative recommendations regarding the design health interventions. Specifically, it is suggested that interventions should activate several sensory cues in order to enable short-term recall among low health literate consumers. Similarly, trends in the data suggest that health educators increase health literacy, as health literacy is a predictor for long-term recall and behavior modification. Finally, this work informs advertising professionals on how to apply sensory marketing in health promotion.

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CHAPTER 1: INTRODUCTION

As of 2015, 123,304 Americans are awaiting an organ transplant (United Network for Organ Sharing UNOS, 2015). Of these Americans needing a transplant, 101,752 (82.5%) are in need of a kidney (UNOS, 2015). In terms of volume, the number of Americans seeking a donation continues to increase, yet the amount of donors is not growing at the same rate (U.S. Department of Health and Human Services USDHHS, 2010). For clarity, the gap between donors and those on the waiting list are disproportionate.

Diabetes is a disease that plagues the United States, which often leads to end-stage kidney disease; in these situations, transplantation is recommended (National Diabetes Information Clearinghouse NDIC, 2014; René, Viera, Daniels, and Santos, 1994; U.S. Renal Data System USRDS, 2010;). Obesity, another American epidemic, also leads to end-stage kidney disease (NDIC, 2014; USRDS, 2010). As for the impact on organ donation, both living and non-living organ donation trends do not match with those that are in need of organ donation (Frates and Bohrer, 2002; Perez et al., 1988; Pietz, Mayes, Naclerio, and Taylor, 2004). There are multiple reasons as to why individuals do not wish to donate organs, among those reasons are medical mistrust (McNamara et al., 1999), fears of organ distribution inequity (Verble and Worth, 2003), and low health education and myths (Frates and Bohrer, 2002).

To reverse this trend, health organizations and professionals have attempted to increase awareness, attention, and practice through health education interventions, especially among individuals with low levels of health literacy. It is said that information leads to credibility and belief, which in turn leads to attitudes and ultimately behavioral intentions (Bang, Ellinger, and Hadjimarcou, 2000). There are two aspects of health education. The first aspect is described by Griffith (1976) where he states that “health education attempts to close the gap between what is

known about optimum health practice and that which is actually practiced.” Simonds (1976) states that the second concept of health education is that the goal of health education is to address health behavior changes desired in individuals and groups (both small and large) and impact future health by developing these health behaviors. The continuum of health education spans from promotion and prevention of disease to illness detection and treatment. Settings for health education include schools, hospitals, pharmacies, communities, and businesses, to name a few.

Currently, there is no clear guidance on how to design effective health education interventions to foster positive beliefs, attitudes, and intentions about organ donation. Therefore, in this dissertation I apply theories of information processing to investigate this issue. In particular, I examine how sensory marketing can enhance message recall and belief change. The moderating role of health literacy is also be examined.

Sensory marketing studies show the activation of multiple senses (sight, smell, and touch) affects memory, recall, and learning (Krishna, 2012). Interestingly, this literature offers mixed findings. On one hand, advocates of the multi-sensorial approach posit that the more sensory cues available, the higher the impact of information on recall and learning. This approach emanates from the idea that we have the capacity to learn in different styles. Felder and Soloman (1991) developed a faintly different approach which also went on to understand and measure learning style. Felder and Silverman (1988) decided to develop the Index of Learning Style (ILS) which includes the following dimensions: active-reflective, sensing-intuitive, visual-verbal and sequential-global dimensions (Felder and Silverman, 1988; Felder and Soloman, 2001). Taking these learning styles into consideration, supporters of the multi-sensory approach contend that the more diverse sensory cues are, the higher the chances that individuals will retain information and change behavior.

On the other hand, some scholars propose a single-sense approach (Braun et al., 1965; Malhorta, 1984; Unnava, Agarwal, and Haugtvedt, 1996). These authors state that individuals' attention span is limited. Therefore, the simultaneous activation of several senses reduce attention and inhibit message encoding. According to this perspective, individuals get distracted when multiple sensorial cues are activated. Thus, the addition of sensorial information is detrimental to message recall and learning.

In this dissertation, I contend that the effectiveness of a single- or a multi-sensory approach depends on the ability of the receptor to encode a message (i.e., individual literacy). Based on Schema Theory, I proposed that by appealing to multiple senses, health education interventions are more effective when health literacy is low, rather than high. When individuals do not possess the ability to process a message, they will seek alternative informational cues to understand the message. Hence, a multi-sensory approach will help low health literacy individuals increase their ability to recall.

Moreover, I proposed that the effectiveness of the multi-sensory approach will become diluted over time. When multiple sensory cues are activated, individuals will store information in long-term memory as an abstract concept. Hence, in the long-run, low health literate individuals will tend to remember the event abstractly, rather than specifically which ultimately does not affect beliefs.

For high health literate individuals, the addition of sensory cues will provoke sensory overload. High health literacy individuals can integrate new health information into existing knowledge structures. Thus, the effect of health education interventions on long-term recall and belief change will be higher for high, rather than low, literacy individuals; regardless of sensory activation.

Specifically, I proposed that (H₁) the effect of sensory activation on beliefs about health donation is mediated by information recall; (H₂) literacy will moderate the effect of sensory activation and recall; (H_{2a}) when an individual has higher health literacy, consumers' recall will remain the same across sensory conditions; (H_{2b}) when an individual has low health literacy, better recall will occur when more senses are involved; and (H₃) Long-term recall specificity and belief change will be higher for individuals that have higher health literacy.

This dissertation contributes to theory in multiple ways. First, I test two rival explanations about sensory cues and recall. Also, I test how individual differences (e.g., literacy) influence information processing in general, and recall, in particular. Practically, the study provides normative recommendations for designing health interventions to maximize effectiveness. Specifically, more sensory cues are necessary for low health literate consumers for short-term recall. Also, this study will encourage health educators to focus on increasing individuals' health literacy, as literacy is essential for long-term recall and permanent belief change. And finally, this study informs marketers how to apply sensory marketing to health education programs.

I test the hypotheses by employing a 3 (Sensory activation: Visual, Visual + Auditory, Visual + Auditory + Kinesthetic) × 2 (Health Literacy: High, Low) between-subjects factorial design in a four part study. Sensory activation will be manipulated and health literacy will be measured. For the study, the sample of 323 collected is composed of undergraduate students.

This dissertation proceeds as follows. Chapter 1 provides the reader with background on current health organ donation. The conceptualization of health education campaigns is also provided in order to understand the target market and the tactics used to appeal to this particular minority group. Next, the dissertation details the studies undertaken to address health education

and the manners in which theory and practice unite. The essence of the dissertation is to determine the best form of encouragement for engagement in the organ donation process. A model is presented, and will later be tested, in order to assess the effectiveness of health education and the power of health literature, health education, and health awareness and their role on health behavior change, specifically within the context of organ donation.

CHAPTER 2: LITERATURE REVIEW

2.1 Health Education

Health education's primary role is to evaluate the function of message delivery and effectiveness along with the motivation it creates in individuals to make informed health choices. There are two aspects of health education. The first aspect is described by Griffiths (1972, p. 12) where he states that "health education attempts to close the gap between what is known about optimum health practice and that which is actually practiced." Simonds (1976) describes the second aspect to be that the goal of health education is to address health behavior changes desired in individuals and groups (both small and large) and impact future health by developing these health behaviors. There are many factors that must be considered when developing health education programs. Health education takes multiple efforts, individual, organizational, economic, and even community-level programs.

Health education ultimately leads to individual level health behavior change which is the best action plan for improving overall health at multiple levels. Sedentary lifestyles, diet, and other health deteriorating behaviors have taken a toll on the population, yet health education programs are beginning to combat these ways of life (Glanz, Rimer, and Viswanath, 2008). Creating a health education program that has a stronger influence on participants and communities is based on the theory of health behavior. Theory-driven programs must be grounded on a firmer understanding of health behavior theory (Ammerman, Lindquist, Lohr, and Hersey, 2002; Glanz, Rimer, and Viswanath, 2008).

Glanz and Rimer (1995) state that environmental perspectives guide health education interventions by identifying personal and environmental leverage topics. Behavior is impacted by, and also impacts, multiple levels from personal to communal and environmental, to name a

few. Another element is the relationship between individuals and their environment. Behavior and the social environment influence, and is influenced, by one another (Glanz and Rimer, 1995; Stokols, Grzywacz, McMahan, and Philips, 2003). Thus, it is important to address behavior with environmental stimulation in order to leave an imprint on individuals.

Due to the nature of current trends, health is becoming more closely examined. Current media outlets, books, online reviews, and general conversations have become more health oriented. The continual medical and technological advances have allowed for more innovative medical tools and better evidence based research. These improvements have allowed for progress on a global scale, addressing such issues as healthcare services (i.e. HIV/AIDS, cancer), abject poverty, and food and water problems (Glanz, Rimer, and Viswanath, 2008; Kanfer and Schefft, 1988). Furthermore, health education professionals have been able to establish global networks which aid in health mobility, treatment, and access to information and assistance (Glasgow and Emmons, 2007; Rimer, Glanz, and Rasband, 2001; Viswanath, 2006). With this increasing interest in health, some of our brightest minds have been incentivized to assist with health education and in influencing health behaviors.

The continuum of health education spans from promotion and prevention of disease to illness detection and treatment. Settings for health education include schools, medical field (hospitals/pharmacies), communities, and businesses, to name a few. Moreover, health educational concepts are conveyed through different forms of media, and often simultaneously (i.e., billboards, the internet, pamphlets, television).

Even with all of this advancement in the health sector, the most recurrent cause of death is chronic disease such as heart disease, lung disease, kidney disease, cancer, and diabetes (Yach, Hawkes, Gould, and Hofman, 2004). As one can observe, much of the risk of those

aforementioned chronic diseases can be minimized with healthy behavioral practices (Mokdad, Marks, Stroup, and Gerberding, 2004, 2005; Schroeder, 2007). Healthy behavior must not only be studied, but it also must be codified and this information be made transferable to its intended audience. These outlets used to accomplish this task must also be assessed for their effectiveness and efficiency. Health education, for this reason, has become especially important.

Health promotion is defined as “any combination of health education and related organizational, economic, and environmental support for behavior of individuals, groups or communities conducive to health” (Green and Kreuter, 1991 p. 321). While the definition could use more precise terminology to create a clear and concise distinction between health education and health promotion, health education principles and their far-reaching social missions would be ignored. Often times, health education and health promotion are used synonymously in health literature. It is worth mentioning that even though the term health promotion accentuates the effort put forth to influence the broader social context of health behavior, both health education and health promotion are closely linked which leads to the terms being used in combination at times.

For some, health promotion and health education are similar concepts, but for others, the terms health promotion and health education are vastly different with widely divergent goals and values. More importantly, health education is mainly concerned with helping individuals make healthy choices, while health promotion is creating awareness. However, in order to fall in line with the definitions found in most of the health literature, health education will be used throughout this dissertation as opposed to health promotion.

2.2 Health Literacy

As health conversations have been placed on the global stage, healthcare has become a daily headline. Interest in health has grown dramatically, particularly in the United States, as discussions surrounding healthcare have sparked heated debates. Specifically, the current administration is concocting a health insurance plan to replace the Affordable Care Act (ACA, also referred to as Obamacare). This highly contested issue has divided the country and has created a discussion with other developed countries due to our lack of cohesiveness on the subject matter on how best to address this issue. Considering their high interest in healthcare related issues, individuals may still not fully understand the conversation. Thus, health literacy must increase in order for everyone to be able to partake in the discussion.

Health literacy, as per the Institute of Medicine (2009), is the ability to attain, read, comprehend, and put into practice healthcare information in order to make suitable health decisions, along with the capability to follow instructions. For example, adequately reading prescription labels and following the instructions requires an appropriate level of health literacy in order to optimize the success of the prescription. In terms of kidney donation/transplantation, it refers to the individual's capacity to overcome deceptive barriers. Health literacy refers to the audience's comprehension of health information. Health literacy is embodied by three major themes: (1) the deliverer's ability to effectively communicate a message; (2) the receiver(s) learning needs; and (3) and the capability of superseding message complexity (Osborne, 2012). Broadly speaking, health literacy represents the aptitude to obtain, digest, and communicate health information (Baker, 2006). Empirical research studying health literacy demonstrates that it is an important moderator on the relationship between communication and health behavior due to the fact that information processing is affected by an individual's health literacy competency. For

instance, an individual with low health literacy will tend to shy away from asking relevant questions of their health care providers due to embarrassment and lead to passivity during the consultation, while high health literacy will lead to a more proactive discussion (Davis et al., 2002; Street, 2001).

The importance of health literacy can be found on multiple levels from a healthcare inpatient/outpatient relationship to the health business model (e.g. profit and losses, return on investment, information collection and dispersion) (Eichler, Wieser, and Brugger, 2009). Health literacy mistakes could be damaging to both the sender and the receiver. Communication between clinicians and patients is often poor and leads to misunderstanding. When communication is good it can be linked with superior physical health, better disease management, and improved quality of life (Aurora, 2003; Ong, de Haes, Hoos, and Lammes, 1995). This suggests that clear and informative communications between patient and healthcare provider leads to improved health related outcomes. Therefore, to create a campaign to increase kidney donation, both awareness and behavior must be easy to understand to fully depict the issues at hand, and finally to assist possible donors in making decisions with as much information as possible. When an appropriate health campaign is created, donors' confidence levels increase due to the pertinent information that is shared. Low confidence levels regarding specific procedures will engender resistance and possibly result in non-compliance with treatment recommendations (Osborne, 2012).

Health literacy is a direct consequence of health education (Nutbeam, 2000). And, overtime Health education has become increasingly sophisticated, developing into its current form. Health education programs were rooted in emerging psychological theories. For example, Azjen and Fishbein's Theory of Planned Behavior, Bandura's Social Learning Theory— which

was later renamed Social Cognitive Theory, and Lewin's Health Belief Model were getting competition from new theoretical perspectives based on more modern research (Ajzen and Fishbein, 1980; Bandura, 1986; Lewin, 1936). During this period of time, health education resulted in increasing health awareness and health knowledge, which is now the essence of health literacy. These theories assisted in clarifying complex health topics and allowed for knowledge to be transferred to a larger population (Nutbeam, 2000). Therefore, health literacy was recognized as an outcome in empirical assessments of health education efficacy (Nutbeam, 1996).

