YARMOHAMMADI, ZAHRA, Ph.D. The Impact of Ambient Awareness on Customers' Purchase Intentions. (2019)
Directed by Dr. Hamid. Nemati. 129 pp.

Recent developments in the field of e-commerce have led to a renewed interest in utilizing novel techniques to impact customers' decision-making processes that lead to revenue growth. One approach that has been noted in the literature is to focus on customer awareness as a mean of raising profitability (Wang & Zhang, 2011). This dissertation posits that customer awareness that impacts decision making is likely to include not only technological aspects it also includes information with a considerable amount of content related to business, products, or services which are socially available (Curty & Zhang, 2011). In fact, this dissertation investigates informational-perspective effects via defining and studying the emergence of exclusive customer awareness through its surrounding environment, called ambient awareness, and its role in customers' decision making.

The idea of ambient awareness refers to the awareness that individuals obtain from ambient communications occurring around them (Leonardi & Meyer, 2015). Indeed, this dissertation examines whether incidental exposure to cues can activate different goals and, in turn, influence subsequent intentions on undesired primarily choice of product in an ambient environment. In IS literature, only a few studies discussed the ambient awareness concept. In most of these studies, ambient awareness is primarily defined as awareness of "who knows what" and "who knows whom" in an enterprise social media that facilitate the knowledge transfer between coworkers (Leonardi, 2015). Similarly, others identified the concept of ambient awareness as the awareness that an individual obtains from the communications occurring around them, again from the perspective of knowledge transfer between individuals (Leonardi & Meyer, 2015; Thompson, 2008).

The current dissertation investigated the process by which ambient awareness is developed and its gradual impacts on different aspects of customers' mindsets. Although few prior kinds of research have acknowledged the importance of cognitive processes (e.g., Hinds & Pfeffer, 2003; Olivera et al., 2008), most of them have emphasized on motivational explanations. This dissertation conceptualizes ambient awareness development as the intersection of cognition and motivation theories to better understand customers purchasing decisions. Then, it presents a conceptual model of ambient awareness development and studies its impacts through the lens of two complementary cognitive and motivational theories. Two powerful theories are integrated (i.e., SCT and ELM) to explain the paths that customers take to develop ambient awareness that impact their purchasing decisions. The dissertation then presents the results of a controlled experimental study to empirically test the impact of the ambient awareness development on decision making. The results show that ambient awareness development in the experiment phases positively contributed to shifting customers' attitudes toward purchasing (i.e., purchase intention). Finally, this dissertation provided evidence that ambient awareness impacted customers' decisions, and eventually altered customers' purchase intentions.

THE IMPACT OF AMBIENT AWARENESS ON CUSTOMERS' PURCHASE INTENTIONS

by

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A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2019

Approved by

_____
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To Pooya,
My perfect companion, friend, and husband,
And my beloved parents,
Hooshang and Ashraf.

APPROVAL PAGE

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ACKNOWLEDGMENTS

I would like to express my most profound appreciation to the Chair of my dissertation committee, Dr. Hamid Nemati, who always supported and encouraged me in every step of my Ph.D. His tremendous academic support, patience, and mentoring helped me stay motivated all the time of research and writing of this dissertation. I am also grateful to the rest of my committee members: Dr. Gupreet Dhillon, Dr. Indika Dissanayake, and Dr. Esra Memili, who have shared their expertise, insightful comments, and guidance that shaped my final dissertation. In addition, I would like to thank ISSCM faculty members of UNC-Greensboro for their invaluable support. Lastly, I much appreciate my family for supporting me spiritually to follow my dreams.

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CHAPTER I

INTRODUCTION

1.1 Overview

Technological advances and the widespread use of social networks have facilitated connectivity (Gruzd et al., 2011; Leonardi, 2015) and resulted in an exponential expansion of available information (Valentini et al., 2018). The characteristics of social networks such as speed and ease of accessibility, low cost of use, flexibility in search options, and the ability of users to customize their interactions have made these platforms very popular among users. Given the popularity of social networks with users, e-commerce retailers have made a concerted effort to adopt these platforms as a way to attract and, more importantly to influence their customers' behaviors (Woo et al. 2016).

In 2005, an emerging phenomenon appeared in the literature to refer to e-commerce new way of doing commerce. Basically, this phenomenon represents the combination of social media and e-commerce through wish lists, tagging, social networks, ranking, recommendation systems, etc. (Curty & Zhang, 2011). Yahoo! initially introduced the label "social commerce" for the phenomenon based on Jascanu and Nicolau (2007). In fact, social commerce is the new way of e-commerce mediated by social media that business owners can make more profits by attracting and alluring potential customers via positive recommendations by helping people to be aware of what, where, and from whom to buy (Jascanu & Nicolau, 2007). In addition to firms, customers can collaborate and shop in an environment similar to social networks combined with one or more vendors. Thus, customers make more informed decisions based on information not only from the vendors, but also from other customers (Curty & Zhang, 2011).

This strategy is envisioned to combine both B2C (business to consumer) and C2C (consumer to consumer) approaches that both customers and firms benefit (Zhu et al., 2006).

Hence, recent developments in the field of e-commerce as social commerce have led to a renewed interest in utilizing novel techniques to impact customers' decision-making processes that lead to revenue growth. One strategy that has been noted in earlier literature is to focus on social commerce technological feasibility to raise business profitability (Wang & Zhang, 2011). For instance, social commerce websites try to upgrade their search algorithms lead to efficiently guiding people to connect where they usually buy and, indeed, personalize the products based on customer's preferences. For example, it has become commonplace among online retailers to employ recommender agents to assist users in making purchase decisions by providing product suggestions to them that best match their personal preferences. These recommender agents use new machine learning algorithms to predict customers' personal interests to find and suggest products that closely match customers' preferences. Therefore, the main goal of recommender agents is to predict the personal preferences of individuals for items that they have may not yet be decided to purchase (Adomavicius et al., 2017). A considerable amount of literature has been published on the design and implementation of recommender agents' algorithms with the goal of improving the accuracy and effectiveness of their performance (Adomavicius & Tuzhilin, 2005). However, it is worth noting that customer behavior is a complex concept, involving a combination of needs and desires that are influenced by a variety of internal and external factors (Ajzern & Fishbein, 1980). Therefore, the comprehensive solution to assist customers decision making is likely entailing not only, technological aspect such as recommendation algorithms that only perform an iterative feedback loop, but also, it should include information perspective that symbolizes the content-driven environment where a considerable amount of content related to business, products or services which are socially available (Curty & Zhang, 2011).

Moreover, several studies emphasized that interpreting and predicting online customers' behaviors is more challenging than originally thought, considering the virtual environment that provides no physical interactions (Jiang, Chen, & Wang, 2008; Mukherjee & Nath, 2007). Some studies have shown the role that online reviews play as a facilitator for the customer's purchase-making process (Mudambi & Schuff, 2010). Not surprisingly, online reviews help customers in exploring information about alternative or substitute products that might ultimately impact customers' purchasing decisions. Based on the evidence of how social commerce websites are growing nowadays and how they contribute to information science such as information behavior, information sharing, user-generated content, collaboration resources, etc., it would be unsatisfactory to consider merely either online reviews or recommendation agents expositions. Hence, this empirical study attempts to comprehensively analyze how all the exposed information on social commerce websites impacts customers decision making to purchase. In fact, this paper investigates informational-perspective effects via defining and studying the emergence of exclusive customer awareness through its surrounding environment, called ambient awareness, and its role in customers' decision making.

The idea of Ambient Awareness tends to be used to refer to the awareness that individuals obtain from the ambient communications occurring around them (Leonardi & Meyer, 2015). Similar to "ambient noise" that refer to any sound other than the sound being monitored or "ambient lighting" as background lightning, ambient awareness could be perceived as information processing that one may unknowingly engage as the result of background and environmental information one receives without any deliberate intention to seek that information. Thompson (2008) first introduced the idea of ambient awareness through the use of public social pages, specifically, on Facebook and Twitter. He noted that:

> This is the paradox of ambient awareness. Each little update—each individual bit of social information—is insignificant on its own, even supremely mundane. But taken together, over time, the little snippets coalesce into a surprisingly sophisticated portrait of your friends' and family members' lives, like thousands of dots making a pointillist painting. This was never before possible because, in the real world, no friend would bother to call you up and detail the sandwiches she was eating. (Thompson, 2008; p. 46)

Another significant research on ambient awareness was performed by Leonardi (2015). He defined ambient awareness as understanding "who knows who" and "who knows what" through using the enterprise social networking. The results of his study indicated that social networking impacts the visibility of other's activities leading to the creation of ambient awareness among individuals that, in turn, influences the way individuals work. For instance, individuals would be aware of valuable information such as daily tasks, project tasks, etc., that are done by other persons in the organization so that individuals have access to such information without any direct request from earlier involved persons.

Similarly, this dissertation aims to shine a new light on the examination of the role of ambient awareness on online-customers decision-making. Social commerce enables customers to be aware of topics that they do not deliberately intend to explore at the first point. However, this information has been available via the ambient environment by social commerce websites. This awareness may eventually alter the customer's decision-making process, in particular, concerning developing purchase intentions. Although research in ambient awareness has an extensive history in disciplines such as sociology, psychology, and philology, it is relatively new in Information System, particularly in studying the understanding of its' capabilities to alter customers' decision making., In this dissertation, we try to identify a comprehensive understanding of the emergence and propagation of ambient awareness among online customers and its impact on their decision making.

1.2 Research Gap

This dissertation attempts to add the extant literature from two different perspectives. First, the study describes the process of ambient awareness individual-oriented development during online shopping embedded by new features available on social commerce websites such as recommendation agents with a variety of product reviews. In IS literature, only a few studies discuss ambient awareness. In most of these studies, ambient awareness is primarily defined as awareness of "who knows what" and "who knows whom" in an enterprise social media that facilitate the knowledge transfer between coworkers (Leonardi, 2015). Similarly, others identified the concept of ambient awareness as the awareness that an individual obtains from the communications occurring around them, again from the perspective of knowledge transfer between individuals (Leonardi & Meyer, 2015; Thompson, 2008). The current research investigates the process by which ambient awareness is developed and its gradual impacts on different aspects of customers' mindsets. This study then utilizes two powerful theories with the ability to explain the paths that customers walk through to make purchasing decisions.

On the other side, most recent empirical studies on customers' decision making have focused on identifying product reviews indicators such as authorship of reviews (Mengxiang et al., 2017; Benlian et al., 2012; Forman et al., 2008), review content (Mengxiang et al., 2017; Yin et al., 2014), number of reviews (Mengxiang et al., 2017), customers rating (Li et al., 2013; Muambi & Schuff, 2010) whereas there have been no controlled studies where the impact of all indicators are examined in understanding of the emerging ambient awareness and its decision-making consequences. Although, there are number of studies that have investigated product reviews as user-generated content (Ghose & Ipeirotes, 2009) that it may carry out valuable information to assist customers decision-making (Mengxiang et al., 2017), researchers have not treated multiple information realms such as information behavior, information sharing, user-

generated content, and collaboration platforms surrounding online customers in much detail at the same time . Indeed, this dissertation adds to the extant literature by discussing how ambient awareness evolvement as the result of such treatment influences customers' purchasing behavior.

1.3 Research Questions

Two goals motivated the current study. First, it addresses the extent to which aspects of customers' state of mind are influenced by the development of ambient awareness (RQ1) and to systematically examine how do ambient awareness development influences overall attribute-level customers' decisions, specifically, alteration of purchase intentions (RQ2). In order to answer the research questions, the development of a robust conceptualization of ambient awareness that is rooted in IS literature is the first necessary step.

1.4 Research Scope

The principal objective of this study is to investigate and develop a comprehensive conceptualization of ambient awareness emergence from an IS perspective and then explore a measure and the magnitude of its' influence in altering customers' attitudes towards purchasing in an online shopping environment. To achieve these objectives, this dissertation (1) conceptualizes ambient awareness development as the intersection of cognition and motivation theories to better understand customers purchasing decisions. Then, it presents a conceptual model of ambient awareness development and studies its impacts through the lens of two complementary cognitive and motivational theories. Two dominant theories are integrated (i.e., SCT and ELM) to explain the paths that customers take to develop ambient awareness that impact their purchasing decisions. Then, this dissertation (2) developed a controlled experimental study to collect data by simulating an online shopping platform using Qualtrics and MTURK, (3) validated and tested the

research constructs by running CFA; (4) evaluated the research hypotheses originated from the research model by performing CB-SEM using AMOS. The dissertation finally presents the results of a controlled experimental study to empirically test the impact of ambient awareness development on decision making. The results show that ambient awareness development in the experiment phases positively contributed to shifting customers' attitudes toward purchasing (i.e., purchase intention).

1.5 Dissertation Organization

The overall structure of this dissertation takes the form of five chapters, including this introductory chapter. Chapter two begins by laying the grounds for the dissertation and provide an overview of the literature on awareness, ambient awareness, and its influence on customers' behaviors. The third chapter presents the theoretical dimensions of the research and conceptualizes the novel notion of ambient awareness. The fourth chapter describes and justifies the methodology used for this dissertation, followed by demonstrating the results of hypotheses testing. In the fifth chapter, discussion, theoretical contributions, practical contributions, limitations, and future research have been represented.