Communication and health literacy go hand-in-hand. For example, a patient with an open communication channel with their clinician will be better able to follow a medication regimen. Furthermore, with a deeper level of understanding about their treatment, options, the patient will have an increase in motivation to continue on a health program (Ong, Visser, Lammes, and de Haes, 2000). Thus, a better understanding between a clinician and a patient contributes to the patient's health literacy and communication effectiveness (Montazeri, Gillis, and McEwen, 1998). Sadly, low health literate individuals may not be able to take advantage of all of the resources available or have access to healthcare, therefore medical decisions may be carried out while uninformed, resulting in a diminished relationship between practitioner and patient (Sentell and Halpin, 2006).

Additional research on health literacy features the development of taxonomies therefore allowing for categorization. Freebody and Luke (1990) developed a categorization method that puts health literacy into tiers: basic/functional health literacy; communicative/interactive health literacy; and critical health literacy. Different levels of health literacy allow for higher levels of autonomy and personal enablement. Basic/functional health literacy gives individuals sufficient

fundamental skills so that they can broadly understand health topics. This would be the case for individuals that know that kidneys act as one of the body's filtering mechanisms and are thus needed for survival. Communicative/interactive health literacy is more advanced than basic/functional health literacy in that individuals in this second segment tend to more actively participate in functions due to their knowledge of health. For instance, these individuals may participate in kidney donation awareness and have substantive conversations with healthcare professionals. Lastly, individuals that have critical health literacy are experts on the subject matter. Thus, having an advanced cognitive understanding of the material and combining that knowledge with social skills, these individuals will analyze information and be critical in their consumptions of healthcare services. In the kidney example used, critically health literate individuals would be leading research investigators and be innovators in the kidney health segment (Nutbeam, 2000).

The maximization of health literacy is one of the main goals for health education interventions. Thus, several strategies are used to ensure message clarity for its intended audience. For instance, the manner in which a message is delivered to children will be different than if that message were to be delivered to adults. Also, there are many factors that need to be considered aside from the message, which will help maximize individuals' health literacy through specific material, such as culture, context, language, and emotions (Osborne, 2012). The four performance levels that individuals can be categorized into, as per The National Assessment of Adult Literacy (NAAL), are: below basic, basic, intermediate, and proficient. NAAL has found that 15% of Americans had below basic health literacy, while 22% were at a basic level, 36% at the intermediate level, and 5% cannot be placed in a level due to issues with understanding the English language. Health literacy can only be considered proficient at a 12%

level (White, Chen, and Atchison, 2008). As one can notice, there are imminent health literacy issues. Therefore, health literacy must be addressed through multiple marketing avenues (i.e., reading material, auditory availability, decision-making skills, and situational health contexts).

Programs such as the National Action Plan for Health Literacy (NAPHL) are in place to address health literacy issues in the United States. Specifically, the NAPHL recognizes three strategies which pertain to increasing health literacy: (1) using simple language and training healthcare individuals to deliver health messages effectively; (2) identifying target populations, creating health education materials in multiple languages, and reviewing the said materials with the target population members; and (3) spreading communication tools and resources for individuals in need (Kutner, Greenberg, Jin, and Paulsen, 2006). Cegala, Post, and McClure (2001) stated that in order to overcome health literacy barriers, healthcare organizations should provide health education in such a manner that it will be audience appropriate, encourage participation, and provide recommendations to improve communications with the patient's healthcare provider.

2.3 Learning Style and Information Processing

Learning style research stems from the personality typology concepts implanted by Carl Jung. Using this as the base of learning, individual differences were found to exist. For example, intuition and sensing (visual, auditory, and touch along with disparities between abstract thought and realism) coupled with an individual's preferred information-processing modality (active/reflective; sequential/random ordering of information) are the manners in which an individual absorbs and processes the information (Frontczak, 1990). These learning style identifiers affect the manner in which individuals receive and interpret information. Habits and preferences are developed and become patterns that individuals use in order to process

information effectively, which can be defined as an individuals' learning style (Gordon, 1984; Kenneth, 1988; Kolb and Kolb, 2005). Individuals learn in a multitude of ways (i.e. seeing, listening, and/or doing), which leads to information reception and ultimately information processing (Felder and Silverman, 1988). Learning has an inherent factor that involves an individual's natural learning ability, but there is also an element of prior knowledge and concept presentation along with learning style compatibility and actual material presentation (Felder and Silverman, 1988). Felder and Silverman (1998) also advance the learning literature by describing that an individual's natural ability and prior knowledge, along with how the information presented to him or her affects his or her learning and retention.

The manner in which individuals take in information can be grouped into three categories: visual, auditory, and kinesthetic. There is much research testing the effectiveness of learning through these segments, and the research agrees that individuals have a tendency to learn best through one of the three segments and have a tendency to disregard the other two sensory learning segments. When an individual's learning style is matched by the manner in which information is presented, information is retained longer which in turn allows for the individual to apply the information more effectively and leads to a better attitude toward the information (Boles, Pillay, and Raj, 1999; Charkins, O'Toole, and Wetzell, 1985; Felder and Silverman, 1988; Kagan and Kagan, 1970). Information retention and application are highly important due to the differing abilities that individuals possess. Kolb (1981) states that unique prior life experiences (e.g. family demographics, upbringing, socialization) will allow for different information assimilation and application. For example, some show strength in understanding facts and deducing theories while others are incapable of thinking abstractly and generating hypotheses. Another example includes individuals who have strong logical

understanding but cannot apply this logic in active experiences. Furthermore, individuals may value abstract thinking while others value concrete experiences. Similarly, the application of skills may be more important to one individual while another with holistic beliefs may prefer a more intangible impression.

Learning styles first began by the development of a four quadrant model which takes active and reflective learning into consideration. Active learning is considered to be a hands-on experimentation style while reflective learning is more observational from a distance. Active and reflective learning describes the mode of information-processing. This information-processing mode is compared with the perception mode an individual prefers which interprets the dichotomous relationship between abstract-generalizations or through concrete-specifics (Kolb, 1984). An individual's learning style can be evaluated through a self-assessment known as the learning style index (LSI). The LSI originally was based on two dimensions on a continuum: abstract-concrete and active-reflective (Kolb, 1976a, 1984). Depending on the manner in which the individual answers the LSI, they will fall into one of four statistically established learning styles: (a) the converger, (b) the diverger, (c) the assimilator, and (d) the accommodator. Each of these styles is unique, having their own characteristics that describe the individual and the preferred learning style. In short, a converger is stimulated by experiential learning and also by wanting to understand the philosophies behind the experience, whereas a diverger is enthused by the classroom setting (lecture and group activities). An assimilator seeks individual work, articles, and manuscripts and an accommodator responds to group assignments, conversations over cases, and simulations.

As Kolb's research began to develop, learning style literature began to flourish. Hall and Moseley (2004) reviewed 800 relevant articles (of which there are thousands) and identified

more than 70 learning style instruments. One of the more established, grounded, and among the most commonly used learning style instruments was initiated in 1991 and fully developed in 2004 by Felder and Soloman (Litzinger, Lee, Wise, and Felder, 2007). Felder and Soloman (1991) developed a faintly different approach, which has facilitated a better understanding and measurement of learning styles. Keeping Kolb's four learning styles in mind, Felder and Silverman (1988) decided to develop the Index of Learning Style (ILS) which includes more dimensions and replaces the prior ones that Kolb established. Instead of the active-reflective dimension, Felder and Soloman generated visual-verbal and sequential-global dimensions. Furthermore, they replaced concrete-abstract with sensing-intuitive (Felder and Silverman, 1988; Felder and Soloman, 2001). Thus, the ILS is made of four scales and, for clarification purposes, they are: active or reflective; sensing or intuitive; visual or verbal; and sequential or global.

An active learner obtains and retains information best by actively engaging in an activity, which could mean discussing a topic, applying a new concept, or even explaining the idea to others. A reflective learner has a preference of thinking on their own and quietly interpreting the information. Oftentimes, the distinction between the two can be flexible. Some topics for an individual may be best learned by being an active learner, while another topic might be best reflected upon by the same individual.

In terms of how individuals process data, those that rank higher in sensing emphasize the present. Meaning, they live in the moment and pursue the current mainstream mantra of "YOLO" (you only live once) and rely on facts that are processed through their senses. In other words, they are concrete thinkers. Those that place an emphasis on intuition pursue more the future-oriented mindset and evaluate each of the possible outcomes. Patterns and impressions are the manner in which they process information and oftentimes can be considered abstract thinkers

as they read between the lines. In summary, sensing individuals are more factual, while more intuitively-oriented individuals are more theoretical.

As the next set states, a visual learner digests information best through pictures, demonstrations, diagrams, etc., while verbal learners will do their best with written or spoken details. When presented with the form of information that most closely aligns with individuals' learning style, attention, absorption, retention, and interpretation of data will be at its peak. If not, individuals find it difficult to translate the information into their preferred method. For instance, if calculating a mathematical problem, some might have a hard time reading a word problem and creating a picture from the information if they are more visual in nature. If the same problem were to be presented visually, comprehension and execution would be easier. This same logic applies to the verbal learning individual.

In the case of sequential versus global learners, those that rank higher in sequential learning will best learn information through linear, logical steps where one topic is built on the previous. Global learners, on the other hand, have a "realization" and the information clicks with no clear pathway, which makes learning seem almost at random points. Global learners will be able to understand the big picture and apply the concepts without having the ability of explaining how they have come to that conclusion. In a nutshell, sequential learners will learn in a step-by-step fashion while global learners will first have to get the big picture before understanding the connections.

2.4 Sensory Marketing

In recent years, sensory marketing has played a more important role in both marketing and psychology. Sensory marketing has been studied to assess judgment and decision making (Krishna and Schwarz, 2014). The current literature defines sensory marketing as "marketing

that engages the consumers' senses and affects their perception, judgment, and behavior” (Krishna, 2012, p. 32). Thus, an individual's senses are a critical component in determining their level of engagement with health related materials. For this reason, sensory marketing has a strong growing interest among practitioners and academics (Krishna and Schwarz, 2013; Schmitt, 1999, 2003). In particular, sensory marketing triggers individual's visual, auditory, and tactile sense modalities. Thus, sensory marketing creates and facilitates the manner in which an individual connects with information (Hulten, Broweus, and van Dijk, 2009). Moreover, sensory marketing goes a step beyond traditional marketing, as it involves more than just leveraging the 4 Ps to target identified segments, it revolves around the individual and makes marketing much more personal.

Findings in sensory marketing have been difficult to interpret. Earlier challenges in research have become amplified which creates difficulties in justifying rational choices in judgment and decision making studies (Lichtenstein and Slovic, 2006). These difficulties arise because sensory experiences and exposure stimuli can be unrelated, yet sensory experiences can affect choice in a different domain due to unknown ties that populate individuals' cognitive structures (Lee and Schwarz, 2014). For example, an individual may see a commercial about shaving with a particular brand (exposure stimuli) and the commercial triggers a prior sensory experience about cutting their chin, which in turn leads to thinking about soothing facial cream. These cognitive ties are difficult to conceptualize, integrate, and include when developing studies involving the sensory experience.

Individuals experience their environment through their senses. Accordingly, information that is transmitted through the senses plays a critical role in cognition and human behavior (Schwarz, 2007). Therefore, it can be said that sensory marketing is the practical application that

is derived from understanding the concept of receiving, interpreting, and recalling information. Elder and Krishna (2010, 2012) studied the effects that sensory stimulation had on food presentation and perceived taste. Specifically, they stimulated study participants by activating either a single or multiple senses when presented with food. The results indicated that the subjects found that food tasted better when more senses were triggered. Therefore, they inferred that the stimulation of multiple senses, coupled with the influence, of the advertising style played a critical role in participants' perceptions.

Prior research has focused more on antecedent and consequent aspects of sensory marketing. For example, studies have investigated visual advertising effects drawn from verbal and visual aids (Houston, Childers, and Heckler, 1987), as well as the effects of advertisement recall from spoken versus written ads (Unnava, Agarwal, and Haugtvedt, 1996). Sensory marketing has taken high importance, so much so that Peck and Childers (2003a) created a touch scale composed of two unique sub-scales measuring instrumental- and autotelic-touching. Instrumental touching is a form of functionality, while autotelic touching captures compulsive and/or emotional touching (Krishna and Morrin, 2008; Peck and Wiggins, 2006).

Circumstances and conditions often amplify or minimize individuals' perceptions of the information that is presented. For instance, individuals spending the same amount of time in different circumstances are affected by their perceptions where time spent with a long awaited friend seems short when compared to standing in line at the bank (Proffitt, Bhalla, Gossweiler, and Midgett, 1995; Schnall Harber, Stefanucci, and Proffitt, 2008). Individuals will often assign and interpret different meaning to situations if their senses are stimulated.

Visual and auditory processing has been vastly researched. For instance, Schmitt, Pan, and Tavassoli (1994) have investigated an individual's different auditory and visual processing

abilities, highlighting the differences between auditory and visual recognition for brand recall. As each one has their different processing, each is important and has their own stream of research. Research has placed a heavy emphasis on the relationship between consumers' visual abilities to receive information and their resulting information processing (Meyers-Levy and Zhu, 2007), as this is the most sought out area of sensory marketing.

More recently, a research trend has begun to test competing theories in sensory marketing with scholars predicting that future research will focus on developing explanatory theories yielding insights into the mechanism underlying such processes (Krishna and Schwarz, 2014). Although this research area is developing, there are still many areas left to explore (Krishna, 2012). Presently, however, this research field has a void linking human cognition and human interaction, meaning, researchers need to take into consideration the manner in which individuals use their senses to observe, learn, interpret, and behave in the world around them.