CHAPTER II

LITERATURE REVIEW

2.1 Awareness

Awareness is a challenging concept to define. Thinkers and researchers from a variety of fields as diverse as philosophy to sociology to psychology through millennia have attempted to describe it with little success. One of the reasons for the difficulty associated with defining awareness may have to do with its uniqueness to human beings. It is a concept that distinguishes human beings different than other creatures. In its broadest sense, the term *awareness* can be synonymous "the state of being conscious," the ability to selectively direct attention to a particular aspect of a situation or fact, and cognitively process it over a timescale (Charlton, 2000). Davenport & Beck (2001) defined awareness as a state of mind processing general, vague information that is absorbed through sensory perceptions. The acquired information may include all the cues generated by activities in which individuals are engaged (Goel et al., 2011). Also, several researchers split the definition of awareness into different types that would help to describe this complicated and broad concept. For instance, one can define awareness within the activity as the initial information regarding an action can be tied to basic questions such as *what* is being done and *where* it occurs (Gutwin et al., 1995). Besides, the reply to *where* question, mostly involves physical space, whereas the answer of *who* relates to the people engaged in a specific activity. Moreover, a person could be in a state of awareness about *how* tasks are done, which can be related to the level of knowledge the person possesses (Gutwin et al. 1995). Thus, a variety of awareness would be assumed to form a specific state of awareness by replying to such questions about a particular aspect, object, person, situation, or fact.

Despite the diversity of views about what constitutes awareness, literature has generally characterized it as having three types. These types are social, activity and cognitive awareness which answers to three fundamental questions that are "*Who is around*?", "*How are things going*?" and "*Who knows what*?" (Carroll et al., 2003).

Social awareness emphasizes the presence of collaborators, group communications and can refer to "*who is here or who can I connect with*" in online social pages (Tang et al., 1994; Dourish et al., 1996). Activity awareness is associated with "*knowing what is going on around you*" (Endsley, 20000). Finally, cognitive awareness is related to the knowledge of individuals (Pifarré et al., 2014). Basically, they defined cognitive awareness refers to self-assessed knowledge and understanding the cues about the distribution of knowledge among individuals in a collaborative group activity.

Most online shopping, uniquely, social commerce websites are equipped with a variety of social features and online marketing tools that are intended to make a large amount of information available to customers to enable them to develop a comprehensive awareness about different aspects of products and services available to them. The myriad of information available to the individuals received as cognitive stimuli makes it challenging to categorize the extract type of awareness that is created. The current dissertation argues that all three categories, as mentioned earlier, awareness could be developed as one unique type of awareness that we refer to as *ambient awareness.* Ambient Awareness is defined as synthesizing all surrounding cognitive stimuli received by an individual to evolve a unique kind of awareness, represented at all three levels mentioned earlier. The salient feature of our definition requires that the synthesis of different cognitive stimuli received by the individual is processed without any deliberate efforts by the individual.

2.2 Ambient Awareness

Initially, it is necessary to clarify exactly what we mean by "ambient awareness" since there is a high degree of uncertainty associated with the terminology in the literature. The term "ambient" is a relatively new qualifier given to "awareness." It is generally defined as "relating to the immediate surroundings of something." Here, the term "ambient awareness" has come to be used to refer to the sensing and exchanging general information relating to the immediate surroundings. Thompson (2008), apparently, is the first to use the term "ambient awareness" arising from being aware of individuals by receiving fragmented social information on social media sites such as Facebook and Twitter. He refers explicitly to social awareness about others including being aware of any digital footprints and status updates while browsing social media. According to Thompson's definition, indeed, "ambient" has been applied to situations where awareness develops peripherally and not actively attending to information within using social media.

There is a consensus among social scientists considering ambient awareness as peripheral pervasive awareness and its potential role in social relations (Lampe et al., 2006; Resnick, 2001; Zhao, Rosson, Matthews, & Moran, 2011), organizational knowledge exchange (Dimicco et al., 2008; Leonardi & Meyer, 2014; Zhao et al., 2011). There is a further definition given by Leonardi (2015), who describes ambient awareness as "awareness of ambient communications occurring amongst coworkers." Although differences of opinion still exist, there appears to be some agreement that ambient awareness uses a transection of context, emphasizing the individuals receiving information that is ambient in the sense of situation and environment. Consistent with Levordashka and Utz (2016), browsing social media is sufficient for awareness to develop, although directed communication is missing. In this dissertation, the term "ambient awareness" is used to declare sensing and exchanging any cognitive stimuli such as ambient information by

browsing social commerce (e.g., online shopping platforms) websites that are equipped to social features such as customers rating, online reviews, and recommendation agents.

2.3 Ambient Awareness Definition in Notification Systems

Ambient awareness concept has been utilized in different fields. One field that seems relevant to our research is using this concept as a notification. But, first, it is vital to understand the basic terms such as "notification" and "notification systems." generally, notification refers to the operation of any notification systems, as the branch of human-computer interfaces that are typically used in attempting to deliver current valued information through a variety of platforms in an efficient and effective manner. (McCrickard & Chewar 2003). Notification systems are becoming a critical instrument that makes essential information visible and heightens the awareness resulting from making a personal alternative available. The effectiveness of the notification has long been viewed favorably by computer users, suggesting since it causes relatively little to no interruptions, but the information they present proves to add utility, often enhance knowledge by facilitating information access.

The most popular notifications are those that utilize visual or auditory signals to draw an individual's attention toward necessary information (Bodnar, Corbett, & Nekrasovski, 2004). For example, one primary type of notification system is the operation of a low battery alert that notifies the user that the battery needs to be changed. Despite its' efficacy and growing demand, notifications are often perceived as causing distractions when used on an ongoing basis. In 2004, Bodnar et al. reported ambient awareness as a new and convenient channel to deliver background information. Authors were able to declare the ability of ambient awareness as a way to move quickly from the periphery of an individual's attention to the center for ambient by changing the way the information is displayed.

Moreover, several studies thus far have linked the development of awareness as a sense of social presence in computer-mediated communications, when there is no physical presence, in a way that it enhances communication by providing information and increasing familiarity (Tu & McIsaac, 2002; Walther & Bazarova, 2008). Thus, it can be argued that browsing social commerce websites containing any social cognitive cues within new features such as customers' comments, ranking, or uploaded images taken by previous customers, can contribute to the sense of awareness.

2.4 Ambient Awareness Development Impacts on Human Behaviors

What we know about ambient awareness's impact is mostly based on empirical studies that examine ambient awareness and the behavior that it contributes to (Leonardi, 2016; Leonardi & Meyer, 2015). Previous research has shown that ambient awareness has a positive impact on knowledge transfer by helping knowledge seekers to acquire knowledge-intensive material from conversations occurring in their organizational social networks. In effect, ambient awareness evolvement performs as a facilitator of knowledge transfer (Leonardi & Meyer, 2015). Also, it should be noted that Ellison et al. (2011) published a paper in which they described that social networking sites might act as a social lubricant that helps individuals become more aware of other activities in their networks.

It suggests that ambient awareness may have contributed to the proliferation of knowledge transfer on social networking sites by allowing knowledge seekers to gather relevant information as well as knowledge itself ambiently. It is encouraging to compare this phenomenon with the one introduced by Leonardi (2016) who declared that ambient awareness derived from the use of an enterprise social media helps people to improve the accuracy of their meta-knowledge or, in other words, it is useful for knowledge sharing and collaboration by allowing

unlimited access to surrounded cognitive cues which can be referred as other's knowledge within the organizational social networks.

These results of what expressed by Leonardi (2015, 2016) in IS literature and those described by (Levordashka & Utz, 2016) in cyberpsychology domain reveal the ambient awareness functions as a facilitator of various social information that allows users to attain awareness of what is going on in the lives of people in their social networks. They highlight the importance of the development of ambient awareness that can bring cognitive benefits for online users. However, these results differ from Bodnar et al., (2004) that demonstrated ambient awareness as olfactory (the sense of smell) notification recognized to be less effective in delivering cognitive cues in comparison to the traditional notifications like sounds and visual pop up alerts. Inversely, other research considered ambient awareness as an effective alternative to notification systems that effectively draw users' attention toward important cognitive cues, and unlike traditional notifications, avoid unnecessary disruption.

Together, these studies outline concentrate on ambient awareness scope, functionality, and in a few cases, efficacy. However, the impact of ambient awareness on behavioral changes; specifically, decision-making, is yet to be established. As formerly stated, this dissertation examines the emerging role of ambient awareness in altering customers' purchase intentions in the context of online shopping. We posit that customers acquire ambient awareness throughout browsing social commerce websites that are equipped with features that enable customers' interactions by providing public commentary tools, rating, and online recommendation agents. Consequently, these disclosed cognitive cues as we call "ambient information" received by the customers ambiently will lead them to sense and exchange awareness that is likely to contribute to their attitude toward purchasing. Indeed, the ultimate goal of this dissertation is to systematically measure the impact of ambient awareness development on customers' attitudes.

Throughout the next sections, we explain why and how we use the term “attitude” to investigate the impact of ambient awareness development on customers' behaviors instead of the broad concept of “behavior” as a way to predict customers' actual behaviors.

2.5 Measuring Attitudes to Predict Behaviors

First, it is vital to distinguish between attitudes and behaviors as researchers in social psychology use these terms in different manners. Briefly, based on the literature, the term attitude should be used to refer to a general *feeling* about an issue, an object, or a person. However, the term behavior represents an *action* toward a matter, an object, or a person (Bem, 1970; Oskamp, 1977; Insko & Schopler, 1972; Oskamp & Schultz, 2005). the declaration, “I like ice cream.”, would be considered an attitude while “I bought ice cream.” Would represent a behavior. In fact, knowing the attitudes presumably, helps others predict the actual behaviors that people are likely to engage as it serves as a declaration to other subsequent actions. (Petty, 2018). Therefore, researchers believe that the attitude should be viewed as a major determinant of genuine intention to perform a behavior (Davis, 1985).

In the early 1930s, the attitude-behavior “relation” is widely investigated among researchers (Petty, 2018). The discussions aroused when LaPiere (1934) compared peoples’ behaviors with their self-reports of prejudgments. This research studied how people’s actual behavior is different from their verbal reports about performing that specific behavior. The researcher traveled with a Chinese couple across the united states and recorded the number of hotels and restaurants that agreed to serve the couple. The Chinese couple was refused service at only one of the places. However, six months later, the researcher asked the same positions whether they would give services to any Chinese guests or not. Ninety-two percent stated that they wouldn’t serve any Chinese guest. Another example study failed to find a relationship

between verbal reports and behavioral actions was the study that measured students' attitudes toward cheating. It attempted to predict cheating on tests (Corey, 1937). The researcher found that the correlation between the students' attitudes toward cheating and the extent of the actual cheating on five tests was close to zero.

While there appears to be an extreme inconsistency between the actual behavior and pre-reports, there has been at least one major issue with the mentioned studies. In the first study, it wasn't clear that the same people who replied to the questioner's inquiry six months later were the same people who had accepted to serve the Chinese guests. Thus, it is unlikely that the researcher measured the same people's attitudes and behaviors. Although, the second study doesn't mention the problem as students who completed the attitude measures were the same who performed the behavior. The problem with the second study was that Corey (1937) employed a general measure of attitude toward cheating to predict a specific behavior that was cheating on a particular type of test in a course (Petty, 2018).

Later, Fishbein and Ajzen (1977; 1980) positively established that attitudes are related to behaviors. They stated that the employed attitude measure should correspond to four elements of specific behavior that is chosen to predict. These four elements are action, target, context, and time that determine the significant relationship between attitudes and behaviors. The action is the behavior itself such as cooking, driving, or purchasing. The target refers to the object which the action is directed toward, like a cake, a car, or a product. The third element is the context of the activity that is performed (e.g., in a kitchen, in the street, or on online shopping). Clearly, the last one, the time, is the time that action is performed, for instance, on regular days, or New Year's Eve. According to Ajzen and Fishbein's analysis, a general attitude measure might not be able to predict a particular behavior with specific elements, as a public cheating attitude statement couldn't be used to predict a particular instance of cheating.

Later, other researchers tried to add complementary factors that help to improve attitude measures for behavioral predictions. One central measurement factor that is still relevant to one of the four main elements is the amount of time intervenes between the attitude and the behavioral measurement. The more time elapses between the measures, the lower the observed correlation between attitudes and behaviors (Davidson & Jaccard, 1979; Schwartz, 1978). The reason is that a person's attitude may change in the intervening time so that the behavior prediction would be based on a different attitude. Another prominent variable that enhances behavioral prediction is a direct experience. Regan and Fazio's (1977) study was an attempt to predict the proportion of time that people would consume to complete different types of puzzles. They examined a group of individuals in an experiment via giving one group of people a direct experience that was an opportunity to play with some sample puzzles before their attitudes were measured. Then, all individuals including the experimental group who were given direct experience, and found all individuals initially expressed the same attitudes about the puzzles on the attitude scales. But the experiment results also showed that the average correlation between the attitude and the behavior for the direct experience group was significantly higher than the other group without direct experience. Furthermore, in 1981, Fazio & Zanna suggest that attitudes based on experience, predict behaviors better than attitudes formed on the mere explanation of the situation. The researcher illustrated that a person with direct experience has more information about the target behavior that could increase attitude reliability.