2.5 Research Gap

Scholars have reported mixed findings regarding the relationship between sensory marketing and information recall. On the one hand, advocates of the multi-sensorial approach posit that the more sensory cues that are available, the higher the impact of information on recall and learning. This approach is derived from the notion that individuals have the ability to learn in different styles. When different approaches to information delivery have been taken into consideration, the advocates of a multi-sensory approach dispute that when more sensory cues are engaged there will be a higher likelihood that an individual will retain the information presented and have a higher likelihood of recall, which ultimately leads to an individual gaining enough motivation to generate behavioral change. On the other hand, many scholars believe in the single-sensorial approach (Braun et al., 1965; Malhorta, 1984; Unnava, Agarwal, and

Hagtvedt, 1996). Those researchers who believe in the single-sensory approach state that an individual's attention span is limited, making sensory marketing inefficient and stating that a multi-sensory approach is distracting. This dissertation attempts to explain this discrepancy.

CHAPTER 3: THEORY

3.1 Self-Determination Theory

Self-Determination Theory (SDT) focuses on the study of motivation. Motivation studies are fluid and revolve around a paradigm of self-regulation and internal will. An individual's competence deals with the manner in which they understand a topic. When an individual understands a topic, their motivation increases due to their satisfaction (Harter, 1978).

Autonomy, another pillar of SDT, emphasizes an individual's ability to rely on themselves and no one else. Individuals become more motivated when autonomy is high (deCharms, 1968; Deci, 1975). Fitting in is also correlated with an individual's motivation. Baumeister and Leary (1995) found that motivation is high when an individual is able to relate to their surroundings and others. These three instinctive traits are the crux of motivation and the definition of SDT.

Competence, autonomy, and relatedness hold their findings across different domain (Deci, 1975).

Curiosity, vitality, and self-motivation are evident when individuals are fully self-motivated (Deci and Ryan, 1985). When an individual is fully motivated and inspired, they strive to learn, seek to extend their best skills, take on new skills, and seek to sharpen their talents for the sake of their own progress. Deci and Ryan (1985) state that when motivation is so powerful that exceptional ability will occur. Yet, the antithesis of motivation is amotivation. Amotivation stunts growth, crushes the human spirit, and rejects responsibility. Alienation, irresponsibility, and apathy are on the other end of the spectrum. This negativity can plague all individuals in different life stages. Both full motivation and amotivation coexist in society, and must learn how to deal with different elements that arise (Deci and Ryan, 1985, 1991; Ryan 1991).

SDT's traditional empirical methods focus on motivation and its interplay with personality, development, and other inner regulatory behaviors (Ryan, Kuhl, and Deci, 1997). SDT focuses on internal growth and psychological tendencies which platforms motivation, inspiration, integration, and positivity. Well-being is an underlying factor that reflects on societal integration and communal function (Gagne and Deci, 2005; Ryan and Deci, 2000).

3.1.1 Motivation Fundamentals

Connell and Wellborn (1991) along with Ryan and Frederick (1997) contribute to the motivation literature by examining intention and activation. Furthermore, their research stream deals with the consequence of motivation. Assessing the consequence of motivation had drawn much research due to the different elements that motivation affects. Considering the dual nature of motivation, having both internal and external pressures is a universal emotion. For instance, any particular action can be the cause of either personal interest or external influences. Thus, every individual may have a different reason to complete an action, yet the action itself would have the same end result, meaning that an individual may behave polite out of their own self will or because they are being observed by a third party.

Due to the manner in which an individual is motivated to behave, SDT identifies several different motivational influences. Each influence is a result of a positive outlook. An individual's desire to learn, to engage in a performance, to assess a personal experience, or and to behave healthily can be attributed to the influences upon an individual and their motivation. SDT studies have addressed multiple fluid motivation scenarios. For instance, behaviors that did not start out to be autonomous but transformed to intrinsic behaviors. Furthermore, SDT also emphasizes how external influences created that transformation process. Essentially, motivation is studied in multiple directions.

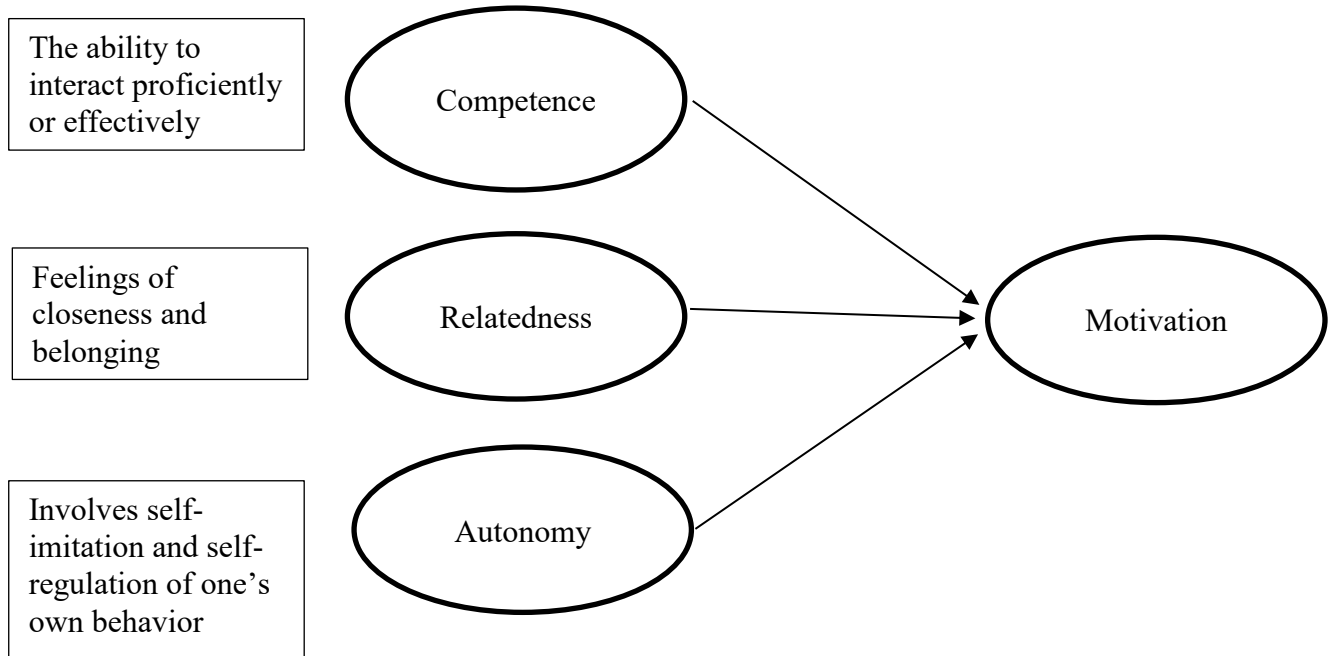


FIGURE 3.1: Self-Determination Theory (SDT)

3.1.2 Intrinsic Motivation

Developing both cognitive and social elements are results of enhanced intrinsic motivation. Intrinsic motivation is the driver for seeking new challenges and pushing limits. Exploring, being pleasure driven, and seeking novelty define intrinsic motivation. Intrinsic motivation follows the path of assimilation, as this is a driver of enjoyment and further internal development. (Csikszentmihalyi and Rathunde, 1993; Ryan, 1995).

Intrinsic motivation is a highly researched area, but its focus is in autonomy and its struggle with control. Intrinsic motivation research often overlooks competence. Although intrinsic motivation is highly interesting, external motivation is just as coveted. Reward, fear, deadlines and threats have stronger motivation than intrinsic motivation (Deci, 1975). Research in external motivation is more controversial as pressure has a negative connotation. Autonomy has a strong motivational pull. Deci and Ryan (1985) studied the autonomy and the feeling it gives individuals that have high autonomy, and concluded that freedom of choice, opportunities, and consideration for feelings elevate intrinsic motivation.

Even though autonomy and competence are often the researched variables in intrinsic motivation literacy, relatedness also has a fruitful research stream (Baumeister and Leary, 1995; Ryan, 1995; Ryan and Frederick, 1997). External factors can enhance or diminish intrinsic motivation by caring about individual's internal needs. Research has already established the firm ties autonomy and competence share with intrinsic motivation. Hagger and Chatzisarantis (2007) found that relatedness, although lagging, also has a relationship ties with intrinsic motivation. Gagne and Deci (2005) and other SDT authors, however, confirm that newness and other positive activities are sought out because of intrinsic motivation and the yearning that individuals have toward these type of inherent actions.

3.1.3 Extrinsic Motivation

There are number of sources for motivation; therefore, motivation is not only generated intrinsically, but can be influenced by external forces (Ryan & La Guardia, 2000). Specifically, external pressures outweigh internal motivation in such a manner that it quells any desire to complete a task or goal. The motivation of other is not a dichotomy, where you find complete devotion to a feeling of indifference, you will find a spectrum with finite changes. This gradation

is derived from an internal regulation system that “internalizes and integrates” the motivational factors (Ryan & Deci, 2000, p.70). Within these terms, Ryan and colleagues show the process for how individuals acquire and convert “values” into their cognition (Ryan & La Guardia, 2000). This view exalts how the environment becomes a determinate for perceptions and behaviors and how it competes against intrinsic desires and needs of individuals.

Extrinsic is defined as the completion of tasks, goals or behaviors that satisfy a need that falls outside of a person’s internal motivation (intrinsic motivation). Ryan and Deci (2000) define internal or intrinsic motivation as a type of motivation that satisfies internal needs. For this reason, performing a task, a goal, or a behavior becomes self-gratifying. On the other side of the spectrum in the motivation continuum is captured through the lack of motivation or amotivation which describes a feeling of indifference or being nonchalant about completing a task. Similarly to motivation there a number of sources for these feelings such as an inadequacy to perform as described by Bandura (1986) in his seminal work “Social Cognitive Theory of Personality” , a indifference toward an activity (Schnell, 2010), or feelings helplessness towards completing a task (Klein, Fencil-Morse, & Seligman, 1976).

The levels of motivation within a person can be managed and changed. This process occurs through the internalization of values and the subsequent adjustments. For instance, when an individual decides that smoke has become important because of all his/her friends have started smoking. Self-regulation is changed in four different ways which include: external, introjection, identification valuations, and integration. The first self-regulation, external regulation, is considered the most dependent on external factors (Niemic, & Ryan, 2009). The second self-regulation is called introjected regulation. This is when individuals felt “pressure or compulsion” in order to complete the task, goal or behavior (Koestner & Losier, 2002). When regulation is

performed through the identification of the value of performing a task, goal or behavior, it fosters greater acceptance of the new motivation (Vallerand et al., 1992).

Integrated regulation is the most autonomous of them all. An individual has integrated regulation when the individual has completely accepted and immersed themselves into the values of the regulation. Both intrinsic and integrated motivation have many of the same qualities. Yet, since their completion is to achieve an outcome rather than integral pleasure, they are extrinsic. Individuals that internalize and integrate regulations are more likely to follow a medication regimen, maintain a healthy lifestyle, and monitor their living arrangements for better quality living (Chatzisarantis, Biddle, and Meek, 1997; Ryan et al., 1997; Ryan, Plant, and O'Malley, 1995; Williams et al., 1998; Williams, Freedman, and Deci, 1998).

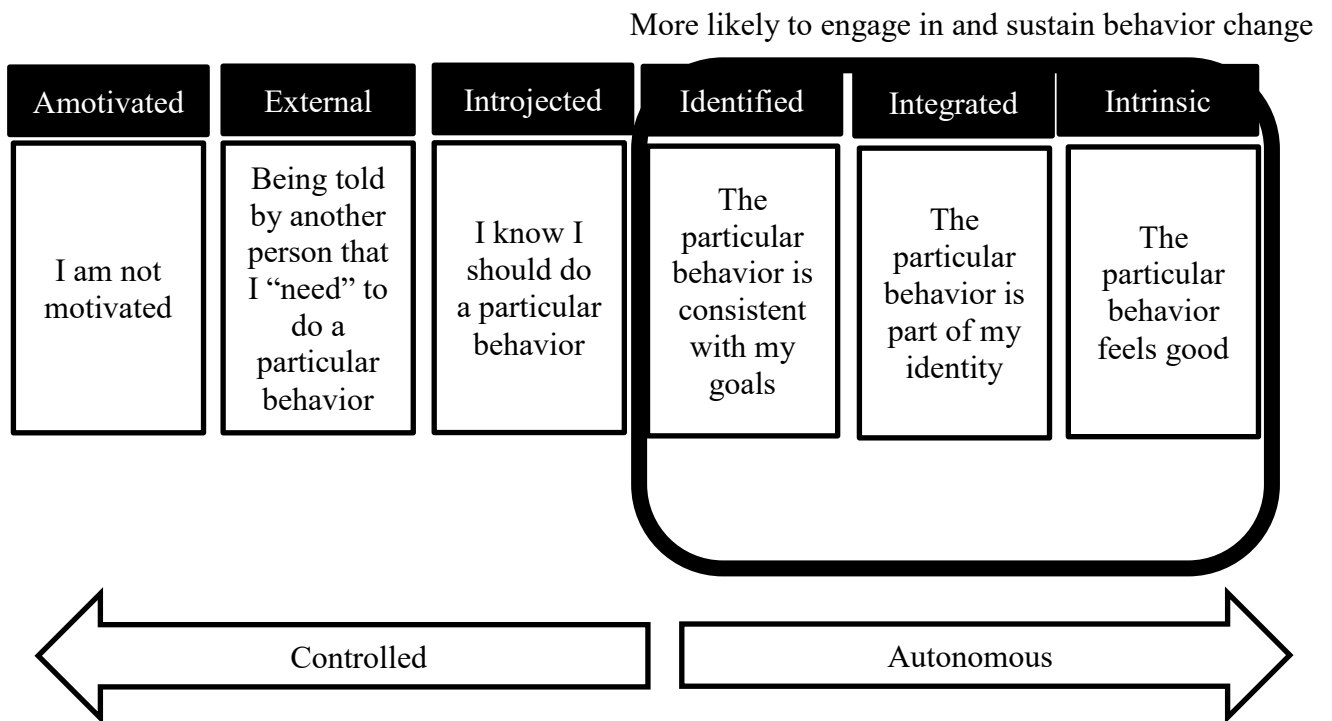


FIGURE 3.2: Controlled vs Autonomous Motivation SDT

Vitality: Energy available to the self. Gould (1991) used the concept of subjective vitality to refer to the sense of aliveness and vigor that energizes volitional actions. They suggested that vitality results from satisfaction of the basic psychological need, is an important indicator of health, and provides the necessary energy for effective self-regulations and coping with challenges. Vitality and autonomous self-regulation are thus activating, but it is a type of activation involving positive affect and is different from the energy people experience when they are angry or anxious. Rozanski (2005) surmised vitality as the energy associated with people's integrated sense of self, which thus invigorates the process of choice, volition, and effective coping with challenges. In terms of vitality's role in SDT, Ryan and Frederick (1997) found a link to both physical health and satisfaction of psychological needs for competence, autonomy, and relatedness.

Promoting healthy behavior. Behavioral choices made by individuals on a daily basis pose the most serious threats to physical health. Research on healthy behavior, using SDT as the platform, report weight loss (Williams et al., 1998), glucose management by diabetic patients (Williams et al., 2004), and medication adherence (Williams and Rodin et al., 1998), among other health benefits, finding that autonomy support provided by physicians or other practitioners predicts patients' autonomous motivation and perceived competence, which in turn predicts maintained health behavior change as well as concrete health indicators. Furthermore, researchers (Hagger and Chatzisarantis, 2007; Vlachopoulos, 2009) have concluded that autonomous self-regulation promotes greater motivation and persistence in physical activities. Additionally, SDT has been universally applied in physical education and health promotion to enhance performance in those particular settings (Deci and Ryan, 1985; Ryan, 1995).

In conclusion, this theory emphasizes the importance of autonomy-supportive, relative to controlling, interpersonal contexts for optimal motivation, effective behavior and healthy development.

3.2 Schema Theory

A schema is considered to be the collection of information that an individual has which creates a meaningful framework for assimilating new information (Anderson, 1984). These schemas are said to be the abstract manner in which an individual stores and categorizes information waiting for recall (Gagne, Yekovich, and Yekovich, 1993). Schemas are also idiosyncratic to the individual. For example, two individuals confronted with similar, new information will store the information using different schemas. Consequently, assigning new information to schemas will allow for stronger recall and also create expectations along with increasing the implicit nature of a particular piece of information.

Schema theory is derived from the premise that knowledge schemata are formed through an individual's prior experience (Anderson, 1977, 1978). Thus, new experiences provide individuals with information that either confirms, adds, or generates schemata. Furthermore, when retrieving information, the manner in which individuals store the information may create difficulties for retrieval. With this in mind, Schema Theory would suggest that prior knowledge is critical to enhancing educational experiences (Miller, 2002). Knowledge structures allow individuals to understand and assimilate new information. Moreover, the positive educational effects of schema building result from crafting analogies and comparisons (Armbruster, 1986).

An individual's abilities to use their senses while learning can generate stronger information recall. Partnering sensory activation with attention, information would be stored for later retrieval and recall, when needed (Childers and Houston, 1984). Drawing on Schema Theory,

involving an individual's senses leads to creating associative networks with the information. Unique individual experiences and prior knowledge are stored in schemas, which are represented as abstract knowledge structure (Bettman, 1979). Ultimately, the ability to shift the new information in an individual's memory from context to context is known as spreading activation. Spreading activation will determine how and when specific information activates the meaning (Bagozzi and Silk, 1983; Robertson, 1987).

CHAPTER 4: HYPOTHESES

Based on the Self-Determination Theory and Schema Theory, I propose that sensory activation will be related to recall and ultimately generate motivation for a positive health behavior change. Engaging multiple senses creates an experience due to the involvement. And with more involvement, learning occurs. Like Benjamin Franklin’s famous adage states, “tell me and I’ll forget; teach me and I’ll remember; involve me and I’ll learn.” Thus, getting more involved will lead to learning which is directly related to recall. Involvement, in many cases, takes on a “hands-on” approach and in this particular case, it is literal. Engaging the visual, auditory, and tactile senses will generate an experience which will yield higher recall. A greater number of senses activated—the number of senses activated in an experience—will provide more information that can be accessible to the individual to remember the experience.

A primary example of this type of learning is best exemplified by that occurring in our high school science classes. In biology class, students will read about amphibians and their special characteristics. Upon reading, students use their visual perceptions to digest words from their biology. In the days to come, students begin a discussion and hear from the teacher about the traits that they read. Students will hear about the different types of frogs, the muscles they use to jump, and the particular set of skills frogs have to catch flies. At this point, the students’ engagement is increased from one sense to two senses. At this point, some students can recall the information for an exam and pass. But now that the students have read and heard about frogs, triggering anymore senses will enhance their experience. Truth be told, the most vivid memory of a sophomore year biology class, though, is dissecting a frog. Granted, as the years have passed I may not remember exactly all of the different parts of the frog, but I still remember the experience. Yet, for the first year, maybe two, I did remember everything. The dissecting of the

frog is essentially the touching element. The touching of the scalpel, the frozen frog, and wearing the gloves, goggles, and lab coat. This involvement, engagement, leads to more learning which ultimately means better and more accurate recall.

A link between recall and behavior modification has been established, and will reinforce health information leading to motivation for change in behaviors (Cacioppo and Petty, 1979, 1989; Stone and Fernandez, 2011). Thus, recall accuracy must be emphasized. An individual's ability to comprehend information is directly related to learned information, meaning that the information recall is evident. Recall accuracy is often difficult, yet it is very important as it is correlated with motivation to modify health behavior (Houts, Doak, Doak, and Loscalzo, 2006).

Concretely connecting the relationship that sensory activation has on recall drives the hypotheses of the experiment and ultimately tests the relationship between recall and motivation. We state that if the individual has a higher level of recall, then their motivations would be altered. Considering the importance of recall in health education interventions, amplifying sensory marketing strength is essential for effectiveness.

Thus:

Hypothesis 1: The relationship between the number of senses activated and the motivation toward health donation is mediated by short-term information recall.



Figure 4.1: Conceptual Model of Hypothesis

Health literacy plays a pivotal role in impacting an individuals' recall ability, especially in the long-term (Houts, Doaks, Doaks, and Loscalzo, 2006). Health literacy, as mentioned earlier, is used in understanding how an individual obtains and interprets specific health information. Houts et al. (2006) did research on recall strength at varying health literacy levels and found that when health care providers combine spoken and written directions along with pictures and reminders, individuals will recall better and more closely follow instructions. This is especially true for low health literacy individuals. Health literacy needs to be improved in order to increase patients' levels of understanding of health related information. Although Delp and Jones (1996) did not contain statistically significant result, they found a trend suggesting that low literacy individuals' comprehension was improved by receiving information in different forms, such as pictures and diagrams in tandem with written prose. Furthermore, Delp and Jones (1996) and Kripalani et al. (2007) reported that individuals will change their health related behaviors when they understand the information presented by their health care provider. In addition, they found that visual cues had a much more profound effect on low literacy

individuals. It is apparent that increasing health literacy is highly important (Kripalani et al., 2007).

Drawing upon Schema Theory, I propose that the association between multiple sensory activation and short term recall will be stronger for individuals with low rather than high health literacy. Those with High health literacy will be distinguished from those individuals with low health literacy based on their university degree area which is confirmed with the pretest on health literacy levels. Individuals with a health science background (i.e. kinesiology and nursing) will be considered high health literate as they collectively scored higher on health science questions, while those individuals that do not have a health science background (i.e. business, engineering, and liberal arts) are low health literate which scored lower on health science questions. For individuals high in health literacy, the addition of sensory cues will provoke sensory overload. As a result, multiple exposures to sensory information will be redundant and uninformative. Individuals with low health literacy will benefit for additional information cues provided by the sensorial experience.

Hypothesis 2: Health literacy will moderate the effect of sensory activation and recall.

Hypothesis 2a: For high health literate individuals, recall will not be associated with sensory activation.

Hypothesis 2b: For low health literate individuals, recall will significantly increase with increased sensory activation.

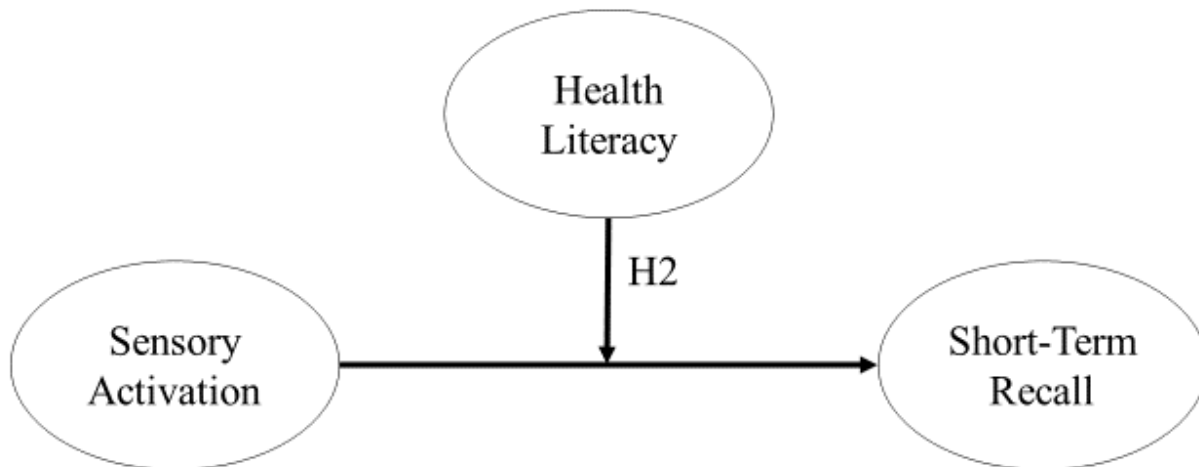


Figure 4.2: Conceptual Model of Hypothesis 2

Over time, the relationship between sensory activation and recall will diminish for individuals with low rather than high health literacy. As time goes by, individuals create abstract knowledge structures regarding specific experiences. The lack of knowledge structures to interpret health information will prevent low health literates from creating abstract information in a manner related to the message. Instead, these individuals will create abstract opinions about the experience in a way not related to the main message. For instance, over time individuals low in health literacy will remember educational information as “I had fun,” “it was a nice experience,” rather than “organ donation is good for society,” or “I should sign up for organ donation.” Motivation will not be affected due to the unspecific nature of long-term recall.

In the dissection example given above, one can note that I mention that the details of the dissection have become vague and generalized. This long-term recall effect will be different for everyone. I strongly assume that individuals that are very fond of frogs, like a veterinarian or

zoologist, will have a more vivid memory for a longer period of time due to interest and prior knowledge of a frog. Those individuals that have no particular interest or prior knowledge will let the experience pass and not much will be remembered. This is applicable to all experiences and topics. As a marketing researcher, I remember ads that I find very impactful. I can remember many of the top half-time Super Bowl commercials because I have an interest in marketing. Due to the occasion, individuals that are not in the marketing field may remember commercials, but for different reasons.

Individuals high in health literacy, on the other hand, possess schemas that allow them to assimilate new information. As a consequence, these individuals will create abstract representations of the experience related to the specific information provided. For example, “organ donation is good.” Thus:

***Hypothesis 3:** Long-term recall specificity and motivational change will be higher for individuals that have high, rather than low, health literacy.*



Figure 4.3: Conceptual Model of Hypothesis 3

CHAPTER 5: HYPOTHESIS TESTING

In this section, I present the research method employed for the dissertation. First, I discuss the research context and design. I then discuss the sample in detail and initial statistics are given. Following the sample, the procedure is described for the experiment. After the procedure, I discuss the stimuli given to the participants, followed by the variables of the study, then the pretest, and manipulation check. Finally the results are then presented and broken into three distinct sections. Each hypotheses has its own subsection when the results are presented.

5.1 Context and Design

The context for the investigation is kidney donation. This type of organ donation is especially relevant because of the high demand and the unparalleled supply on donation waiting lists (Alvaro, Siegel, Crano, and Dominick, 2010; Siegel, Alvaro, Lac, Crano, and Dominick, 2008). Thus, kidney donation serves as an adequate context to test my research propositions.

I employed a 3 (Sensory activation: Visual, Visual + Auditory, Visual + Auditory + Kinesthetic) \times 2 (Health Literacy: High, Low) between-subjects factorial design. Health literacy was measured before and after the experimental stimulation, along with questions related to kidney function. These questions were consistent with health information that was specific to individuals that are familiar with health science. Factorial experimental designs have a randomized sample and are often used with pre-/post-intervention studies which are common in the health literature. The variables were measured before and after the experimental stimulation.

The experimental design was a pre- and posttest, pre- and post-intervention factorial design which, by default, is based on random assignment. The appeal for a factorial design experiment is due to the ability to understand the effect of independent variables (two or more) upon a single dependent variable. One group will be controlled while the others serve as the

experimental groups. Significant differences in the experimental group, with differences not found in control group, can be attributed to the treatment. An analysis of variance (ANOVA) will be conducted to test the mean differences between the unrelated groups. Groups will not be compared through multiple *t*-tests as this method has a higher likelihood of making a Type 1 error; running an ANOVA controls for these errors. An ANOVA consists of three main assumptions:

1. Normal distribution of the dependent variable in each group being used in the one-way ANOVA;
2. Homogeneity of variances; and
3. Independence of observations must be determined, meaning whether the researcher believes that it is possible that the observations are not independent based on the study design.

This dissertation has held up all three assumptions that are associated with ANOVA.

5.2 Sample

I collected data at two points in time. Those who participated in Part 1 were contacted two-weeks after being exposed to the experimental conditions/stimuli, and were asked to participate for Part 2. The sample consisted of university students from multiple colleges located in the Southwest region of the United States. The colleges that participated are the College of Business, College of Education, College of Engineering, College of Health Science, College of Liberal Arts, College of Science, and School of Nursing. In order to generate participation, extra credit and two \$50 gift card raffles were used as incentives. Participants were randomly assigned to one of three conditions.

In Part 1, 434 students were surveyed. However, 323 responses (75.4%) were usable due to issues of incomplete participation and/or response bias from subjects. This was addressed through software analysis and visual inspections. Subjects participated in a 3 (Sensory Activation: Visual, Visual + Audio, Visual + Audio + Kinesthetic) \times 2 (Health Literacy: High, Low) between-subjects experimental design. Although each cell is not perfectly equal in terms of size/number of participants, this is to be expected from experimental research (please, refer to Table 5.1).