2.6 Purchase Intentions as Customers Behavioral Determinant

The analysis of online customer's buying behavior is a crucial issue embodying research in online shopping at e-commerce markets. Accordingly, analyzing the insights of online customers' buying behavior is a classic problem in the e-commerce domain. Based on Ajzen and

Fishbein (1980), buying behaviors can be complicated, involving a combination of needs and desires influenced by a variety of internal and external factors. In a study that sets out to determine these factors, Barber et al. (2012) found out that personality, knowledge, attitude as internal criteria and product, price, and promotion as external criteria control purchase behaviors. Thus, the first step in any behavioral change model is identifying the behavior that is needed to understand (Fishbein & Cappella, 2006). Fundamentally, purchase intention has been recognized to explain "relationships between individual values and attitudes on intent to purchase products" (Ajzen & Fishbein, 1980). Although the strength of the relationship between purchase intentions and actual purchasing varies from study to study, the associated link is generally acknowledged to be significant (Limayem et al., 2000; Jamil & Mat, 2011; Lim et al., 2016). In addition, the purchase intention has been determined as a significant predictor of actual behavior on online shopping (He et al., 2008; Orapin, 2009; Roca et al., 2009). Other researchers have reported that the lack of online purchase intention is the main problem towards e-commerce businesses (He et al., 2008). In fact, it is crucial to address the purchase intention as it governs retailers' final goal via the attitude-level determinant of customers' behaviors. It is worth to mention the challenges for decoding of online customers purchase intentions due to non- physical interactions in online shopping (Jiang et al., 2008; Mukherjee & Nath, 2007), online retailers are prone to make massive investments to understand and predict online-customers behaviors. In 2010, Mudambi & Schuff confirmed the role of online content as an initiator for the customers purchasing behaviors. They identified that online reviews deliver a capability for other customers exploring information about all alternatives which subsequently, impacts customers' purchasing decisions. They conclude that there is a likelihood that customers become aware of the untold features of products by noticing to prior reviews. This conclusion is consistent with our argument that surrounding cognitive cues incorporating any displayed- segment of information on social commerce websites

would be processed by customers and would shift the level of awareness (i.e., ambient awareness) and motivates attitudinal change about the product.

CHAPTER III

THEORETICAL FOUNDATIONS AND RESEARCH MODEL

3.1 Integrating Theories

In seeking candidate theories on which to base a robust conceptualization of ambient awareness and its impacts, we proffer a combination of cognitive and motivational theories that meet the requirements of our research objectives, that allows us to explain how ambient awareness is developed and the ways ambient awareness impacts and subsequently influences customers purchasing decisions.

Regarding the requirements of how ambient awareness develops in an individual and how it is expected to impact the individual's behaviors, previous research has presented that cognitive processing of persuasive information is necessary for behavioral changes (Gardner, 2004; Puhakainen & Siponen, 2010). Most social commerce websites provide customers initial cognitive cues through recommendations that may use machine learning algorithms to generate a specific set of recommendations based on the characteristics and history of customers' interactions with the website. It constitutes the initial set of ambient information as cognitive cues that may include the essential customers' expectations relevant to the initially searched product as well as additional informational signals that the customer may not have initially explored. We claim this combined set of informational cues presented ambiently by these recommendation agents can lead to ambient awareness in customers by merely viewing them. This research posits that ambient awareness is generated by the information that is available to customers ambiently, and further, we argue that a carefully constructed ambient awareness, customers' cognitive

processes that form the basis of their decision making are impacted to the point that it manifests itself in altering their decisions.

This dissertation expects that the emerged ambient awareness is sufficient for recipients to make decisions based on cognitive cues on social commerce websites, which would not be, deliberately, intended to explore by customers in the first place. Also, it is postulated that the decisions within the presence of ambient awareness would be different than the situations that customers decide, exclusively, based on their initial preference. We present social cognitive theory (SCT) (Bandura, 1978) to explain first, the formation of ambient awareness in terms of cognitive representation of information shared in social commerce websites and second, we use the elaboration likelihood model (ELM) (Petty & Cacioppo, 1979, 1986; Petty et al.; 1983) to explore customers' evaluation process' mindset in order to interpret the impact of ambient awareness on their purchasing attitude. These two theories complement each other well in a way that SCT provides a concrete explanation for the emergence and developing of ambient awareness that is personalized based on the customer characteristics and preferences during online purchasing on social commerce's websites, while ELM helps in investigating why and how ambient awareness, systematically, influences on customers attitudinal- level decision making.

3.2 Social Cognition Theory

Social cognitive theory (SCT) is a well- established theory that has been used in information systems studies (Chiu et al., 2006; Lin & Huang, 2008; Zhou et al., 2014; Lin, 2018). It offers a comprehensive explanation for human behavior as a product of the reciprocal interactions between personal, behavioral, and environmental factors (Bandura, 1978, 1986). While earlier theories of behavior considered human behavior as merely reactionary to

environmental stimuli, Bandura developed this theory by framing human behavior as a cognitive process across environmental stimuli, beliefs and ways of personal thinking. All three elements dynamically and mutually interact with one another, which results in forming either a basis for behavior or potential interventions to change behaviors (Bandura, 1978, 1986, 2001). Specifically, Bandura (1991) believes that SCT influences the operation of the causal agency residing in the forethought and self-regulatory mechanism that controls the shifting direction of the behavior. In fact, he argues the ongoing exercise of self- influence, environmental circumstances and judgment of one's behavior contribute extensively to a self-regulative mechanism that affects incentives and guides for purposive action.

Besides, based on the prior literature about SCT, two slightly different approaches have been illustrated. First, most of the studies referred to the main structure of SCT, focusing on the interaction between internal factors such as thinking process (e.g., attention, notice, memory, inspiration) and external components (environment) in determining human behaviors. Yet, the second group of researchers believes that SCT is an updated version of learning theory through Bandura's argument by utilizing self-regulation mechanism to explain future human behavior state, in a way that people learn through observing and imitating others by positive reinforcement. Although these two approaches seem to assist different aspects of SCT, both agree upon that behavioral change is affected not only by internal dispositions but also by external forces such as environmental influences. (Yoon & Tourassi, 2014).

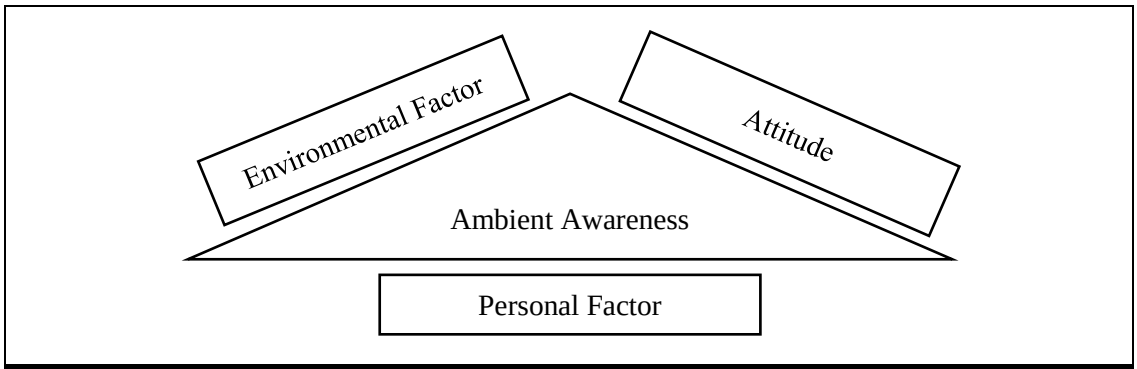


Figure 1. SCT Pyramid of Ambient Awareness

As noted earlier, the concept of ambient awareness refers to the awareness that individuals develop from communications that carry cognitive cues that occur around them (Leonardi, 2015). It is also true to claim that ambient awareness would be evolved as a result of communications that occur in public social networking such as Facebook (Thompson, 2008). These are other evidence that suggests that the grow of ambient awareness is also associated with the other virtual environmental platforms such as social commerce websites that people can post their opinions via question/answering, reviews, ratings, and images. By considering the self-regulation capability explained via SCT and the communications occurring in the new era of the environment (virtual environments), this dissertation claims that SCT has the capacity to explain the unique grow of ambient awareness in each individual. Indeed, SCT rationalizes the distinction development of ambient awareness as an exclusive product of sensing and exchanging ambient information for each individual through its ability to represent future human behaviors. As attitudes are unique and vary from person to person, ambient awareness development varies from person to person as different characteristics with different preferences (personal factors) can process disclosed information differently, with consideration of the virtual environment features. The unique feature of SCT that concurrently emphasize on social influence, internal (personal) and external (environmental) reinforcements explains the unique way in which individuals

acquire ambient awareness while, at the same time, has the potential to predict behavioral activities. Figure 1 shows the pyramid of distinctive ambient awareness emergence for any individual.

Indeed, this theory takes into account a person's determinants (i.e., knowledge, experience), which influences reinforcements, expectations, all of which shape a specific awareness about the situation whether a person engages in specific behavior and the perspective of why a person engages in that behavior.

In addition, considering ambient awareness as awareness grown by ambient communications (Leonardi, 2015), it is similar to the definition given by Pifarre et al. (2014) that outline cognitive awareness as self-achieved knowledge about others' knowledge, and the distribution of knowledge in collaborative social interactions. By utilizing SCT, individuals behave in a manner in which they consider beneficial to them by observing that others benefit from similar behaviors or by paying attention to public collaborations discussing the benefits of specific behaviors. Therefore, individuals' behaviors are directed by cognized forethought, and the self-regulatory mechanisms reside in the growth of ambient awareness, which is translated into the driver of individuals' behavioral changes.

3.3 Elaboration Likelihood Model (ELM)

Elaboration likelihood model (ELM) has been used by researches to predict changed attitudes in marketing and consumer-related research (Petty & Cacioppo, 1979, 1983, 1984, 1986). ELM model illustrates how cognitive cues (any persuasive information) can change one's attitude without the individual actively thinking about it. Additionally, there is this recent study argues the potential capability of cues allowing the recipient to adopt an attitude without deeply analyzing the main issue under consideration (Puhakainen & Siponen, 2010).

In ELM, elaboration is defined as the extent to which a person carefully thinks about an argument (Petty & Cacioppo, 1979). ELM or persuasion theory (Petty & Cacioppo, 1979, 1983, 1984, 1986) describes the impact of elaboration on the persuasion of individually-distinctive items on an individual's overall attitude.

Commonly, ELM explains how individuals process information by engaging in two cognitive processes in which attitudes are formed. These two processes mainly differ in the cognitive approach which an individual use to evaluate information (Petty & Cacioppo, 1986; Cummings & Dennis, 2018). These two processes have been called a central route and peripheral route. The primary route uses extensive cognitive processing that focuses on the actual merits and relevancy of the information presented to individuals whereas peripheral route emphasizes just about anything else that involves less intensive cognitive processing of situational cues through the use of stimuli or making a simple inference about the immediate consequences of adopting a certain attitude (Petty & Cacioppo, 1986).

Central route associated with the situation that the information is highly relevant, therefore, the strength of the factual arguments has the most significant impact on perceptions (Carpenter 2015; Schumann et al. 2012, Cummings & Dennis, 2018) while peripheral route is more likely used when the information is less relevant, so, other superficial factors would influence on perceptions (Petty et al. 1987; Schumann et al. 2012, Cummings & Dennis, 2018). The model suggests that the strength and persuasiveness of an argument are dependent upon the inclusion of specific relevant elements such as central relevancy of claim, data, and information, which is logical to the presented individual regarding his/her situation (Kim & Benbasat, 2006).

Individuals using the central route carefully review newly exposed information and consider its merits and weaknesses while using the peripheral route offers a way to quickly accept or refuse a piece of information without actively thinking. Therefore, as long as the growth of

ambient awareness as the result of exchanging the ambient information targets the individually-relevant logical arguments, in this case, it can be referred to customers' preference, and preserving the rationality to customers' needs, is likely to be processed through the central route. Whereas the ambient information relevant to the peripheral direction, persuasion processing induced via individuals' associations with positive or negative cues in the stimulus leads to form an initial impression about the argument disclosed within given ambient information. Although there are several various theoretical approaches to explain persuasions, they seem identical to ELM in a way that there are only two fundamentally "routes" to changing an individual's attitudes (Petty, 2018). As noted earlier, the central route emphasizes the information that a customer has about an object, or product under its own rationalized consideration that depends on its needs and personal factors (e.g., preferences). The other route, the peripheral route focuses about anything else rather than the individual's initial consideration (e.g., information about the previous customers on the product). Based on ELM, the route that is responsible for persuasion is a crucial determinant to direct the attitude change (Petty, 2018). Customers persuading the central route tend to make more permanent attitude changes than those follow the peripheral route. In fact, customers are influenced by peripheral cues potentially utilize peripheral route which allows them to make swift decisions rather than engaging them in broad cognitive thinking. Ambient information presented as the peripheral signals are likely to form initial impressions tending to have a potential effect on individuals' future observations and interactions (Petty & Cacioppo 1986, Good, 2000; Cummings & Dennis, 2018).