TABLE 5.1
Part 1 – Participant Breakdown

Part 1	Condition 1	Condition 2	Condition 3	Total
Health Science	65	70	24	159
Non-Health Science	61	59	44	164
Total	126	129	68	323

Notes: For the Part 1 of the data collection, 434 participants began the survey, yet only 323 (74.4%) of the surveys were usable. 111 (25.6%) of the surveys were not usable due to issues of completion and participants just clicking through the answers. The breakdown for each condition and their academic background can be seen in the appropriate cells.

In Part 2, 285 subjects (88.2% of the 323 from Part 1) provided a valid email address. These individuals with valid emails were contacted with follow-up questions. Due to attrition, 139 responded (48.8%) and 125 responses (43.9%) were usable. Follow-up emails were used as reminders in order to promote responses from subjects. These percentages align with research in this area. Subjects were matched via the email addresses provided in Part 1 and 2 of the experiment. As mentioned above, although each cell is not perfectly equal, this is to be expected from experimental research (please, refer to Table 5.2). Table 5.3 contains the number of subjects that participated in each study, allowing for a comparison of those that participated in

Part 1 and to those that participated in Part 2 per condition. These percentages are telling of the relationship between sensory activation and study involvement, but more on this in the “Discussion” section.

TABLE 5.2
Part 2 – Participant Breakdown

Part 2	Condition 1	Condition 2	Condition 3	Total
Health Science	25	24	14	63
Non-Health Science	22	22	18	62
Total	47	46	32	125

Notes: For the Part 2 of the data collection, I used the emails that the participants provided in Part 1. Of the 323 participants in Part 1, false emails were given along with participants that did not respond in the space provided. Thus, 285 emails were sent and 139 responded. However, not all the responses were usable as some did not do what was asked and at times responses were inadequate, thus, 125 responses were usable. The breakdown for each condition and their academic background can be seen in the appropriate cells.

TABLE 5.3
Comparing Part 2 Participation with Part 1 in Percentages

Part 2/Part 1	Condition 1	Condition 2	Condition 3	Total
Health Science	38.5%	34.3%	58.3%	39.6%
Non-Health Science	36.1%	37.3%	40.9%	37.8%
Total	37.3%	35.7%	47.1%	43.9%

Notes: Table 5.3 shows the representation of individuals that participated in both Part 1 and Part 2 of the study. As attrition is a natural part of primary data collection, I did want to depict the percentages of individuals that participated per condition. One can see the higher participation involvement in condition 3 when compared to conditions 1 and 2. The breakdown for each condition and their academic background can be seen in the appropriate cells.

5.3 Procedure

Due to the structure of the study, regardless of the subjects' literacy levels, subjects would be in either condition 1, condition 2, or condition 3. Those who were randomly assigned to condition 1 or 2 could either come to a lab during the hours that I had arranged or be done on their own time. If subjects took part in condition 3, they were taken to a computer lab in order to be presented with a kidney prop. This kidney prop had a similar size and feel of an actual kidney. Kidney props were used to engage the kinesthetic aspect of the study. As these props needed to be massaged along with the visual and audio stimulation, being in a computer lab was critical for observation. Time and content were held consistent throughout the surveying process, Qualtrics, for all three conditions. Participants responded to a series of questions containing a manipulation check, dependent variables, and relevant demographic questions. Two weeks later, the participants were contacted and asked to respond to questions regarding dependent variables without the aid of stimuli, hence assessing their unaided ability to recall.

5.4 Stimuli

As the reader may recall, sensory activation was manipulated using three conditions. The first condition was visual. Under the visual condition, participants were reading PowerPoint slides that were set on a timer. The timer is important because all three conditions viewed the slides for the same amount of time. Those participants that were under Condition 2, not only viewed the PowerPoint slides, but they were subject to an auditory stimulus, a voice that read the contents of the slides aloud. Therefore, participants would read and hear the same information. Finally, Condition 3 participants had three senses activated, meaning they would be able to read the content, hear the content, and also hold a kidney-like prop in their hands. The kidney-like

props were a silicone material that were wrapped in a clear sandwich-like bag for sanitation purposes. The shape of the prop was cylindrical, similar to the shape of the hard plastic containers that housed them. The participants then took the kidney-like props out of the containers and held them in their hands. The participants were encouraged to squish them in a similar fashion that one would a stress ball.

5.5 Variables

Sensory Activation. Individual's senses are often triggered to create a response. My dissertation particularly investigates the effects of activating certain senses. Thus, *sensory activation* is an independent variable triggering one (visual), two (visual + audio), and finally three (visual + audio + kinesthetic) senses in individuals to measure how the stimulating of particular senses will impact an individual's recall and motivation. Participants will be randomly assigned to a condition (visual, visual + audio, visual + audio + kinesthetic) and given kidney and organ information through a presentation. Finally, high health literate groups will be compared with low health literate groups across the conditions.

Health Literacy. Even though the sample was divided into groups based on participants' particular academic backgrounds, I asked the participants a series of questions before the stimulation to verify their health literacy. These questions were kidney-specific questions which assessed their knowledge level. Participants who selected either College of Health Science, College of Science, or School of Nursing are assumed to be high health literate as they would be more familiar with the human body in areas such as anatomy and organ specifics (i.e., function, location). This group was considered to be "health science." Subjects who selected either the College of Business, College of Engineering, College of Education, or College of Liberal Arts are assumed to be low health literate as these subjects' backgrounds are not as aligned with

topics of the human body. As such, this group was considered to be “non-health science.” In order to further validate these assumptions, pretest questions were given to each distinct group. The averages of the two differentiating groups (high- v low-health literacy) held true to the belief that high health literate individuals knew more on health related topics than did low-health literate individuals. In other words, my assumptions held true, the health science group had higher health literacy than the non-health science group.

Short-term Recall. Short-term recall was measured by giving the participants multiple choice questions regarding the information presented to them in the experimental stimulation. These questions were very specific to the information that was given to them and covered all of the material found in the presentation. I then counted the number of each individual’s correct answers. These answers created a summated variable which was then used to compare groups.

Long-term Recall. In order to measure long-term recall, I produced an innovative technique. Longitudinal studies create an aggregate of answers for analysis. Thus, long-term recall (the dependent variable in hypothesis 3) was measured using an unaided open-ended section. Participants were asked to “tell me up to 10 points about what you specifically learned about kidney donation,” as kidney donation is the context of the study. Some participants did not answer properly and some even put “nothing” in the space provided, and thus received a score of zero. Other participants answered all ten slots and received a score of ten. For each participant’s responses, I verified that the participants answered properly, meaning that the answers were within the parameters of the study. This was a three person verification process where two researchers and myself independently assessed the answers and discussed if the answers were adequate. For example, “it is ok to live with one kidney” was properly answered while “nothing” was not properly answered. Essentially, long-term recall was measured by summing the

number of unaided recalled facts from the presentation two weeks after exposure to the experimental treatment.

Motivation. In order to assess the construct of motivation, the Health-Care Self Determination Theory Scale Packet (HC-SDT) was referred. This packet is made of three questionnaires which were developed to assess constructs within SDT in the health-care behavior context (Deci and Ryan, 1985; Williams, Deci, and Ryan, 1999). The contents of the packet are the Treatment of Self-Regulation Questionnaire (TSRQ), the Perceived Competence Scale (PCS), and the Health Care Climate Questionnaire (HCCQ). The packet contains a total of twenty-five questions broken down by fifteen TSRQ questions, four PCS questions, and six HCCQ questions.

Specifically, TSRQ was created in order to examine motivations for multiple health related behaviors such engaging in a healthy behavior, entering a treatment program, or changing from an unhealthy to healthy behavior. This fifteen-item scale is broken down into six autonomous motivation questions, six controlled motivation questions, and three questions that assess amotivation. It is important to note that each of these subscales can be used separately for research purposes (Deci and Ryan, 1985).

PCS focuses on the emotional aspects of healthy behaviors, meaning, how an individual feels about behaving healthily. In detail, the questionnaire emphasizes the confidence that an individual has in their ability to make healthy behavior changes. For example, the individual's competence is used to gauge the behavior, while they are participating in a health-care program. This scale has been used extensively in health research with Cronbach's alpha reliability scores consistently about .90 (Williams, Freedman, and Deci, 1998).

Support for healthy behavior is measured with the HCCQ. The original HCCQ is a fifteen item scale that measures the perceptions an individual has in terms of support from healthcare

providers. The support being either autonomous or controlling, which will ultimately influence the type of motivation that an individual has for particular health behaviors. As in the PCS, the majority of HCCQ's alpha reliabilities range around .90 (Williams, Cox, Kouides, and Deci, 1999; Williams, Gagne, Ryan, and Deci, 1999). A shortened form of HCCQ also exists that includes six of the fifteen items with an alpha of approximately .82.

The motivation measure included TSRQ items that asked about the individual's motivation to become a donor. As mentioned above, the TSRQ scale included fifteen items, from which I selected four that reflect the individual's beliefs toward organ donation (see appendix). These four items are: "Because I personally believe it is the best thing;" "Because I have carefully thought about it and believe it is very important for many aspects of my life;" "Because it is an important choice I really want to make;" and "Because it is consistent with my life goals." These items were on a 5-point Likert scale ranging from "definitely false" to "definitely true."

5.6 Pretest

The pretest served two purposes. The first purpose for the pretest was to confirm the distinction between the two groups in terms of health literacy. As mentioned throughout the dissertation, those that were from a health science background were considered to be high in health literacy while those with a non-health science background were considered low in health literacy. In this pretest, questions about kidney donation were asked in order to contrast between the two groups. A clear distinction was made from the initial questions. The second purpose for the pretest was to have a benchmark. This initial benchmark was used to assess both short-term and long-term recall.

The participants' knowledge of kidney donation was assessed prior to the stimulation. These questions solicited basic information that would be more difficult for those who are not familiar with the topic, yet easy enough for those who are familiar. For example, "where are the kidneys located?" and "how big are the kidneys" are two questions of the ten that were given to the participants. After the stimulation, twenty questions at the same level of difficulty were given to the participants, while all of the questions were given to the participants during the stimulation. Thus, the participants had already seen the information. Furthermore, organ donation motivation was assessed with the Health Care Self-Determination Theory questionnaire and then again after a two week period. Thus, I have measured motivation at Time 1 and Time 2. These motivation questions were also measured by asking "most people like me would become an organ donor," "I am confident that I can meet the requirements to become an organ donor," and "I intend to become an organ donor" among other questions asked (please, refer to appendix).

5.7 Manipulation Check

The experimental design's internal validity was assessed through a manipulation check. Also, it is common practice to conduct the manipulation check toward the end of the survey in order to confirm that the experimental manipulation lasted the throughout the experiment. It is also done toward the end to not call attention to the manipulation. Having effective manipulation checks help rule out reasons as to why a particular manipulation could have been unsuccessful in influencing the dependent variable. Thus, at the end of the data collection, I asked the participants to recall the condition in which they participated. The manipulation check consisted of asking the participants about their experiment experience: "In the study you participated in, the delivery of message was: (a) Reading PowerPoint slides, (b) Reading and Listening to

PowerPoint slides of (c) Reading and Listening to PowerPoint slides while massaging a kidney prop.” Of the 125 individuals that responded, 74.4% correctly recalled their condition. I checked the success of the manipulation for sensory activation by comparing the scores to the sensory activation scale across conditions which can be seen in Table 5.4.

TABLE 5.4
Manipulation Check

	Frequency	Percent
Correct	93	74.4%
Incorrect	32	25.6%
Total	125	100%

Notes: In Part 2 of the study, I asked individuals to verify the condition they pertained to in the experiment. I specifically asked for their experimental treatment: In the study you participated in, the delivery of the message was: (1) Reading PowerPoint slides; (2) Reading and Listening to PowerPoint slides; (3) Reading and Listening to PowerPoint slides while massaging a kidney prop.

5.8 Results

In this section, I will explain how I tested each of the hypotheses. Hypothesis 1 states that the relationship between sensory activation and motivation is mediated by short-term recall.

Hypothesis 2 states that health literacy will moderate the effect between sensory activation and short-term recall. Hypothesis 3 states that in long-term specificity will be directly impacted by health literacy (high vs low).

5.8.1 Hypothesis 1

To test for mediation, I followed the Baron and Kenny (1986) procedure. First, I checked if sensory strength was related to the dependent variable (motivation). I ran an ANOVA with sensory activation as the independent variable and motivation as the dependent variable.

Dependent Variable. For Hypothesis 1, motivation includes the four aforementioned TSRQ items regarding an individual’s belief about organ donation. The items were on a 5-point Likert scale (ranging from “definitely false” to “definitely true”) and they are: “Because I personally believe it is the best thing;” “Because I have carefully thought about it and believe it is very important for many aspects of my life;” “Because it is an important choice I really want to make;” and “Because it is consistent with my life goals.”

Results. I ran EFA with the four items and the results showed a one factor solution with an Eigen-value of 2.74 and an average variance explained of 68.53%. A reliability analysis showed a Cronbach’s alpha of .84 with all item-to-total correlations above .58. Next, I created a summated scale with these four items. The results of an ANOVA with sensory activation as an independent variable and the motivation summated scale as a dependent variable showed a non-significant effect of sensory activation ($df: 2, 323; F = .048, p = .953$).

TABLE 5.5
Reliability Analysis

	Mean	Standard Error	Lower Bound	Upper Bound
Condition 1	3.835	.078	3.681	3.989
Condition 2	3.857	.077	3.704	4.009
Condition 3	3.875	.107	3.665	4.085

Notes: The dependent variable in this case was driven by motivation. Treatment of Self-Regulation Questions (TSRQ) is a 15-question scale, of which, I selected four questions that best suited the direction of the study regarding motivation. I ran EFA with the four items and the results showed a one factor solution with an Eigen-value of 2.74 and an average variance explained of 68.53%. A reliability analysis showed a Cronbach’s alpha of .84.

Also, I checked for the effect of sensory activation on recall. This was done by computing the recall score on organ donation information that was provided in the presentation.

A one-way ANOVA with sensory activation as the independent variable and recall as the dependent variable showed a non-significant effect of sensory activation on recall ($df: 2, 320; F = 2.12, p = .121$).