Figure 2 demonstrates the main argument underpinning ELM theory by depicting two cognitive processing routes that impact individuals' perceptions and, literally, motivate changed in the attitude.

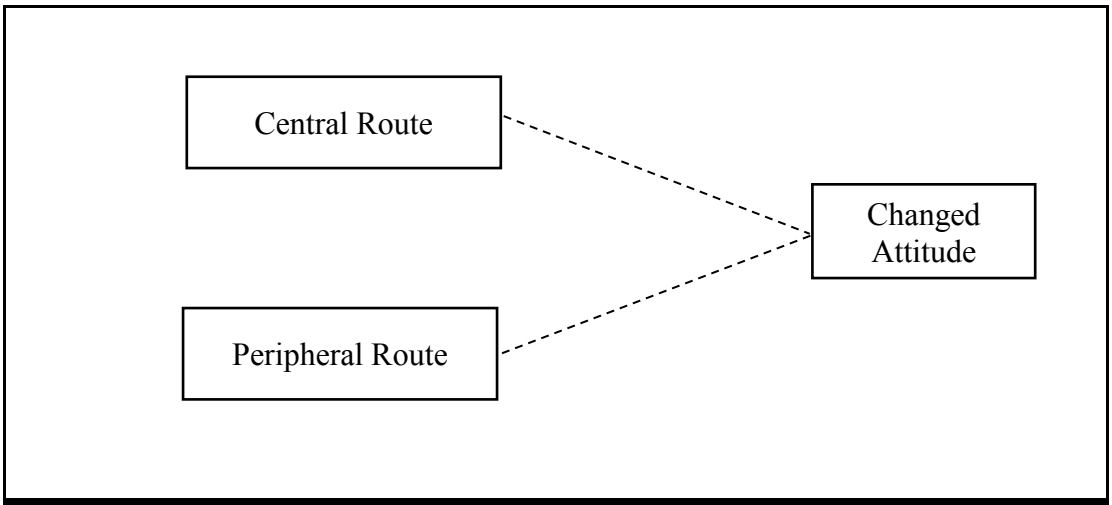


Figure 2. ELM Central Argument

Hence, when the depth of processing is high, the ELM describes it as the central route to attitude formation, in which the person carefully processes the logic of the information presented in the ambient environment and scrutinizes the rational relevancy of information. In contrast, when the depth of processing is low, the ELM describes it as the peripheral route sufficient to attitudes' formation, in which the person processes the information based on associations with fairly simple-superficial cues such as attractive images, evoking keywords, etc. and form the initial impression on the basis of these cues.

3.4 Research Model

3.4.1 Research Overview

As the primary outcome of the research should be the incremental advancement of understanding how to process research questions, it is equally critical to apply a consistent model of appropriate constructs based on influential theories to measure and collect empirical evidence to systematically answer the research questions. In the following section, this dissertation tried to remind its goals to conceptualize the best-fitted model. As mentioned in previous chapters, the

present dissertation is designed to clarify the extent that customers using social commerce websites are influenced by the development of ambient awareness (RQ1) and systematically examine the process by which ambient awareness affects overall customers' purchase intentions (RQ2).

Although a considerable amount of literature has been published on investigating behavioral changes by using a variety of theories such as the theory of planned behavior (Ajzen, 1985, 1991; Ajzen & Madden, 1986), the theory of subjective culture and interpersonal relations (Triandis, 1972, 1977), the transtheoretical model of behavior change (Prochaska & DiClemente, 1983, 1986, 1992; Prochaska et al., 1992; Prochaska et al., 1994), the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Cappella), social cognitive theory (Bandura, 1978, 1986, 2001) and the elaboration likelihood model (Petty & Cacioppo, 1979, 1983, 1986), it has conclusively been suggested that there are only a limited number of variables must be considered in understanding changes in and prediction of any given behavior (Fishbein et al., 2001). However, before conceptualizing the research model and associated hypotheses, it is necessary to explore the layers in which ambient awareness resides and begins to evolve to influence customers' attitudes to change toward purchasing. In fact, the notion of layers helps to rigorously investigate the complex concept of ambient awareness evolvement through ELM routes.

3.4.2 Ambient Awareness Layers

As stated previously in the literature review, several pieces of research have shown that ambient awareness operates as a great channel to deliver background information in notification systems (Bodnar et al., 2004). They compared ambient awareness to the scent-like sensing that has the ability to transfer the margin of individuals' attention to its dominant focus. It means that ambient awareness would work as a new solution to increase the efficacy of notification systems.

Thus, the recent evidence points to requiring the inclusion of ambient awareness growth into notification systems as an enabler to deliver surrounding cues.

In addition, McCrickard et al. (2003) proposed a model to classify notification systems based on three criteria. These three criteria cover the recipients' stages of attention. They are comprehension, interruption, and reaction. Comprehension can be defined as the suitability of the notification system to provide information cues in order to be understood, whereas interruption refers to the edge of focus transmission from the primary task to the notification. Accordingly, reaction arises from the desire of a rapid response to the notification.

Regarding the definition provided by Bodnar et al. (2004), messaging notifications through ambient awareness is associated with varying proportions of comprehension and reaction. Therefore, any notification mainly operates via two underlying layers that transmit the stage of marginal attention to the dominant one which is the cognitive layer and conative layer. The cognitive layer involves an individual's mind processing, while the conative layer involves reactional status. Considering ambient awareness development as the notification operation, these two layers of evolvement would explain the impact of ambient awareness effects on customers' changes of attitudes in a detailed manner.

To the best of our knowledge, most research that has been written on ambient awareness includes cognitive level of analysis by showing its potential role in relational maintenance (Lampe et al., 2006; Resnick, 2001; Zhao et al., 2011) and its capability to knowledge transfer (Dimicco et al., 2008; Leonardi & Meyer, 2015; Zhao et al., 2011). Additionally, Levordashka et al. (2016) added to ambient awareness definition by establishing it on passive relations in computer-mediated communications as a product of automatic, spontaneous inferences during browsing social web pages without deliberately intentions to do so. Clearly, these cases are sufficient to support the cognitive approach of ambient awareness effects.

The other proposed ambient awareness development effect that involves the conative layer relatively represents reaction status. Cvijikj et al. (2011) have been addressed the relationship between exposed internet-based information on social networks and its' influence on users' interactions. The impact of the ambient information on customers' behaviors has been exemplified far in marketing communication, specifically, to measure the effects of advertisements toward customers purchasing (Lariscy et al., 2009; Moro et al., 2016). As the consumer moves from simple liking of the product to establishing it as a preference, change of behavior is being emerged, parallelly, within improving the preference level (Smith et al., 2008). The research model has utilized both layers to have a better understanding of how ambient awareness is developing and influencing customers' purchasing intentions through cognitive and conative layers so that it affects either their mind processing stage or their reactional status.

Furthermore, this view primarily has been supported by a marketing researcher as well. McGuire (1968) is the first who introduced a similar multi-layer model to investigate advertising effects on customers' persuasion process. His proposed model mostly focused on the role that a variety of cognition processes play in customers' behaviors and then tried to predict the sequence of cognition including awareness, knowledge, liking, and preference. However, this dissertation research model worked to represent the effect of ambient awareness evolvement beyond the mere cognitive stage and included a conative layer to describe customers' reactions to a certain amount of ambient awareness development and its further impact on changes in attitudes.

Figure 3 illustrates the conceptual, integrative model that attempts to represent the ambient awareness development impacts in mentioned layers within borrowing fundamental concepts from SCT and ELM theories. It is worth to mention that combining SCT and ELM are vital to investigate the extent of ambient awareness development to navigate customers' change

of attitudes. Next section, this dissertation explains the use of each theory to conceptualize the model constructs and associated hypotheses more specifically.

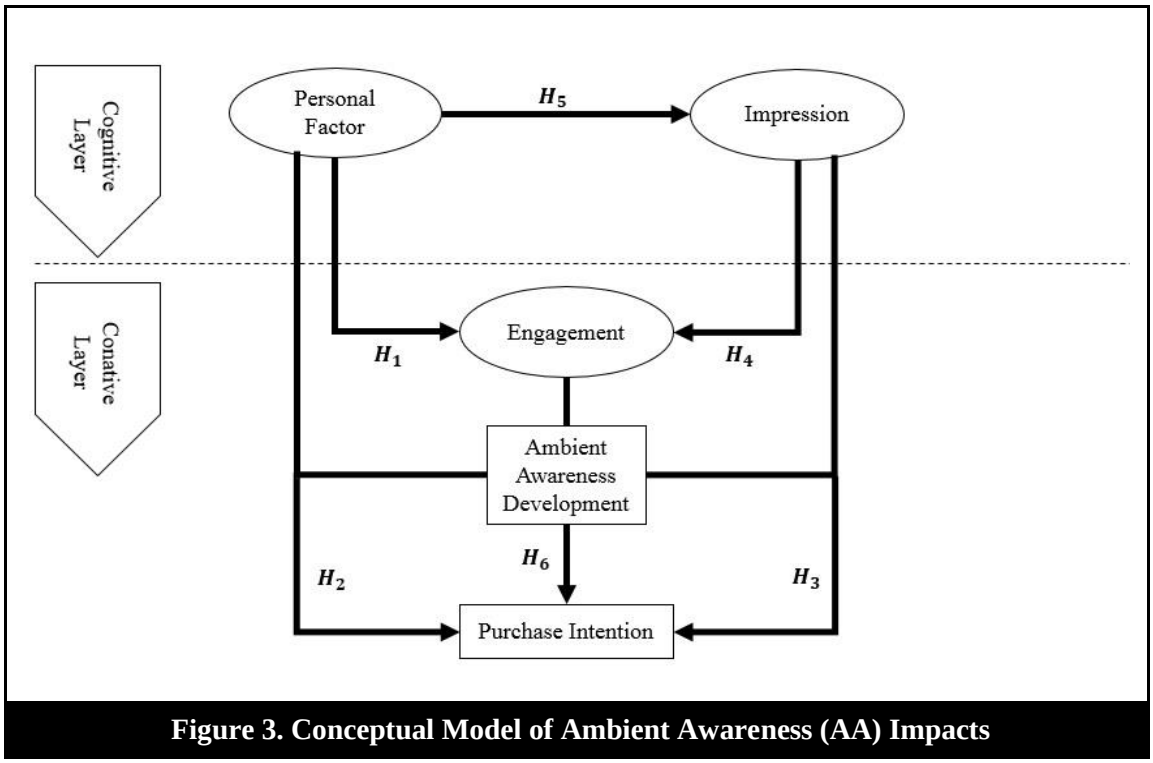


Figure 3. Conceptual Model of Ambient Awareness (AA) Impacts

3.4.3 Personal Factor Through Ambient Awareness Evolvement (Central Route)

According to social cognitive theory (SCT), a person's characteristic especially, its mindset including mind processing capability, rationalizing status, preferences, etc. is one of the main determinants of understanding human's behavioral change as the operation of self-regulatory mechanism (Bandura, 1978, 1986, 2001). Besides, personal factors are fundamental to distinguish whether ambient information has been processed through the central route or peripheral route. Central to ELM, when an issue is highly relevant, an individual is more likely to use the central route as the strength of logical-relevant information has the highest impact on perceptions (Carpenter, 2015; Schumann et al., 2012).

However, receiving sufficient information which represents the level of ambient awareness development through personal factors is challenging since this process requires comprehensive information about the individual's background and the relative mind processing that serves as a basis on which ambient awareness develops and leads to further changes of attitudes. In the case of ambient awareness development and its impacts on customers' attitudes in terms of purchase intentions, the inclusion of information such as customers' profiles and their primary needs or purchase preferences may perform as the logical link to the personal factor that affects the purchase intention.

Furthermore, while some studies are consistent with the sequence of cognition to conation under systematic conditions (Petty & Cacioppo, 1979, 1983, 1986a, 1986b), other studies in the advertising field stated that persuasion process does not always follow this order, and that conation can precede cognition when the customer involvement is low (Krugman, 1965). Thus, in some cases where the information is personalized, highly relevant to the personal factor, and the other available information in the environment (i.e., social commerce websites) have low involvement effect, there is a chance that customers directly change their attitudes without any further engagement. In fact, ambient awareness evolvement is likely, to positively impact customers' attitudes who perceived the ambient information more relevant, and the strength of the impact is associated with the strength of the relevancy to customers' personal factor. While, in some cases, ambient awareness development may impact the conative layer as well as the cognitive layer in a way that customers may wish to persuade further information and interact to other sources of information available in the environment. Specifically, customers may engage with additional information in the process of decision making and changes of attitudes (e.g., investigate previous customers' question/answering, etc.). The following hypotheses resulted from noted views.

Hypothesis 1- The personal factor through ambient awareness development within the central route is positively associated with customers' further engagement rate.

Hypothesis 2- The ambient awareness development impact within the central route that is highly relevant to the personal factor is positively associated with customers' purchase intentions.

3.4.4 Impression Forming Through Ambient Awareness Development (Peripheral Route)

The widespread use of the term impression is referred to the perception of other people about a person, object or event build upon classified information that is accessible to the others (Goffman, 1959).

Beyond traditional definition, impression formation, which often happens in the physical world through face-to-face meetings, interactions to build interpersonal relationships, has recently been included in most websites. The impression formation is achieved in the virtual world may consist of much information generated by others (e.g., sharing others' information, photos, videos, and sending/receiving messages) so that they allow forming initial impressions about the person or the object itself without any physical contacts. Also, it should be noted that recent evidence suggests the importance of the first impression, in a way that it may not be significantly changed over time (Gregg et al., 2006; Wyer, 2010). Indeed, the first impression can have a significant effect on the individual, so that future observations and interactions are influenced by this initial impression (Petty & Cacioppo, 1986; Good & Gambetti, 1988). For instance, previous studies reported how corporate posts on social media have helped in building a favorable brand by utilizing the influence of impression of audiences' perceptions about the corporate brand (Spear & Roper, 2013). Others noted that future team interactions are built upon the first impression's basis (Tidwell & Walther, 2002).

This research focuses on the initial impression formation on social commerce websites grounded on the available ambient information throughout website features (i.e., shared images, keywords, rates). Considering that literature illustrated how individuals form impressions from direct encounters and meetings, and consequently, how they perceive and interpret "cues" into their forethought (Donath, 2007), in the computer-mediated environment, individuals' perceptions can be formed on whatever cues are available to them (Hancock & Dunham, 2001). Hence, it is consistent with our definition of sensing and developing ambient awareness as the result of the employment of any cues and information in the immediate surrounding of customers. Customers are likely to be prone to making decisions based on perceptions motivated by their first impressions formed rather than a rational path to process information. While developing a perception, a claim of expertise may be enough to make a claim believable (O'Keefe & Jensen, 2008) and motivate customers using peripheral processing to set their future attitudes.

Hypothesis 3- The first impression generated through ambient awareness development within the peripheral path is positively associated with customers' purchase intentions.

In the meanwhile, customers persuade the peripheral route as the result of ambient awareness development may seek more information before taking any attitude toward purchasing. That means, in some cases, the ambient awareness development in the peripheral route would involve the conative layer that, consequently, leads customers to further engagement in their decision-making process (i.e., customers may wish to know more about the provided information by exploring previous customers reviews). In other words, the impression generated through the customer's further interactions and engagements (e.g., reading others' comments, sharing images, asking questions and gathering ideas) is expected to influence the customer's purchase intention.

Hypothesis 4- The ambient awareness development through first impression formation via the peripheral path positively associated with customer's further engagement.

Likewise, initial impressions may involve “liking” of customers by employing trustworthiness and additional information in a form that makes a rational link to their initial preferences and, ultimately, personal factor.

Hypothesis 5- The personal factor is positively associated with the formation of the first impression generated by ambient awareness development.

3.4.5 Customers Engagements

There is harmony among social scientists that a multidimensional perspective on the engagement with cognitive, emotional, and conation dimensions exists (Vivek et al., 2012), where the specific expression of these generic dimensions may vary in a specific context. Indeed, Brodie et al. (2011) demonstrated that different psychological states generate different levels of customers’ engagements as a dynamic process that creates values. This dissertation considers customers’ engagement as an iterative process representing the conative dimension to manifest any further changes in customers' attitudes. Hollebeek (2011), defined the customer’s engagement as a state in which the motivational, brand-related and context-dependent state of mind of the customer is expressing, in terms of a degree of activation, identification, and interactions. It adds up to the traditional concept, which includes only the customer’s satisfaction and its emphasis on the outcome of customers' attitudes (Hollebeek, 2011) and, ultimately, generating revenues (Hollebeek, 2011; Hollebeek et al., 2016). Online shopping, which permits customers to share and interact with each other, would help customers to acquire a sensemaking conclusion through collaborative sharing content and questions answering (e.g., text, video, and images). This engagement that contributes to ambient awareness development positively influences customers' purchase intentions.

Hypotheses 6- The customer's engagement through ambient awareness development is positively associated with the customer's purchase intention.

CHAPTER IV

METHOD

4.1 Research Design

In this dissertation, we used a quantitative method that allowed us the capability to perform exploratory, diagnostic and predictive analyses (Lee, 1992). Quantitative methods help researchers to understand better the relationship between theory and observation using empirically collected data. Generally, the quantitative research method is considered to be "objective" derived from the natural sciences, following the positivist approach (Lee, 1992; Bryman, 2016). Indeed, researchers utilize quantitative methods to explore relationships among theorized constructs that emphasize objectivity, measurement, reliability and validity based on statistics (Lee, 1992).

While this dissertation aims to explore the development of ambient awareness in situations where information is propagated ambiently, it also seeks to examine the impact of the developed ambient awareness on attitude alterations. To achieve the goal, this research developed and conducted an experimental study in which participants have presented information ambiently over three experimental phases so that we would be able to investigate the impact of ambient awareness growth by comparing the outcomes of the contributions under different information to subjects. The controlled experimental setting has been used to run various information treatments within an online-survey instrument since it is difficult to obtain naturally occurring data of customers' behavior under different information presidency (Hashim et al., 2017). An experimental approach has been employed in this study since it allows the researcher to have

control over the treatments, to set up a direct comparison between the treatments, and to minimize any bias in the comparisons (Oehlert, 2010).

The other advantage of the experimental study is that it allows the researcher the ability to make robust implications about the nature of differences among variables within the experiment (Oehlert, 2010), and limits the effect of retrospective bias (Norheim-Hansen, 2015) by controlling for external variables (William et al., 2002; Valentini et al., 2018). Specifically, experimental based methodologies have been long established in online communications, social media research to understand the impact of experimentally controlled variables on the dependent variables (e.g., Xu & Wu, 2015; Kim, 2016; Cuomo et al., 2016; Jin, 2018, Valentini et al., 2018). This research reports on several experiments that examine the influence of the ambient awareness growth for purchase intentions toward three random multivitamins by gradually presenting differed information in three treatments (i.e., steps). This strategy picked to establish more rigorous controls through experimental design (Franz & Robey, 1986).

To test our hypotheses, an online experiment was designed to record the participants purchasing attitudes in choosing a nutrition supplement, specifically a multivitamin with respect to the experimental treatments. The multivitamin product was selected for implementing this research as it has several attributes that may impact the customer's attitudes. The distinct set of attributes also allows discriminating customers' decision making and the purchasing process possible causes (Lambert-Pandraud et al. 2005). Additionally, another reason to select the multivitamins as the research product of interest is that it is not, typically, perceived as primary needs/necessity for customers. Usually, the necessity-type products have a limited set of attributes and hardly are capable of being replaced with another type of product. For instance, if a person needs potatoes for its dinner, it is unlikely either the person looks for a new replacement for the regular potatoes as he/she always used to buy or search for a better type of it with different

properties due to the limited number of attributes. In addition, the multivitamin is not a necessity for daily living. When customers seek to buy a primary need-type of product, barely, notice to other detailed information provided the background. There would be little chance that customers gave up their routine product type/brand with a specific characteristic and consider other alternatives to substitute the usual product. However, a product like the multivitamin with multiple attributes, there is always a chance that the customer compromises one attribute to the other attribute. For example, the multivitamin has several attributes such as price, size, dietary type, format, ingredients, etc. A customer may replace its routine multivitamin with less expense to buy a more expensive one with a specific ingredient that turned out it is more suitable for that customer. Thus, we believe a multivitamin product meets our research purpose as it is a product that customers may consider alternatives as well as it has enough attributes customized for any characteristics.

Furthermore, this is consistent with this dissertation research model that multiple products' attributes help this study to evaluate and differentiate customers' decisions. In fact, customers could consider additional detailed information/properties about such products as multi-vitamins have multiple sets of attributes that distinct customers' choices. However, products like primary needs have limited attributes that won't allow customers to replace alternatives with different properties (e.g., a bottle of water). Also, since the multivitamin is a multi-gender product (e.g., some products are dedicated to a unique gender such as grooming stuff that is for men), it enables this study to randomize respondents without any impact on the dissertation objectives via preventing selection biases.

Overall, we aim to implement experimental treatments by manipulating the available information of three random multivitamins for participants in three main steps in our experiment. In fact, participants are exposed to randomized, prepared scenarios/conditions, including

randomized multivitamins. Each scenario is associated with three randomized products that would contain three main steps of information treatments. Generally, each experimental step entails the presentation of manipulated ambient information according to the conceptual model of ambient awareness developmental layers presented earlier. Table 1 summarizes the theory-based stages to perform treatments for this research experiment. To proceed, participants are starting, initially, with the information associated with the cognitive layer, in particular, the personal factor, including a set of the necessary information about the multivitamin concerning the participant's gender. As noted earlier, this is the first phase of the experiment that starts with the information about the multivitamin attributes such as price, size, dietary specialty, format, ingredients. This information forms a customer's initial preferences typically to buy a multivitamin representing its personal factor. In the second phase, the displaying information includes the information that collaborates the cognitive-related ambient information to form impression criteria and added to the personal factor-related information. In the third phase of the experiment, the additional portion of the information is presented to participants. This information includes the information previously displayed at the first and second phases plus more detailed ambient information regarding the conative layer as it usually requires deep customers' engagement with the multivitamin profile. The last phase was designed to evaluate the ultimate ambient awareness evolvement in participants by full exposure of the ambient information including the basic properties of the product, the background information about the product that forms the initial impression such as the overall rate and the number of customers that wrote a review for the product, finally, the more in-depth detailed information that generally requires a customer to engage in the profile webpage of the product such as reading previous customers' comments (i.e., online reviews).

In summary, there were three different phases of information presented in each random scenario/condition. After each phase, the participant's purchase intention was captured to compare and measure the impact of ambient awareness growth in each phase. It allows us to conduct further comparative statistical analyses at the experimental stages for ambient awareness development. Indeed, this research compares the information presentation and the resulting ambient awareness change in each scenario to measure the impact of ambient awareness development on customers' purchase intention.

Table 1. Experimental Stages: Level of Ambient Information in Each Condition

Scenario/Condition X	**The layer involves AA development**	**Variables involvements**
Ambient information Stage 1	*The cognitive layer*	✓*Personal factor*
Ambient information Stage 2	*The cognitive layer*	✓*Personal factor* ✓*Impression formation*
Ambient information Stage 3	*The cognitive* *The conative layer*	✓*Personal factor* ✓*Impression formation* ✓*Engagement*

4.2 The Experiment Instrument

This dissertation develops a survey platform using Qualtrics as the foundation for the experimental phases and also collects participants' responses to the experiment questions along with participants' demographic information. It also provides several features to achieve the reliability and validity including randomization functions for our experiment. This randomization function used in this experiment enables us to explore all experimental scenarios without introducing effect bias. In addition, it provides features that have been used to design several scenarios under each phase that were randomly assigned to participants. Therefore, this dissertation uses Qualtrics as the platform to create the experiment phases with three randomized multivitamins in a scenario which we will call condition henceforth.

For the experiment, as noted earlier, there were three main stages/phases for each participant. We provide and display a different set of information to each participant during each step of the experiment. Consistent with the research model, in the first phase (we call stage 1), the information presented is about the essential criteria of three multivitamins that have been shown to the participants. This information would be general properties that any customer would have in mind about a multivitamin without any interaction with the environment. For instance, this general information contains the price, size, type, and size of the multivitamin. For the second treatment (we call stage 2), additional information presented that includes the commercial picture of the multivitamin, the commercial description provided by the vendor, the overall rate of the multivitamin, the number of customers' reviews in Amazon website (as an example of a known and available online shopping website) displayed to respondents. During the third treatment, we reveal more detailed information to the participant. This type of information would typically be acquired ambiently by the customers during a more prolonged interaction with the online shopping website (this information only is available when a customer clicks on the multivitamin name on Amazon) such as online reviews, the uploaded pictures that have been taken by previous customers. As noted earlier, during each treatment, the available information has been designed to allow us to examine different levels of ambient awareness growth in each person based on the information provided for them. In fact, the treatments have been designed for twelve different multivitamins. Half of them are typically intended to be used by males and the other half associated with female multivitamins. Each scenario/condition consists of three randomly selected multivitamins out of the basket of twelve (12) multivitamins. In total, forty (40) scenarios/conditions have been developed based on the combination of 3 product selection out of 6with respect to each gender category to observe the experimental results. The selection process is explained in more detail in the following section (4.4).