TABLE 5.6
ANOVA

Tests of Between-Subjects Effects

Dependent Variable: The number of correct answers from questions 119-128 out of 10

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	17.934 ^a	2	8.967	2.127	.121
Intercept	10287.802	1	10287.802	2440.385	.000
SSCondition	17.934	2	8.967	2.127	.121
Error	1349.007	320	4.216		
Total	12321.000	323			
Corrected Total	1366.941	322			

a. R Squared = .013 (Adjusted R Squared = .007)

Although non-significant figures are reported, when correctly answering questions after the experimental stimulation, participants under condition 3 are marginally higher than those under conditions 1 or 2. Consequently, at the 95% confidence interval, the lower and upper bounds of correct answers in condition 3 is higher than those in the other conditions. Also, in running pairwise comparisons, condition 3 shows that it is distinct from conditions 1 and 2.

TABLE 5.7
Post-Treatment Analysis

Estimates

Dependent Variable: The number of correct answers from questions 119-128 out of 10

Which condition was the subject exposed to? Condition 1, Condition 2, or Condition 3	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Condition1	5.690	.183	5.331	6.050
Condition 2	5.713	.181	5.358	6.069
Condition 3	6.279	.249	5.790	6.769

Pairwise Comparisons

Dependent Variable: The number of correct answers from questions 119-128 out of 10

(I) Which condition was the subject exposed to? Condition 1, Condition 2, or Condition 3	(J) Which condition was the subject exposed to? Condition 1, Condition 2, or Condition 3	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
Condition1	Condition 2	-.023	.257	.930	-.529	.483
	Condition 3	-.589	.309	.058	-1.197	.019
Condition 2	Condition1	.023	.257	.930	-.483	.529
	Condition 3	-.566	.308	.067	-1.172	.039
Condition 3	Condition1	.589	.309	.058	-.019	1.197
	Condition 2	.566	.308	.067	-.039	1.172

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

As a consequence to having non-significant findings under the Baron and Kenny (1986) mediation method, I ran the Preacher and Hayes (2004) bootstrapping routine in SPSS using 10,000 iterations. The mediation of recall on the dependent variable also showed to be non-significant. This is proved by having the interval between lower-level confidence interval (-.0157) and upper-level confidence interval (.0152) includes zero. Therefore, hypothesis 1 is not supported. More explanation on this result is provided in the “General Discussion” section.

5.8.2 Hypothesis 2

Hypothesis 2 stated that the effect of sensory activation on short-term recall would be stronger for those participants that are considered low health literate compared to those

individuals that are high health literate. Before running any tests, I wanted to test the validity of my health literacy grouping. Meaning, I wanted to test if health-related majors in fact were more health literate than those who were not health-related. I ran a t-test between the average score from the two student groups. The result showed that the non-health student group scored lower than the health student group (Mean non-health = 4.90, Mean health = 5.39, $p = .004$). Therefore, as expected, health students represent the high health literate group and the non-health students represent the low health literate group.

Dependent Variable. Short-term recall is the dependent variable in hypothesis 2. As mentioned above, short-term recall was assessed using a series of questions that each participant was asked to answer after the stimulation. The scores were then averaged by group and compared across groups.

Results. I ran an ANOVA with recall as the dependent variable, and with sensory activation and literacy (student type) as independent variables. The results showed that the interaction between the sensory activation and literacy groups was non-significant ($df: 2, 317; F = .142, p = .867$). I also ran a pairwise comparison for literacy groups in each condition, and I did not find any significant differences between the groups. Therefore, hypothesis 2 is not supported. More explanation on this result is provided in the “General Discussion” section.

5.8.3 Hypothesis 3

The effect of sensory activation on long-term recall would be stronger for respondents with high literacy is the basis of hypothesis 3. Due to the longitudinal nature of Part 2, the study’s hypothesis 3 had its own survey questions, which had questions similar to those presented in time 1 and also new questions.

Dependent Variable. Long-term recall is the dependent variable in hypothesis 3. As mentioned above, long-term recall was measured by the number of meaningful answers that the participants input in the spaces provided. These answers were individually counted by two individuals, myself included, to confirm valid answers after the two-week period. The average number was 4.66 facts, whereas the median was 4.

TABLE 5.8
Part 2 Responses per Condition

	Condition 1	Condition 2	Condition 3
Non-Health Science	3.91	6.00	5.22
Health Science	4.08	4.42	4.43

Notes: As long-recall is my dependent variable for Part 2 of the study, I had ten blank spaces for participants to input what they recalled from the study two-weeks prior. The figures in the cells are the averages that participants remembered per condition.

Results. In order to test hypothesis 3, I ran an ANOVA with long-term recall as the dependent variable, and sensory activation and health literacy as independent variables. The results showed a non-significant interaction between sensory activation and health literacy ($df: 2, 125; F = .811, p = .447$). Next, I ran a series of pairwise comparisons between literacy groups for each condition, and I did not find any significant differences between groups. Therefore, hypothesis 3 is not supported. More explanation on this result is provided in the “General Discussion” section.

TABLE 5.9
Part 2 ANOVA

Tests of Between-Subjects Effects

Dependent Variable: This is the raw number of specifics that subjects answered from Specifics1-...

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	71.302 ^a	5	14.260	1.240	.295
Intercept	2764.752	1	2764.752	240.324	.000
SSCondition	36.938	2	18.469	1.605	.205
studentype	17.093	1	17.093	1.486	.225
SSCondition * studentype	18.660	2	9.330	.811	.447
Error	1438.031	125	11.504		
Total	4350.318	131			
Corrected Total	1509.333	130			

a. R Squared = .047 (Adjusted R Squared = .009)

5.8.4 Effect Size

Considering my dissertation had a moderate sample size, producing the effect size will generate some explanation to the study. Effect size estimates explain practical significance by describing the strength of association between the dependent and independent variables. Experiments that use ANOVA as the statistical method often use either Partial Eta Square or Eta Square. Both of these effect size descriptors give the percentage of variance in the dependent variable accounted for by the independent variable. However, Eta Square typically overestimates due to bias while Partial Eta Square is an unbiased correction. Although these two statistical terms are different, when conducting one-way ANOVA experiments they will produce the same percentage number.

Effect size estimates could be used to determine both practical and theoretical relevance of an effect. Effect sizes are categorized between small, medium, and large. When using Eta

Squared, small effect sizes are considered to be around .02, medium effect sizes are considered to be around .13, and large effect sizes are considered to be .26. Meaning, if 2 percent of the dependent variable is explained by the independent variable, then it would be considered a small effect size, and so on.

In my dissertation, the relationships in each of my hypotheses had small effect sizes. Hypothesis 1 yielded an effect size of .032, hypothesis 2 yielded an effect size of .013, and hypotheses 3 yielded an effect size of .012.

CHAPTER 6: CONTRIBUTION

6.1 General Discussion

Even though the results for hypotheses 1, 2, and 3 are non-significant, one can notice a trend showing that the involvement of more senses (sensory activation) leads to more recall, and this holds particularly true in the long-term. This is evident when viewing the number of correct questions in the pre- and post-treatment, as indicated in the Tables 5.3, 5.8, 6.1, and 6.2 and Figures 6.1, 6.2, and 6.3. The questions that were given to the participants before the treatment (See table 6.1 and figure 6.1), this could create a benchmark for health donation information for each group. And as mentioned earlier, the results show that those with a health background were more health literate. Post-treatment shows an increase in all three conditions. Incremental improvement is shown with more sensory activation (see Tables 6.2 and 6.2). Additionally, these differences can be seen graphically in the appendix (see Figures 6.1 and 6.2). I believe that with a larger sample size, the recall of participants will become more apparent.

TABLE 6.1
Pre-Treatment Correct Answers

#Correct1: General Kidney Questions (Pre-Treatment)

	Condition1	Condition 2	Condition 3
Non-Health Science	5.13	5.03	4.41
Health Science	5.54	5.34	5.13

Notes: When collecting Part 1 of the data, I asked participants before the treatment health related questions. Table 6.1 shows the amount of correct answers that the participants had before the information that was given. Figures are broken down by condition and academic background.

TABLE 6.2
Post-Treatment Correct Answers

#Correct2: Organ Donation Questions (Post-Treatment)

	Condition1	Condition 2	Condition 3
Non-Health Science	6.25	6.34	6.66
Health Science	6.08	6.07	6.42

Notes: When collecting Part 1 of the data, I asked participants after the treatment health related questions. Table 6.2 shows the amount of correct answers that the participants had after the information that was given. Figures are broken down by condition and academic background.

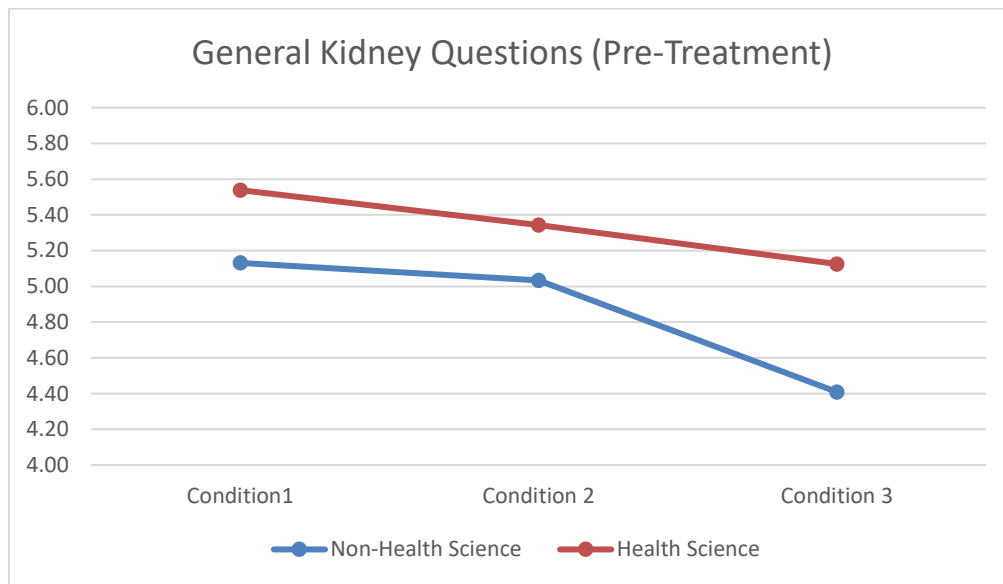


FIGURE 6.1: Pre-treatment Health Literacy Measurement

Notes: Figure 6.1 graphically shows the questions that were answered correctly before the experimental treatment

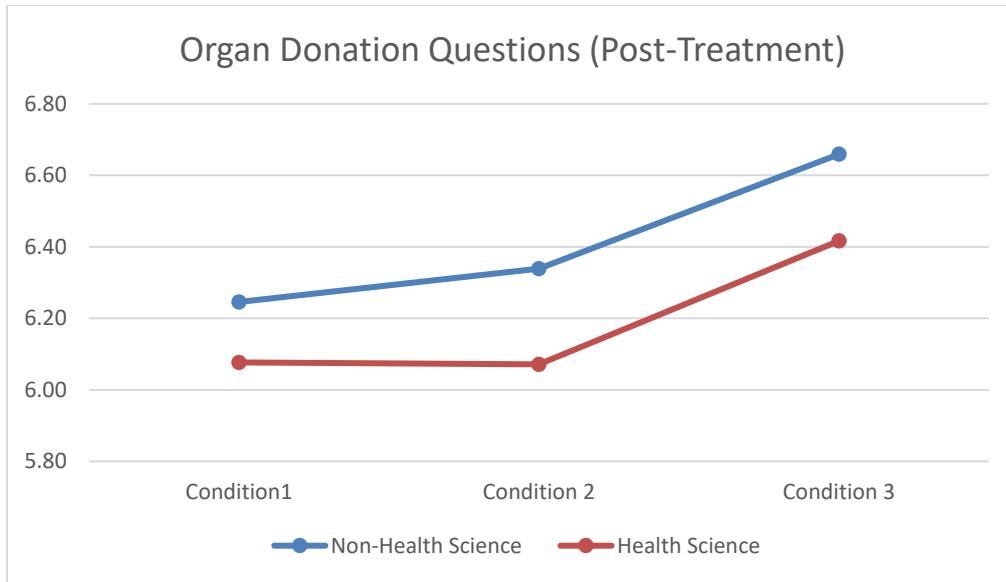


FIGURE 6.2: Post-treatment Health Literacy Measurement

Notes: Figure 6.2 graphically shows the questions that were answered correctly after the experimental treatment

Upon my visual inspection of the data, individuals with more sensory activation had more recall. And, although the results were non-significant, a trend analysis using visual inspect of the graphs depict that participants with all three senses activated, they recalled more and with greater detail. One by one, I read through the answers that the participants input during the Part 2 of the study and it was obvious that those in condition 1 did not recall facts other than the general overview of the study, while those in condition 2 had more detail than those in condition 1. Ultimately, those in condition 3 were able to recall the most detailed facts of all three conditions. For example, a participant in condition 1 stated that “genetics factor into organ donation,” a participant in condition 2 stated “organ donation restores patients health/lifestyle,” and finally a

condition 3 participant stated that “1 in 8 individuals develop kidney disease.” Thus, more precise details are being remembered by those individuals that have higher sensory activation.

TABLE 6.3
Part 2 Responses per Condition

	Condition1	Condition 2	Condition 3
Non-Health Science	3.91	6.00	5.22
Health Science	4.08	4.42	4.43

Notes: As long-recall is my dependent variable for Part 2 of the study, I had ten blank spaces for participants to input what they recalled from the study two-weeks prior. The figures in the cells are the averages that participants remembered per condition.