After designing the experiment treatment stages and conditions via Qualtrics, this dissertation employed MTURK (Amazon Mechanical Turk) as an online panel service to recruit unbiased participants that are accessible to a random sample of the population nationwide. MTURK has been shown as a reliable source of data collection by a myriad of research studies and in various fields of study (Kees et al., 2017; Hauser et al., 2016; Casler et al., 2013). MTURK is a fast-growing method of internet recruitment, where employers/researchers post "human intelligence tasks" for paid workers to complete a task. Researchers have found MTURK to be a productive forum for recruiting eligible participants to complete computer-based tasks such as filling out a questionnaire that has been said would avoid selection bias (Casler et al., 2013). In the process of completing the experiment, participants need to fill an agreement explaining the survey scope, participants' compensation amount and the possible risks of survey answering. Therefore, respondents decide whether or not to participate based on a set of incentives including the paid amount for completing the questionnaire or the experiment set designed by the researcher. This incentive mechanism and the description of the task (i.e., describing the survey and its purpose for the research) are described to the participants before they consent to participate. The other advantage of employing MTURK as the recruitment environment is that it assures complete anonymity of the participants who can only be identified through a worker ID (Valentini et al., 2018). At the end of the study, MTURK's internal and external validity has been confirmed by literature that participants are much more demographically diverse than participants through traditional methods (Casler et al., 2013; Horton et al., 2011; Paolacci et al., 2010; Buhrmester et al., 2011).

4.3 Participants

MTURK recruit participants for this dissertation. People could participate in the experiment from the nationwide pool of potential participants. However, since MTURK is integrated with other Amazon services that require participants to have an Amazon ID, their demographics and other characteristics can be reliably ascertained. Due to the age restriction for using specific nutritional supplements, we limited the acceptable age for our participants to be between 18 to 50. Additionally, having Amazon ID means that our participants have already used Amazon before and that they are familiar with online shopping. At the beginning of the experimental phases, all participants are required to agree upon a consent form that describes the experimental process and informs them about the research goals. The consent form clearly indicates their rights to privacy and anonymity. Participants are told that they can freely abandon the survey at any time without any consequences. Furthermore, we designed the experimental survey to assign the relative multivitamins based on participants' gender. So, the respondents grouped and directed to the appropriate experimental condition, that displays the relevant multivitamins concerning the gender.

4.4 The Experimental Procedure within Online Survey

For processing the experiment through Qualtrics, we implemented three stages of the experiment in a way that each step has been imposed in the online survey as a different question section. Figure 3 shows more detail about the flow of the experiment within the online survey. This online survey consists of three sections. The consent form and the screening section are distributed to all participants as these sections aimed to collect general information about the experiment agreement, demographic, online-shopping experience, and additional relevant questions that enable us to ascertain participants' customized preferences in online shopping.

However, the last part of the survey randomly assigns each participant one of the experimental conditions. Thus, any respondent that finished the first two sections randomly routed to the previous section, including the experimental stages (one of twenty experimental conditions for each gender group, resulting in forty experimental conditions in total). It was achieved by using Qualtrics randomization function so that each participant directed to one specific experimental condition. The researcher published the link of Qualtrics survey through MTURK that addressed participants to the central survey. For this purpose, the researcher created an account with dedicated funding assigned to anyone recruited for completing this research task. Based on Zhao (2015), any questionnaire regularly consists of four sections:

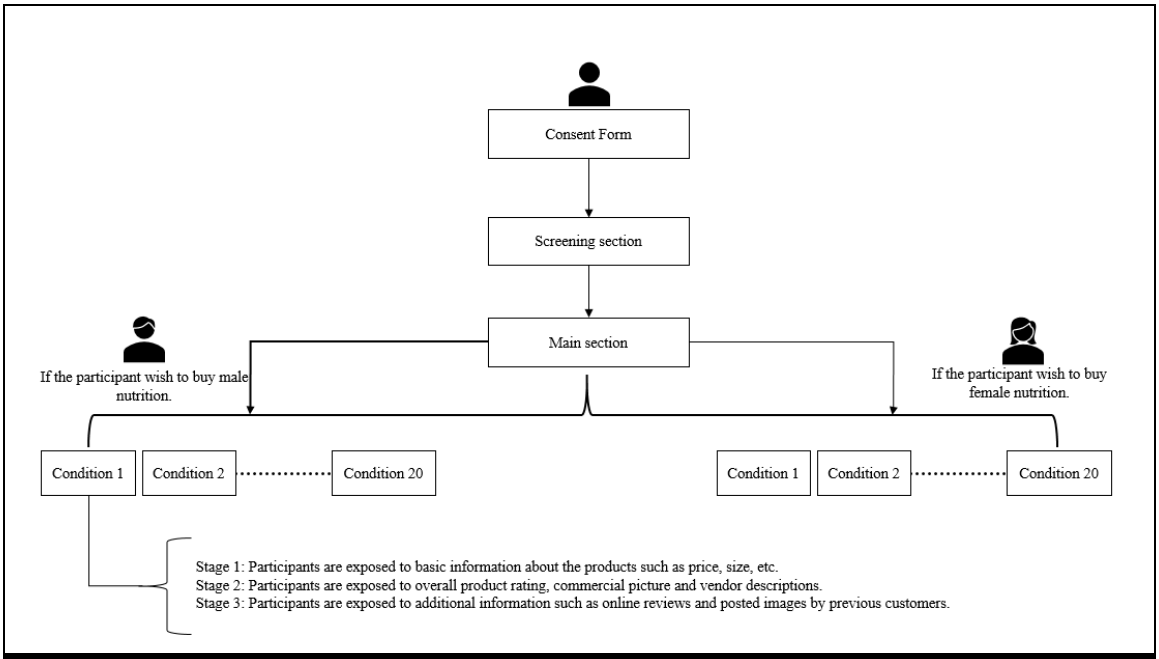


Figure 4. The Survey Logical Procedure

The first section encompassed the consent form; the second was the background section consists of basic demographic questions; the third section was the screening section, which covered questions about participants' online shopping experience, and finally, the main body

encompasses the experimental sections (Zhao, 2015). It is worth mentioning that this experiment including the survey, was reviewed by IRB office and received IRB exemption validation number (IRB number: 20-0006).

After requiring participants to read and sign the consent form, they were required to complete the screening questions that cover demographic and necessary information regarding their online shopping background. It was done to assess the participants' basic information and their experience regarding online shopping. The use of demographic and online shopping-experience here was consistent with the conceptual model as control variables. The survey instrument is attached in Appendix A.

Subsequently, participants were routed to the body of the experiment. The main body of the experiment includes three stages that each has been designed to expose the different amounts of ambient information. In the first stage, respondents were asked about their preferences through a series of questions that required them to sort five attributes relates to the desired multivitamin characteristics. We chose five attributes as the starting point since it has been confirmed that people could concurrently hold only 7 ± 2 pieces of information in their working memory (Miller, 1956). Then, participants have presented the same attributes for different three randomly selected multivitamins (i.e., three randomized products) that were considered the low level of displaying ambient information to respondents, which was associated with measuring the impact of ambient awareness development via participants personal factor described in the research model. In fact, it was consistent with the purposed research model to capture participants' preferences and their purchase intentions right after displaying the information based on their personal factors. The main idea here was that we, incrementally, display ambient information associated with different layers and concepts in the conceptual model at each stage, speculating that ambient awareness development in each step impacts the final purchase intentions. Hence,

we were able to measure the impact of ambient awareness development in each stage by comparing participants purchasing intentions at the end of each stage. Any possible change in their purchase intentions is tracked throughout the experimental investigations by controlling other variables.

Accordingly, we randomly chose six multivitamins from the primary search on Amazon using the required keywords (i.e., Multivitamins for men/women) to be employed for the experimental conditions. Since on a typical Amazon product page, typically three products are visible without any customers' additional effort (i.e., mouse movement), it was decided to randomly display 3 out of 6 products to participants throughout the entire experiment process. The reason we picked six products as the total number of products employed in this experiment that it allows being secure from any selection bias in the conditions. Thus, the number of combinations (6 combinations of 3) produces 20 conditions for each gender group. Each gender group was directed to different experimental conditions right after the screening phase while the multivitamins are specified for each gender separately.

$$\binom{6}{3} + \binom{6}{3} = 20 + 20 = 40$$

- The number of multivitamins that randomly assigned to female participants who wish to buy products containing nutrition =6
- The number of multivitamins that randomly assigned to male participants who wish to purchase products containing nutrition = 6
- The number of multivitamins that are shown randomly in each condition = 3
- The total number of conditions assigned to female participants who wish to buy multivitamins = 20

- The total number of conditions assigned to male participants who wish to purchase multivitamins = 20
- The total number of conditions for this experiment = 40

In fact, the level of ambient information that is available for participants in each stage of the experiment is manipulated based on the research model constructs in different ambient awareness development levels based on the research model. Figure 4 illustrates the general design to perform the experimental treatments in each stage within a condition. So, each condition with three steps covers all factors purposed in the research model, which are a personal factor, impression, and engagement factor that is hypothesized to be associated with the impact of ambient awareness development on the purchase intentions.

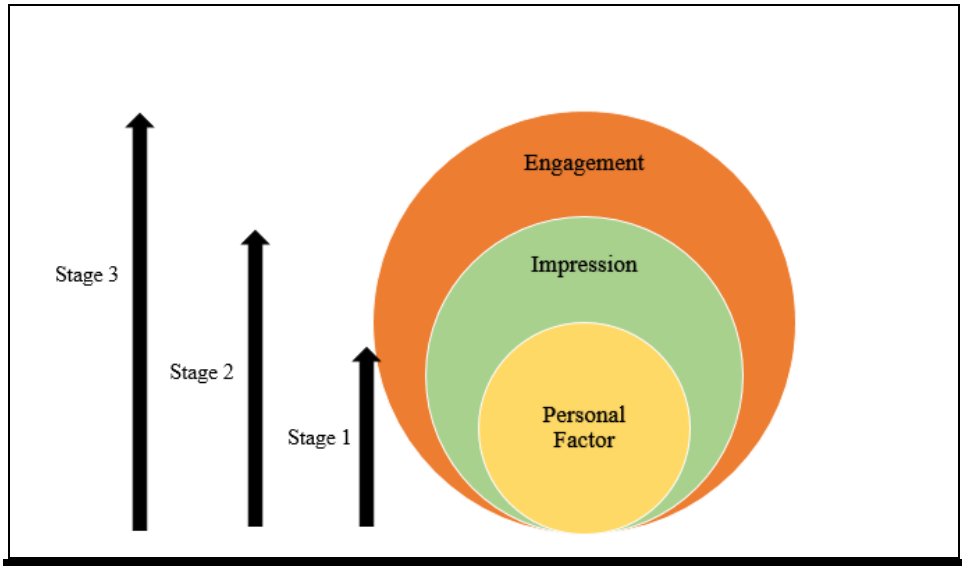


Figure 5. The Experiment Progress for AA Impacts

For the first treatment, participants are shown the essential descriptions for each of 3 random multivitamins that were assigned from the basket of six products based on the chosen gender group. The description includes the primary five attributes, such as the price, name

(brand), ingredients, quantity and the type of material. Figure 5 shows an example of what a respondent sees at the first stage. This step is an attempt to compile and assess participants' personal expectations based on their individual characteristics. Using this approach, we were able to present ambient information associated with each layer that is responsible for the ambient awareness development in the experimental stages to participants.

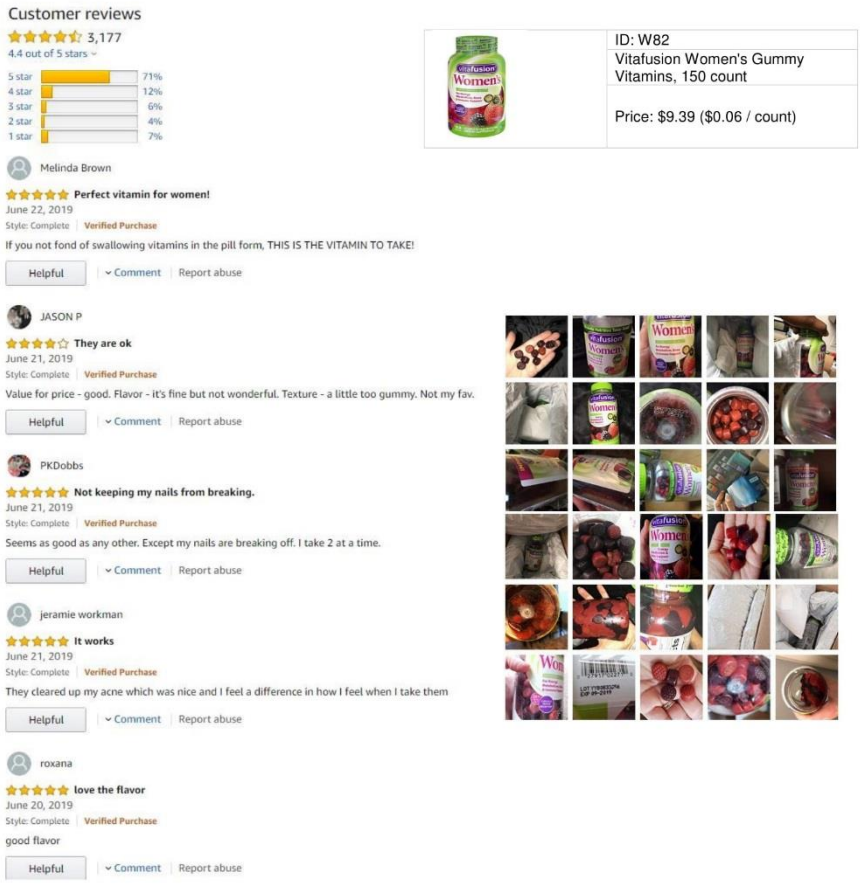
In the second step, as shown in Figure 5, participants are presented with the factors from the research model that is relevant to the cognitive layer of ambient awareness (i.e., personal factor and impression factor). In other words, participants are exposed to the ambient information that we believe affect ambient awareness development through personal factors and impressions formation in the cognitive layer. In this regard, products that were formerly represented to participants in the first stage with necessary information relevant to their initial preferences displayed again with some additional information that is regularly provided by Amazon. This information includes the relevant description about the product vendor, previous customers' rankings (customers overall rates) and the total number of available reviews that are assumed to be responsible for ambient awareness development within the impression formation as representing information that may not have been produced by other customers rather, they were generated by vendors to deliberately create desired impression among the customers (In order to maintain the validity of our experimental study, we try to capture the same information that is available on Amazon when a customer searches a product so that the participant is only exposed to the information related to their initial preferences representing their personal factors). Figure 6 demonstrates an example of information displaying in stages 1, 2 and 3 of one product.

ID	**W82**
Name	Vitafusion Women's Gummy Vitamins
Size	150 count
Format	Gummy
Dietary Type	Gluten Free
Price	$9.39 ($0.06 / count)

Ingredients: Retinyl palmitate, ascorbic acid, cholecalciferol, dl-alpha-tocopheryl acetate, inositol niacinate, pyridoxine HCl, folic acid, cyancobalamin, biotin, calcium d-pantothenate, tricalcium phosphate, potassium iodide, chromium picolinate, choline bitartrate, inositol niacinate, boron citrate, glucose syrup, sucrose, water, gelatin; less than 2% of: blend of oils (coconut and/or palm) with beeswax and/or carnauba wax, citric acid, colors (blueberry and carrot concentrates, lycopene, purple carrot juice concentrate), lactic acid, and natural flavors. Contains tree nuts (coconut).

An example of stage 1

An example of stage 2



An example of stage 3

Figure 6. An Example of the Experiment Stages

The reason that we chose to display the same information as Amazon would without any changes was to keep the experimental condition precisely similar to the actual situation that an individual would have experienced in real-life online shopping. Indeed, Bhattacherjee (2012) noted the importance of the relevance of scientific research to reality, which leads to building an improved foundation for the study. Basically, the detailed ambient information of three randomized multivitamins gradually was added in each stage that was the web content regularly, loaded onto the customer's browser after searching the multivitamin. After displaying the basic

properties of the multivitamins in the first stage, a portion of ambient information was exposed to the participant that is typically available for any customer as the background content on the loading page. Indeed, this added ambient information in the second stage is responsible for developing the ambient awareness utilizing the cognitive layer without requiring the participants to further engage in the online shopping website (i.e., any click on the product profile web page). The ambient information in the second stage of the experiment includes the full description of the multivitamin by its vendor, the business image, previous customers' overall rating, the number of total available reviews for the multivitamin. Moro et al. (2016) confirmed that visualize (e.g., name, image) and interacting (e.g., customers rates, the number of reviews) metrics are responsible for customers' first impressions. Parameters representing each stage of the survey are reported in Table 2.

Table 2. The Survey Structure

Stage	**Name**	**Type**	**Source**
First section	Consent form	• Agreement	Schmidt, 1997
Screening section	Control variables	• Gender • Age • Education • Internet using experience • Online shopping experience	Venkatesh et al., 2003 Bandura, 1977 Miller, 1956
The Experiment Stage 1	Basic information relevant to personal preferences	• Name of the product • Price of the product • Size of the product • Format of the product • Diet type of product	Walther & Bazarova, 2008 Bandura, 1977
The Experiment Stage 2	Display additional information related to ambient awareness development association within impression formation	• Customers number of reviews • Commercial image • Customers overall rating • Product descriptions provided by the vendor	Goffman, 1959 Donath, 2007 Gregg et al., 2006

The Experiment Stage 3	Display additional information related to the ambient awareness development association within customers further engagement	• Top 5 most recent online reviews • Uploaded images by previous customers	Hancock & Dunham, 2001 Gregg et al., 2006
The Experiment Stage 1, 2 & 3	Purchase intentions for all three multivitamins shown in each stage	• Based on five Likert scale	Jamil & Mat, 2011

It is worth mentioning that participants were asked about their initial product preference at the first experimental step. The initial preference of participants to buy a multivitamin in terms of the basic properties was measured using five Likert-scale to track respondents' purchase intentions. To fulfill our experimental goals, for measuring the ambient awareness development impacts on the conative layer, in the third stage, participants were presented with the information that is ordinarily available when customers interact more closely with the product web page on the online shopping website (i.e., Amazon). The uploaded images and the top five most recent online reviews by former customers were picked to add for this phase of the experiment. In fact, this information has been considered as evidence of participants' engagements since this information is visible only through clicking on the websites. Thus, it requires customers to involve in the multivitamin profile beyond the cognitive layer (looking into the initial page content that is loaded on the browser after initiating the search of the product) and engage further (i.e., here by clicking on the multivitamin profile webpage in an online shopping website). Same as previous stages in the experiment, participants once more were asked to rate the most helpful ambient information presented to them in this experimental phase right after revealing the ambient information that is relevant to the development of ambient awareness associated with the conative layer in the research model. It is worth noting that while time spent online is an indicator

of participants' involvement, our experiment allows for monitoring and collection of the time spent during each stage (Laurent & Kapferer, 1985) for further analysis.

4.5 Pre-Test

The questionnaire designed based on the three main sections noted earlier. The items used in the questionnaire to operationalize the research purposes and constructs consistent with the research model were adopted from relevant prior literature to understand the research concepts and measure the hypotheses. After the development of the initial instrument, a pretest was conducted to include the suggestions of the advisory committee on the topic. The pre-test was administered to one IS professor and thirteen IS Ph.D. students. They were asked to review each item carefully and provide feedback. The feedbacks allow us to revise items to be validated and well- understood (Straub, 1989). To tailor the instrument, the advised wording changes were made to keep the structure of sentences consistent along with the survey flow. The pre-test is specifically valuable to ensure that items used to measure are reliable and validated (Lin & Hsieh, 2011).

4.6 Pilot Test

After revising the questionnaire based on the pretest feedback, the link of the survey distributed among IS graduate students and a portion of a consultant company employees to conduct a pilot test with a variety of demographics such as age, gender, and education. These individuals have been asked to complete the questionnaire and then, carefully review each part and note their comments in a comment box that has been added at the end of the questionnaire. Hence, this would ensure that there are no significant issues in the flow of the survey, precisely the experiment conditions and the way that each stage is represented to the respondents. Based on

24 responses, the pilot test reported that the whole questionnaire contains any technical problem. However, there were some requests to clarify some of the sentences and wording again which has been taken care of. Overall, the pilot test demonstrated the instrument's high reliability and validity.

4.7 Data Collection and Preparation

Once we remained to ensure the instrument and the items representing the research constructs in the questionnaire, the researcher set MTURK account to recruit the individuals fitting this research purpose. Accordingly, the researcher published the questionnaire link only for the individuals locating in the US with the age range of 18 to 50. For the higher reliability, the project was also limited to be accessible for individuals with an equal or higher approval rate of %85. This rate collectively shows each individual approval rate form its past performance on MTURK tasks. The reward for completing the project on MTURK was 60 ($0.6) cents per individual. After the survey was launched and managed on MTURK, a total of 1200 MTURK users responded to the task and their responses recorded at the researcher secured Qualtrics account.

After a careful initial screening of the data obtained, it was discovered that only 769 responses are valid to use in this research. First, we removed 126 responses that were completed under 3 minutes since the standard responding time for finishing the survey was estimated at 8 minutes. Therefore, the responses with the duration time of 180 seconds may include several errors due to the respondent's negligence. We also added several trap questions along the survey to discern the reliability of the responses. So far, another 286 replies were removed from the database. After removing the responses containing missing data, a total of 769 valid responses remained, thus resulting in a response rate of %64.1.

4.8 Data Mining

Alongside the data that was collected, all the characteristics of multivitamins' information that were exposed in each stage analyzed, and the appropriated scales extracted. This approach is consistent with the research goals to deeply understand the presented information in each step of the experiment to correctly evaluate the result of each treatment per condition as data mining typically assists data understanding, data preparation, modeling, and evaluation (Han et al., 2011). To process, we analyzed multivitamins' information that was used in each stage of the experiment that is consistent with our research questions to see if the ambient awareness development in each step of the experiment would eventually affect the customers' decisions or here, the purchase intentions toward any specific multivitamin. The data features that were used to evaluate participants' treatments in each stage are described in Table 3. It should be noted that we utilized a text mining method in R to compute the review's negativity/positivity indexes for each multivitamin. These measures are the basis for measuring the experiment treatment performance in each condition. Besides, any of the followings can be used as an output to predict the model's functionality.

Table 3. The Multivitamins' Features in Each Stage of the Experiment

No.	Name	Stage 1	Stage 2	Stage 3
1	Product ID (random ID)	✓	✓	✓
2	Price per serving	✓	✓	✓
3	Dietary format (regular or not)	✓	✓	✓
4	Type (pill, capsule or gummy)	✓	✓	✓
5	Number of words used in the ingredient's description	✓	✓	✓
6	Number of words used in the description provided by the vendors	-	✓	✓
7	The product overall customers rate (out of 5)	-	✓	✓
8	The product total number of available reviews	-	✓	✓
9	The product reviews positivity index	-	-	✓

10	The product reviews negativity index	-	-	✓
11	Average of five available online reviews for this experiment	-	-	✓
12	Number of displayed images uploaded by previous customers	-	-	✓

4.9 Measures

The questionnaire consisted of items that were designated to measure Personal Factor (PF) to buy a multivitamin, these items basically intended to measure the degree that basic information respect to the primary characteristics of a multivitamin is important for the individual (i.e., how important is the price, size, format type, dietary type, etc.), Impression (Imp) formation, these items were considered to measure the degree that additional information that usually is displayed to create the first impression are important/helpful for individuals (i.e., how important is the commercial image, vendor description, overall rate of the multivitamin, etc.), Engagement (Eng) factor, these items were specified to measure the degree that the information shown as the result of more interaction within the multivitamins are important/helpful for individuals (i.e., online reviews texts, uploaded images by previous customers). The final items are listed in Table 3 along with their references of earlier studies and measured on a 5-point Likert scale (Goffman, 1959; Hancock & Dunhum, 2001; Venkatesh et al., 2003; Gregg et al., 2006; Donath, 2007; Walther & Bazarova, 2008; Jamil & Mat, 2011).

For the experiment purpose, measures for ambient awareness development factors within each stage of this study experiment phase were captured from the different levels of information exposed to each participant based on the condition that was randomly assigned to the participant. As noted earlier, all the multivitamins features have been customized and computed to precisely measure each experiment's stages of information manipulations. Thus, the researcher can evaluate

the alteration effect on the respondent's purchase intentions. All the measures used to calculate the ambient awareness development within each stage are presented in Table 4.

Table 4. Question Items Used in the Experiment

Construct	Item	Measure
Personal Factor	9 items	The degree that the following items are important: - Ingredients of the multivitamin - The health and dietary specialty (i.e., organic, gluten-free, etc.) - The format (i.e., pill, gummy, etc.) - The quantity per serving - The price
Impression Factor	5 items	The degree that the following items are important and helpful: - The multivitamin description provided by the vendor - The overall rate of multivitamin - The number of customers' reviews - The commercial picture of the multivitamin
Engagement Factor	8 items	The degree that the following items are important and helpful: - The customers' reviews - The word of mouth - The respondent's judgment - The uploaded images by previous customers

4.10 Descriptive Statistics

Table 5 below demonstrates the assortment of valid responses obtained, the majority of participants (47.3%) fall within the 26-35 age range, followed by 30.8% with the 36-45 age bracket. Since we have limited the acceptable age range for completing this research between 18 to 50, the remaining age ranges fall within two categories (18-25; 46-50). Both have a percentage of responding under 15% (i.e., 14.4% and 7.4% correspondingly). Also, the data shows that of the

total responses in some way are equally assigned to the participants with respect to gender, 53.2% of the respondents are female, and 46.8% are male. In terms of the level of education, the results show that the majority of respondents (49.8%) hold a college degree, followed by a high school diploma or some college degree holders (26.8%). The demographic results show that the remaining (19.8%) hold a graduate degree and only, 3.6% fall within the high school or less education level.