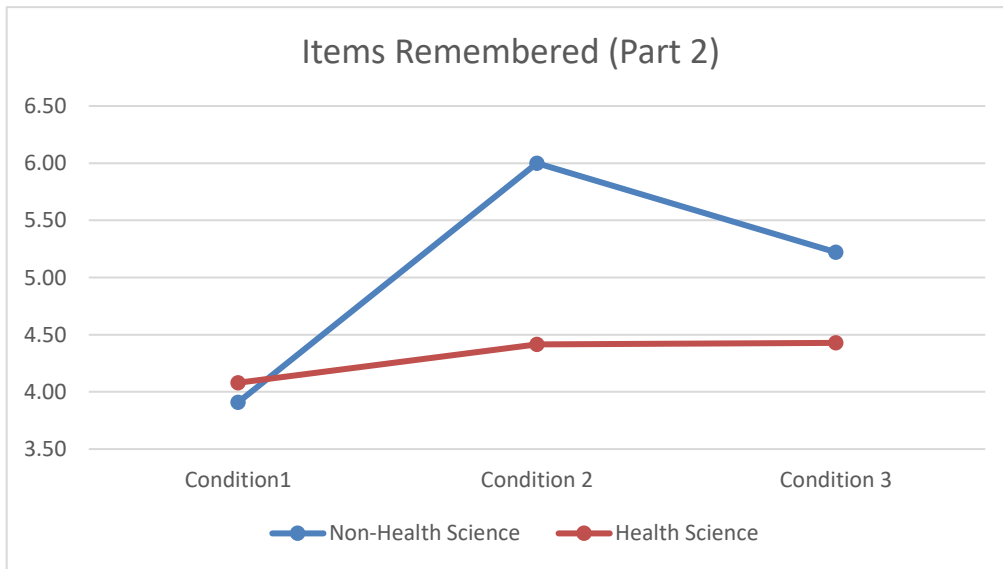


FIGURE 6.3: Part 2—Items Remembered

Notes: Figure 6.3 graphically shows the items remembered by the participants

Additionally, an element that is important in health research is participation. High participation rates are difficult to achieve in primary research, especially when dealing with sensitive information. It is especially difficult to get individuals to partake in a longitudinal study, as oftentimes participants do not wish to disclose more information or spend more time answering questions. Interestingly enough, in this research, I can firmly state that those engaged in higher sensory activation are more willing to participate in Part 2 than those in any other condition. The fact that close to 60 percent of the high health literate and 41 percent of low health literate participants that were in condition 3 volunteered their time to take part of Part 2, while those in conditions 1 and 2 in both the high and low health literate groups averaged only 36.5 percent participation (ranging from 34.3-38.5 percent) in Part 2 (see Table 5.3). Even though participation was not part of the study, it infers that higher sensory activation will have more engagement from participants another finding.

Ultimately, in order to have more participation in health campaigns over a longer period of time, sensory activation is important. Furthermore, trends found in the analysis do indicate that with more sensory activation, individuals will retain information. Although I had hypothesized that high health literate individuals would retain more information in the long-term, the results surprisingly suggest that low health literate individuals held the information longer. Meaning, the experience lasted longer with those individuals that do not have prior knowledge. A possible explanation of this serendipitous finding could be that newness and curiosity created a longer lasting impression.

6.2 Potential Explanations for Non-significant Results

The paper's non-significant results can be attributed to many reasons. In my dissertation, participants received a single exposure. However, multiple exposures could have had a more

substantial impact on the dependent variable. As mentioned, a visual inspection of an interaction graph suggests a tendency toward a significant interaction. In this case, non-significant results could be turned into significant results if the participants were subjected to additional exposures. For instance, if participants were to have been given a pretest before the Time 1 exposure and then tested after the first exposure. After a month's time, the participants would engage in a Time 2 follow up stimulation exposure. Time 2 would also involve the distribution of a pre- and post-test questionnaire. Finally, Time 3 could be a month later and would be measured in a similar fashion as Time 1 and 2 with a pre- and post-test. These three exposures may yield significant results. Also, this multiple exposure method would represent a more rigorous approach to testing for short- versus long-term recall. Participants in conditions 2 and 3 were able to recall the message from the experiment better than those in condition 1 which indicated that the manipulation worked. Statistically, however, the results showed otherwise. Upon reflection however, people in real life attend multiple workshops and are subject to any number of different stimuli, with varying frequencies of exposure. This would suggest that, in order to imitate real life, the experiment would be more effective by having multiple exposures.

The nature of the sample may also provide some clues into the study's non-significant results. Given that the study's sample consisted mostly of Hispanics, the study might have benefited from more ethnic diversity. Since the central thesis of this dissertation centers on sensory marketing and behavioral change, I did not focus on these other variables, such as ethnicity and race. However, the majority of the study's participants self-reported as being ethnically Hispanic. It should also be noted that previous research suggests that Hispanics are more prone towards a cultural bias. And, despite the fact that the study partitions participants based on their major field of study, this condition may need a greater separation among

experimental levels. Perhaps, elements such as learning styles may be a better indicator for information processing and sensory activation. The cross-cultural nature of this study, however, may make it more attractive to journal outlets. Moreover, the sample consisted primarily of undergraduate students meaning that the participants were mostly young adults. Age could have affected the results, as kidney disease and subsequent organ donation are not salient to younger aged participants.

Online data collection is one of the most frequently used methods in published experiments (Granello and Wheaton, 2004). Thus, I found no problem using this method when conducting my experiment. As mentioned earlier, those that were in conditions 1 and 2 had the option of conducting the first part of the experiment online. In retrospect, individuals not being physically present in the lab for the experiment could have affected the participants' concentration levels. Upon having the exposure at their own office or home, participants could have gotten distracted by normally occurring things such as talkative children, a droning television, biting hunger, or grating boredom. These distractions would have led to less learning and ultimately to lower recall. Participating in the experiment on their leisure time may have lessened the effects of the independent variable on the dependent variable.

TABLE 6.3
Potential Problems Explaining Non-Significant Results and their Possible Solutions

	Potential Explanation	Problem	Future Research
1	Stimulation Exposure	Stimulation was single exposure	Test with multiple exposure
2	Sample	Homogeneous	Test different ethnicities/races and age groups
3	Issue with Data Collection	Online vs lab	Test in a more controlled environment

This table describes potential explanations for non-significant results, how each explanation could have been a problem, and how to remedy the problem for better results in future research.

6.3 Limitations and Future Research

As with all research, this dissertation has its limitations. Specifically, things mentioned above can be adjusted in order to make for a stronger study. First, the longitudinal effect of information could have been extended to longer than two weeks to get a different perspective of long-term recall. Meaning, Time 1 and Time 2 could have been further spaced apart, and even Time 3 could have been collected. Furthermore, during that time, more than one exposure of the material within each time period could be shown. Moreover, Part 3 may have allowed for a better glimpse into information decay. However, the nature of the research presented imposed a time constraint on long-term recall. Also, the treatment can be improved. In this vein, the default time constraints contained in the software used to conduct the experiment allowed for the presentation of the stimulus to be forced under five minutes. This led to problems of getting all of the information to each participant with adequate time. The trial software that I used promoted a

complete purchase in order to capitalize on all its features which was costly without the purchase my presentation was limited.

I feel that repeated exposure to the same health information would generate more detailed recall with higher accuracy. In order to effectively initiate and maintain behavioral change, repeated interventions at various levels are required. The stimulus strength would increase and generate a more interconnected experience between the participant and the information. This, nevertheless, can be turned into future research. Given that I have a strong benchmark with trending results, the collection of additional data would increase the design's statistical power and thus the likelihood of capturing statistically significant results. Also, the data I collected contains a variety of constructs that were not discussed in the dissertation which will be later assessed. These constructs include learning style variables that could be taken into consideration. Learning styles have become a highly debated topic and my research can shed light in this subject matter research conversation. The location of the data collection site created a higher amount of Hispanic participants. Thus, data collected from another location could also help by increasing participant diversity. Gathering health data across cultures will help answer many questions that are currently asked by researchers in this field.

6.4 Managerial Implications

Based on prior trends mentioned, interactivity and interest are aligned. Participation increased with more interactivity, thus inferring that interactivity created interest, especially in the low health literate group. Sensory activation is currently occurring when delivering information. Examples are cigarette advertising that generate a buzz. Specific brands such as Camel and Newport have launched a new type of campaign to influence cigarette purchase. The aforementioned brands attend music festivals and set up large tents with exclusive participation.

Within these tents, virtual stimulation is created by using 3-dimensional software to engage the participants, along with games and other sensory stimulants like music and product placement. Once the participants finish they are given gifts such as shirts, hats, and other apparel, along with a pack of cigarettes of your choice (as long as it's their brand of course) and a participant in exchange must supply an email. This then has generated an experience for the participants, created an exchange, and established other touchpoints with emails. This memory will then stay with the individuals when entering grocery stores, drug stores, and corner stores.

The example I just gave is promoting a negative health product and service. Positive health product and service organizations need to keep up with current trends and establish these kinds of experience with individuals to leave a lasting impression and generate longitudinal experiences. Furthermore, engagement from individuals in health educational campaigns also assists these organizations in having participants willing to receive future information. Moreover, a willingness to share more information and a willingness to learn more about the topic is also generated when an experience is achieved. All these aspects are particularly important with low literate (new) individuals as engagement will help increase interest.

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APPENDIX

Survey

Part 1

Organ Donation Experiment (Dissertation) - Master

Q1.1 The University of Texas at El Paso (UTEP) Informed Consent Form for Research

I am a doctoral student of Marketing at The University of Texas at El Paso and I invite you to participate in a study that investigates health information and health education processing. As a participant, it is important that you read this consent form and have the comfort to ask questions, if needed. By participating, you will be asked to partake in an experiment which is estimated to take approximately 30 minutes to complete. I would like to remind you that participation is voluntary. Additionally, in a couple of weeks you will receive an email regarding the study. You will be asked to take a few minutes to answer questions regarding the study. Due to the nature of this research study, no risk, discomfort or injury is likely to affect you as a result of participation. By participating in the study, you do not give up any legal rights, nor do you obtain direct benefits or incur in any costs. As a study participant, we protect your information and will keep everything confidential. Your confidentiality is ensured because your responses will be stored in password-protected computers to which only the researchers will have access. The results of this study may be presented at meetings or in publications; however, your identity will not be disclosed in those presentations. The only exception to your privacy as a participant is a requirement for mandatory reporting of potentially dangerous behaviors to others. This is unlikely to be an issue given the nature of this study. If you have any questions, please contact Gerardo Moreira at 915-747-7741 or gjmoreira@utep.edu. If you have concerns about your participation as a research subject, please contact the UTEP Institutional Review Board (IRB) at (915-747-8841) or irb.orsp@utep.edu. If you agree to participate click next and start the study. If you do not want to participate just simply close the browser window.

Q2.1 Please select one of the two options for every question. You may only choose one answer for each question and every question must be answered. If both answers apply to you, please choose the one that applies more frequently. I understand something better after I

- try it out. (1)
- think it through. (2)

Q2.2 I would rather be considered

- realistic. (1)
- innovative. (2)

Q2.3 When I think about what I did yesterday, I am most likely to get

- a picture. (1)
- words. (2)

Q2.4 I tend to

- understand details of a subject but may be fuzzy about its overall structure. (1)
- understand the overall structure but may be fuzzy about details. (2)

Q2.5 When I am learning something new, it helps me to

- talk about it. (1)
- think about it. (2)

Q2.6 If I were a teacher, I would rather teach a course

- that deals with facts and real life situations. (1)
- that deals with ideas and theories. (2)

Q2.7 I prefer to get new information in

- pictures, diagrams, graphs, or maps. (1)
- written directions or verbal information. (2)

Q2.8 Once I understand

- all parts, I understand the whole thing. (1)
- the whole thing, I see how the parts fit. (2)

Q2.9 In a study group working on difficult material, I am more likely to

- jump in and contribute ideas. (1)
- sit back and listen. (2)

Q2.10 I find it easier

- to learn facts. (1)
- to learn concepts. (2)

Q2.11 In a book with lots of pictures and charts, I am likely to

- look over the pictures and charts carefully. (1)
- focus on the written texts. (2)

Q2.12 When I solve math problems

- I usually work my way to the solutions one step at a time. (1)
- I often just see the solutions but then have to struggle to figure out the steps to get to them. (2)

Q2.13 In classes I have taken

- I have usually got to know many of the students. (1)
- I have rarely got to know many of the students. (2)

Q2.14 In reading non-fiction, I prefer

- something that teaches me new facts or tells me how to do something. (1)
- something that gives me new ideas to think about. (2)

Q2.15 I like teachers

- who put a lot of diagrams on the board. (1)
- who spend a lot of time explaining. (2)

Q2.16 When I'm analyzing a story or a novel

- I think of the incidents and try to put them together to figure out the themes. (1)
- I just know what the themes are when I finish reading and then I have to go back and find the incidents that demonstrate them. (2)

Q2.17 When I start a homework problem, I am more likely to

- start working on the solution immediately. (1)
- try to fully understand the problem first. (2)

Q2.18 I prefer the idea of

- certainty. (1)
- theory. (2)

Q2.19 I remember best

- what I see. (1)
- what I hear. (2)

Q2.20 It is more important to me that an instructor

- lay out the material in clear sequential steps. (1)
- give me an overall picture and relate the material to other subjects. (2)

Q2.21 I prefer to study

- in a group. (1)
- alone. (2)

Q2.22 I am more likely to be considered

- careful about the details of my work. (1)
- creative about how to do my work. (2)

Q2.23 When I get directions to a new place, I prefer

- a map. (1)
- written instructions. (2)

Q2.24 I learn

- at a fairly regular pace. If i study hard, I'll "get it." (1)
- in fits and starts. I'll be totally confused and then suddenly it all "clicks." (2)

Q2.25 I would rather first

- Try things out. (1)
- think about how I'm going to do it. (2)

Q2.26 When I am reading for enjoyment, I like writers to

- clearly say what they mean (1)
- say things in creative, interesting ways. (2)

Q2.27 When I see a diagram or sketch in class, I am most likely to remember

- the picture. (1)
- what the instructor said about it. (2)

Q2.28 When considering a body of information, I am more likely to

- focus on details and miss the big picture. (1)
- try to understand the big picture before getting into the details. (2)

Q2.29 I more easily remember

- something I have done. (1)
- something I have thought a lot about. (2)

Q2.30 When I have to perform a task, I prefer to

- master one way of doing it. (1)
- come up with new ways of doing it. (2)

Q2.31 When someone is showing me data, I prefer

- charts or graphs. (1)
- text summarizing the results. (2)

Q2.32 When writing a paper, I am more likely to

- work on (think about or write) the beginning of the paper and progress forward. (1)
- work on (think about or write) different parts of the paper and then order them. (2)

Q2.33 When I have to work on a group project, I first want to

- have a "group brainstorming" where everyone contributes ideas. (1)
- brainstorm individually and then come together as a group to compare ideas. (2)

Q2.34 I consider it high praise to call someone

- sensible. (1)
- imaginative. (2)

Q2.35 When I meet people at a party, I am more likely to remember

- what they looked like. (1)
- what they said about themselves. (2)

Q2.36 When I am learning a new subject, I prefer to

- stay focused on the subject, learning as much about it as I can. (1)
- try to make connections between that subject and related subjects. (2)

Q2.37 I am more likely to be considered

- outgoing. (1)
- reserved. (2)

Q2.38 I prefer courses that emphasize

- concrete materials (facts, data). (1)
- abstract material (concepts, theories). (2)

Q2.39 For entertainment, I would rather

- watch television. (1)
- read a book. (2)

Q2.40 Some teachers start their lectures with an outline of what they will cover. Such outlines are

- somewhat helpful to me. (1)
- very helpful to me. (2)

Q2.41 The idea of doing homework in groups, with one grade for the entire group,

- appeals to me. (1)
- does not appeal to me. (2)

Q2.42 When I am doing long calculations

- I tend to repeat all my steps and check my work carefully. (1)
- I find checking my work tiresome and have to force myself to do it. (2)

Q2.43 I tend to picture places I have been

- easily and fairly accurately. (1)
- with difficulty and without much detail. (2)

Q2.44 When solving problems in a group, I would be more likely to

- think of the steps in the solution process. (1)
- think of possible consequences or applications of the solution in a wide range of areas. (2)

Q3.1 Where are the kidneys located on the human body?

- Lower back (1)
- Lower abdomen (2)
- Upper back (3)
- Upper abdomen (4)

Q3.2 In approximation, the kidneys are relatively _____ of the spine.

- On either side (1)
- In front (2)
- Behind (3)
- Opposite (4)

Q3.3 Approximately how big is a kidney?

- 2-3 inches (1)
- 4-5 inches (2)
- 6-7 inches (3)
- 8-9 inches (4)

Q3.4 What is the primary function of a kidney?

- Detoxify chemicals in the blood (1)
- Eliminate waste and form urine (2)
- Produce enzymes for food digestion (3)
- Absorb nutrients and minerals from food (4)

Q3.5 The urinary tract does not consist of which of the following:

- Kidney (1)
- Bladder (2)
- Liver (3)
- Urethra (4)

Q3.6 How much blood do kidneys filter a day?

- 50 quarts (1)
- 100 quarts (2)
- 200 quarts (3)
- 500 quarts (4)

Q3.7 Kidneys filter _____ gallons of blood to remove water and waste products daily.

- 30 (1)
- 45 (2)
- 70 (3)
- 130 (4)

Q3.8 Other functions of the kidney include:

- Getting rid of chemicals and fluid from the body (1)
- Help control blood pressure (2)
- Helping keep bones healthy (3)
- Filter blood coming to the digestive tract (4)

Q3.9 Which of these risk factors does not lead to kidney disease?

- High blood pressure (1)
- Diabetes (2)
- High levels of triglycerides in blood (3)
- Heart failure (4)

Q3.10 T or F: Pain medication (i.e. Motrin, Tylenol, and Advil) affects kidneys.

- True (1)
- False (2)

Q4.1 Please click on the video and pay attention. The video will take 4 minutes 30 seconds and it is important that you do not fast forward. This video has no audio.

Q4.2 Timing

- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)

Q5.1 This is a practice video. Please make sure your speakers are working before you continue with the study. Once you are comfortable with the audio levels, please click next to begin the study.

Q5.2 Timing

- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)

Q5.3 Please click on the video and pay attention. The video will take 4 minutes 30 seconds and it is important that you do not fast forward.

Q5.4 Timing

- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)

Q6.1 This is a practice video. Please make sure your speakers are working before you continue with the study. Once you are comfortable with the audio levels, please click next to begin the study.

Q6.2 Timing

- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)

Q6.3 Please click on the video and pay attention. The video will take 4 minutes 30 seconds and it is important that you do not fast forward.

Q6.4 Timing

- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)

Q7.1

	Extremely bad (1)	Moderately bad (2)	Slightly bad (3)	Neither good nor bad (4)	Slightly good (5)	Moderately good (6)	Extremely good (7)
Becoming an organ donor would be (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.2

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Most people who are important to me approve of me becoming an organ donor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Becoming an organ donor is my choice (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the past, I have purposefully declined to become an organ donor when i am at the department of motor vehicles (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.3

	Extremel y unlikely (1)	Moderatel y unlikely (2)	Slightl y unkel y (3)	Neither likely nor unkel y (4)	Slightl y likely (5)	Moderatel y likely (6)	Extremel y likely (7)
Most people like me would become an organ donor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that I can meet the requirement s to become an organ donor (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend to become an organ donor (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.4 The reason I would donate is:	Definitely false (1)	Probably false (2)	Neither true nor false (3)	Probably true (4)	Definitely true (5)
Because I feel that I want to take responsibility for my own health actions (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I would feel guilty or ashamed if I wasn't an organ donor (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I personally believe it is the best thing (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because others would be upset with me if I was an organ donor (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really do not think about it (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I have carefully thought about it and believe it is very important for many aspects of my life (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Because I would feel bad about myself if I was not an organ donor (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because it is an important choice I really want to make (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I feel pressure from others to be an organ donor (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because it is easier to do what I am told than think about it (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because it is consistent with my life goals (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I want others to approve of me (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because it is very important (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I want others to see that I can do it (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not really know why (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.5

	Definitely false (1)	Probably false (2)	Neither true nor false (3)	Probably true (4)	Definitely true (5)
I feel confident in my ability to become an organ donor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I now feel capable of becoming an organ donor (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to live with my decision of becoming an organ donor (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to meet the challenge of being an organ donor (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.6	Definitely false (1)	Probably false (2)	Neither true nor false (3)	Probably true (4)	Definitely true (5)
I feel that the information providers have provided me with choices and options about becoming an organ donor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that the information providers understand how I see things with respect to organ donation (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information providers convey confidence in my ability to become an organ donor (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information providers listen to how I would like to do things regarding organ donation (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The information providers encourage me to ask questions about organ donation (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information providers try to understand how I see organ donation before suggesting any changes (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8.1 How can one register as an organ donor?

- Online with state's organ donor registry (1)
- Local department of motor vehicles (2)
- Both a and b (3)
- All of the above (4)

Q8.2 The factors that determine who gets an organ are

- Severity of illness (1)
- Time spent on the waiting list (2)
- All of the above (3)

Q8.3 On average, how much does the organ donation process cost the donor?

- \$0 (1)
- \$500 (2)
- \$1,000 (3)
- \$10,000 (4)

Q8.4 The success rate for organ transplants is between _____ percent.

- 40-50 (1)
- 50-60 (2)
- 70-80 (3)
- 80-90 (4)

Q8.5 How many lives can you save from becoming an organ donor?

- 4 (1)
- 6 (2)
- 8 (3)
- 10 (4)

Q8.6 T or F: If a prior organ donor should require an organ donation, they would move to the top of the list.

- True (1)
- False (2)

Q8.7 How many people are on the organ donation list?

- 80,000 (1)
- 120,000 (2)
- 8,000,000 (3)
- 12,000,000 (4)

Q8.8 On average, how many minutes go by before another individual is placed on the organ donation list?

- 4 minutes (1)
- 6 minutes (2)
- 10 minutes (3)
- 13 minutes (4)

Q8.9 How many people die each day waiting for an organ donor?

- 8 people (1)
- 12 people (2)
- 17 people (3)
- 22 people (4)

Q8.10 What is the percentage of Americans that are actual organ donors?

- 35% (1)
- 38% (2)
- 45% (3)
- 48% (4)

Q8.11 Will you become an organ donor?

- Yes (1)
- Maybe (2)
- No (3)

Q9.1 _____ of patients waiting are in need of a kidney.

- 64% (1)
- 76% (2)
- 82% (3)
- 90% (4)

Q9.2 Dialysis artificially does the function of a kidney, which of these is the most common among those who are on dialysis?

- Introdialysis (1)
- Prosthetic Dialysis (2)
- Hemodialysis (3)
- Peritoneal dialysis (4)

Q9.3 One in how many Americans are at risk of kidney disease?

- One in two (1)
- One in three (2)
- Two in three (3)
- Three in four (4)

Q9.4 There are multiple triggers that can lead to kidney disease, which of these can be attributed to be a trigger?

- Diabetes (1)
- High blood pressure (2)
- Family history (3)
- All of the above (4)

Q9.5 When blood testing for kidney disease, what is specifically tested?

- Fasting Plasma Glucose (FPG) (1)
- Glomerular Filtration Rate (GFR) (2)
- Albumin and Creatinine Ratio (ACR) (3)
- Erythrocyte Sedimentation Rate (ESR) (4)

Q9.6 T or F: After donating a kidney, no medication is needed to help regulate the kidney function.

- True (1)
- False (2)

Q9.7 What is the average waiting time for a kidney from a deceased donor?

- 1-3 years (1)
- 2-4 years (2)
- 3-5 years (3)
- 5-7 years (4)

Q9.8 How many nights at the hospital is usually required after a kidney transplantation procedure for the donor?

- 1 night (1)
- 2 nights (2)
- 3 nights (3)
- 4 nights (4)

Q9.9 What is the name of the pilot program that is an innovative way to pair donors and recipients?

- National Kidney Buddy-Buddy Organization (NKBBBO) (1)
- Matching Friendship Donation (MFD) (2)
- Kidney Paid Donation (KDP) (3)
- Pairing Kidneys (PK) (4)

Q9.10 What are branch of medicine focuses on the kidney?

- Nephrology (1)
- Cardiology (2)
- Radiology (3)
- Gastronomy (4)

Q10.1 Gender

- Male (1)
- Female (2)

Q10.2 What is your age?

- 18-24 years old (1)
- 25-34 years old (2)
- 35-44 years old (3)
- 45 years or older (4)

Q10.3 What is your household income for the previous year?

- \$24,999 or less (1)
- \$25,000-49,999 (2)
- \$50,000-74,999 (3)
- \$75,000-99,999 (4)
- \$100,000 or more (5)

Q10.4 Please specify your race

- White (1)
- Black or African (2)
- American Indian or Alaska Native (3)
- Asian (4)
- Native Hawaiian or Pacific Islander (5)
- Other (6)

Q10.5 Are you Hispanic?

- Yes (1)
- No (2)

Q10.6 How many siblings do you have?

- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4+ (5)

Q10.7 What is your marital status?

- Single, never married (1)
- Married or domestic partner (2)
- Widowed (3)
- Divorced (4)
- Separated (5)

Q10.8 What level of education have you most completed?

- Some high school, no diploma (1)
- Some college (2)
- Associates Degree (3)
- Bachelor's Degree (4)
- Master's Degree (5)
- Doctoral Degree (6)

Q10.9 If currently a collegiate student, which college do you pertain to?

- College of Business Administration (1)
- College of Education (2)
- College of Engineering (3)
- College of Health Science (4)
- College of Liberal Arts (5)
- School of Nursing (6)
- College of Science (7)

Q10.10 With which religion do you most closely relate to?

- Christian (1)
- Catholic (2)
- Jewish (3)
- Mormon (4)
- Muslim (5)
- Protestant (6)
- Hindi (7)
- Buddhism (8)
- Other (9)

Q10.11 What is your employment status?

- Full time (1)
- Part time (2)
- Unemployed (3)
- Retired (4)

Q10.12 How would you describe your political views?

- Very conservative (1)
- Conservative (2)
- Moderate (3)
- Liberal (4)
- Very liberal (5)

Q10.13 What is your preferred email?

Part 2

Organ Donation Experiment - Part 2

Q7 This is the second part of the survey that will take approximately 7-10 minutes. Please complete the answers to the best of your ability as your answers are very important to the study. I anticipate that the response rate will be high as everyone was made aware of this second phase and it will not require much time. This part will be required in order to get full participation

credit. Thank you. By clicking on the "next" button, you are agreeing to participate in the rest of the study.

Q5 What did you learn from the information provided in this study? Please give details.

Q2 Describe what you remember from your participation in this study.

Q28 Tell me up to 10 points about what you specifically learned about kidney donation.

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

Q14

	Extremely bad (1)	Moderately bad (2)	Slightly bad (3)	Neither good nor bad (4)	Slightly good (5)	Moderately good (6)	Extremely good (7)
Becoming an organ donor would be (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q18

	Extremel y unlikely (1)	Moderatel y unlikely (2)	Slightl y unlikel y (3)	Neither likely nor unlikel y (4)	Slightl y likely (5)	Moderatel y likely (6)	Extremel y likely (7)
Most people like me would become an organ donor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that I can meet the requirement s to become an organ donor (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend to become an organ donor (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25 I am currently an organ donor.

- Yes (1)
 No (2)

Q29 How much do you feel that your perception on kidney donation changed because of this study?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Not at all: A whole lot (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not influenced: Highly influenced (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q30 How much information do you remember from the PowerPoint slides that were presented in the prior study?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
I do not remember anything: I remember everything (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q26 In the study you participated in, the delivery of message was:

- Reading PowerPoint slides (1)
- Reading and Listening to PowerPoint slides (2)
- Reading and Listening to PowerPoint slides while massaging a kidney prop (3)

Q4 What is the last name of the instructor/professor where you heard about this experiment?

VITA

Gerardo J. Moreira earned his Bachelor of Business Administration in Marketing (2005), Master of Business Administration with a concentration in Management (2012), and most recently his Doctoral Degree in Business Administration with a concentration in Marketing (2017) from the University of Texas at El Paso. During his time in the doctoral program, he received numerous honors and awards including the first research award for a doctoral student and selected to represent the university at a well-established consortium. He has published research in renowned marketing journals and has presented research at various conferences. He also taught various marketing courses at an undergraduate level.

Dr. Moreira will join the faculty of Sacred Heart University as an Assistant Professor, where he will teach marketing courses and pursue research.

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This dissertation was typed by Gerardo J. Moreira.