With respect to the average time of internet use as a control variable, the descriptive statistics show that the majority of respondents (66.8%) consumed more than 3 hours online, followed by participants (17.0%) who spent 2 to 3 hours on the internet. It is worth to mention that we have already removed the records of participants from the original dataset whose reply was "Never use the internet" in the cleaning process as it clearly, implies inconsistent to the research method and the way we performed the survey. The remaining acceptable ranges all have a percentage of respondents below (10%). In terms of the online shopping experience, the preliminary analysis demonstrates that most of the respondents have done online shopping a few times a month (46.8%) or every week (40.2%). The remaining acceptable categories followed by those who did online shopping a few times before this survey (8.5%), then by those who do online- shopping every day (5.2%). As far as online shopping experience is concerned for the experimental section, the records of those who had never done online shopping for this survey were removed from the original data set in the data cleaning step.

Table 5. Demographic Profile of Participants and Control Variables

Variable	Count	Percentage (%)
Respondents Demographics		
Age (in years)		
18-25	111	14.4
26-35	364	47.3
36-45	237	30.8
45-50	57	7.4
Gender		
Male	360	46.8
Female	409	53.2
Education		
High school or less	28	3.6
High school diploma and some college	206	26.8
College degree	383	49.8
Graduate degree	152	19.8
Respondents Experiences		
Online-Shopping experience		
I have never done online shopping before this survey.	-	-
I have done online shopping a few times before this survey.	65	8.5
I do online-shopping a few times a month.	355	46.2
I do online-shopping every week.	309	40.2
I do online-shopping every day	40	5.2
The average time of internet using		
Never use the internet	-	-
Less than 30 minutes	9	1.2
30 minutes to 1 hour	40	5.2
1 hour to 2 hours	75	9.8
2 hours to 3 hours	131	17.0
More than 3 hours	514	66.8

4.11 Construct Validity

4.11.1 Reliability Analysis

Table 6 shows the results of the reliability analysis for the measurement instrument. Reliability alpha, composite reliability (Cronbach's alpha), and item-total correlations have been used to estimate the internal consistency reliability among the measures (Bollen & Lennox, 1991; Mackenzie et al., 2011). These indicators conventionally are employed for first-order constructs with reflective measures (Tan et al., 2013). The analysis illustrates that the reliability alpha ranged within the accepted standard which is .70 or above for newly developed measures (Nunnally & Bernstein, 1994; Mackenzie et al., 2011). It is recommended that composite reliabilities exceed 0.7 (Fornell & Larcker, 1981). Generally, the accepted range for the corrected item-total correlations is between 0.2 to 0.7. As all the constructs exhibited satisfactory reliability (see Table 6) in our sample, the measurements fulfilled the requirement of convergent validity.

Table 6. Summary of Measurement Scales (N= 769)

Construct	Mean[1]	Standard deviation	Reliability (alpha)	Corrected Item-Total Correlation	Cronbach's Alpha
PF1	4.31	0.867	0.722	0.403	0.698
PF2	3.7	1.142		0.384	0.701
PF3	3.68	1.091		0.425	0.693
PF4	3.66	1.095		0.478	0.682
PF5	4.12	0.891		0.504	0.681
PF6	4.38	0.847		0.365	0.704
PF7	4	1.005		0.296	0.716
PF8	3.62	1.083		0.313	0.714
PF9	4.14	0.9		0.436	0.692
Imp1	3.91	0.909	0.709	0.297	0.721
Imp2	4.04	0.916		0.536	0.635
Imp3	3.95	0.968		0.506	0.645
Imp4	3.32	1.175		0.509	0.643
Imp5	3.49	1.073		0.495	0.648
Eng1	4.08	0.915	0.733	0.543	0.686
Eng2	3.67	1.105		0.435	0.705
Eng3	3.6	1.009		0.514	0.689
Eng4	4.41	0.816		0.274	0.732
Eng5	3.16	1.125		0.295	0.734
Eng6	3.81	0.987		0.495	0.693
Eng7	4.18	0.946		0.512	0.691
Eng8	3.4	1.294		0.396	0.717

[1] Likert-type scale ranging from 1 to 5 with not at all important to extremely important or equivalently not helpful to extremely helpful.

Tables 7 shows the correlation matrices for all the measures of the latent variables. A researcher must consider whether the considered indicators suffer from high multicollinearity with the other indicators. In fact, when the indicators are highly correlated with one another, there is the potential for a multicollinearity problem making it more challenging to estimate the unique indicators' effects (Bollen, 2011). It has been advised that if indicators correlations are less than 0.8, there is evidence that the multicollinearity issue is absent (Belsley et al. 1980). The results illustrate that the highest correlated range is less than 0.64 (<0.8), indicating that in general, we would not expect a high degree of collinearity among indicators.

Table 7. Correlations of Latent Constructs

Construct	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9
PF1	1								
PF2	0.332	1							
PF3	0.262	0.524	1						
PF4	0.193	0.33	0.434	1					
PF5	0.345	0.181	0.173	0.293	1				
PF6	0.259	0.093	0.071	0.137	0.395	1			
PF7	0.237	0.029	0.071	0.069	0.296	0.392	1		
PF8	0.053	0.173	0.194	0.416	0.146	0.051	0.055	1	
PF9	0.168	0.036	0.101	0.2	0.506	0.364	0.355	0.32	1

Construct	Imp1	Imp2	Imp3	Imp4	Imp5
Imp1	1				
Imp2	0.214	1			
Imp3	0.18	0.641	1		
Imp4	0.2	0.341	0.347	1	
Imp5	0.284	0.298	0.264	0.504	1

Construct	Eng1	Eng2	Eng3	Eng4	Eng5	Eng6	Eng7	Eng8
Eng1	1							
Eng2	0.275	1						
Eng3	0.23	0.548	1					
Eng4	0.2	0.19	0.32	1				
Eng5	0.227	0.171	0.219	0.087	1			
Eng6	0.511	0.26	0.286	0.239	0.194	1		
Eng7	0.546	0.208	0.237	0.164	0.169	0.396	1	
Eng8	0.29	0.206	0.29	0.041	0.206	0.237	0.412	1

4.11.2 Confirmatory Factor Analysis

To comprehensively access and modify theoretical models on a substantive basis, this dissertation tested the research model using covariance-based structural equation modeling (CB-SEM) software AMOS. AMOS is being sold by IBM with SPSS is a user-friendly statistical package that helps the researcher to focus more on the research problem itself rather than learning the complexity of the software (Hair et al., 2014). The research model consists entirely of reflective measures. Following Straub (2011), the mode of measurement is reflective since the measures used in the study are manifestations of latent variables, and as such, the first order dimensions are reflective of the intermediate and higher-order dimensions.

Confirmatory factor analysis (CFA) performed by using AMOS software to evaluate factors' measurement properties and discriminant validity (Anderson & Gerbing, 1988; Mackenzie et al., 2011). Adams et al. (1992) noted the importance of the reliability and validity of the measurement model (performing CFA), which postulates the relationship between observed metrics and their underlying constructs to its application in testing the structural relationships of the research model. Factor 1/Personal Factor (PF) represents the degree that basic personal characteristics of a multivitamin are important for a participant in this study (i.e., price, size, ingredient, health format, & dietary type). Factor 2/Impression (Imp) signifies the degree of a participant's care about the information with regard to first impression formation and finds this information helpful (i.e., the impression information refers to any additional information that is available in the multivitamin's Amazon profile in the first look/search). Factor 3/Engagement (Eng) represents the degree to which a participant believes additional information would normally require an individual to interact at a deeper level or to consider further details about the multivitamin's profile in order to find them valuable and helpful in purchase decision (i.e., here

the engagement information means specific information that requires customers additional investigation (clicks) in the multivitamin's Amazon profile webpage).

Table 8 identifies CFA results for each of the personal factor, the impression factor, and the engagement factor as the latent variables for this study. Based on the results, all indicators are significant (p<0.05) with the associated standardized loadings.

Table 8. Maximum Likelihood Estimates for a Recursive Path of Model 1, 2 & 3

Path	Unstandardized	S.E.	Standardized	P
PF1 <-- PF	1.000		0.995	***
PF2 <-- PF	0.602	0.118	0.455	***
PF3 <-- PF	0.555	0.117	0.439	***
PF4 <-- PF	0.920	0.133	0.725	***
PF5 <-- PF	0.377	0.095	0.365	***
PF6 <-- PF	0.233	0.065	0.237	***
PF7 <-- PF	0.227	0.122	0.195	***
PF8 <-- PF	0.452	0.063	0.363	***
PF9 <-- PF	0.212	0.060	0.203	***
Imp1 <-- Imp	0.641	0.111	0.296	***
Imp2 <-- Imp	1.000		0.458	***
Imp3 <-- Imp	1.020	0.084	0.442	***
Imp4 <-- Imp	2.138	0.239	0.763	***
Imp5 <-- Imp	1.673	0.177	0.654	***
Eng1 <-- Eng	0.844	0.074	0.470	***
Eng2 <-- Eng	0.893	0.114	0.411	***
Eng3 <-- Eng	1.089	0.115	0.549	***
Eng4 <-- Eng	0.712	0.098	0.445	***
Eng5 <-- Eng	0.712	0.109	0.322	***
Eng6 <-- Eng	0.915	0.092	0.472	***
Eng7 <-- Eng	1.000		0.538	***
Eng8 <-- Eng	1.532	0.178	0.603	***

*** $p<0.005$

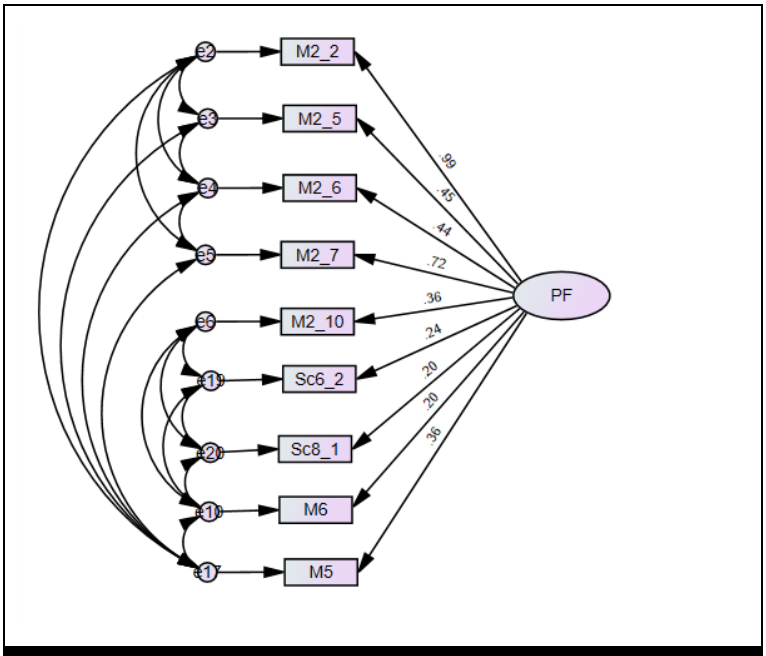


Figure 7. CFA Results for Personal Factor

Table 9. Fit Indices for Personal Factor

Model	χ^2/df	CFI	NFI	TLI	RMSEA	*P*<0.05
PF	2.668	0.988	0.981	0.959	0.047	0.002
Where No. obs. Is 769; df is a degree of freedom; CFI is Comparative Fit Index; NFI is Normed Fit Index; TLI is Tucker Lewis Index; RMSEA is Standardized Root Mean Square Residual; p is p-value.						

Figure 7 indicates a brief summary of CFA results for PF, the utilized items, and their loadings to PF. Furthermore, Table 9 presents fit indices for personal factors (PF) and how well indicators fit in the CFA model (Mcdonald & Ho, 2002). Based on Table 9, relative normed chi-square/df (χ^2/df) is within the recommended range (2.66) which is from 2.0 to as high as 5.0 (Wheaton et al., 1977; Tabachnick & Fidell, 2007).

In addition, RMSEA value was estimated to be 0.047 that is considered an indication of a good fit (MacCalllum et al., 1996). It is known as 'one of the most informative fit indices' that is sensitive to the number of estimated parameters (Diamantopoulos & Siguaw, 2000) More

recently, RMSEA cut off points for a well-fitting is considered 0.06 while RMSEA in the range of 0.08 to 0.10 indicated mediocre fit and lowered 0.08 shows a good fit (Hu & Bentler, 1999; Steiger, 2007).

In summary, all other indices including CFI, NFI, and TLI in Table 9 are higher than theoretically acceptable cut off values (NFI>0.95, CFI>0.95, TLI>0.8) pointing towards a good fit (Bentler, 1990; Kline, 2005; Tabachnick & Fidell, 2007). It can be concluded that the overall fit of the model is good.

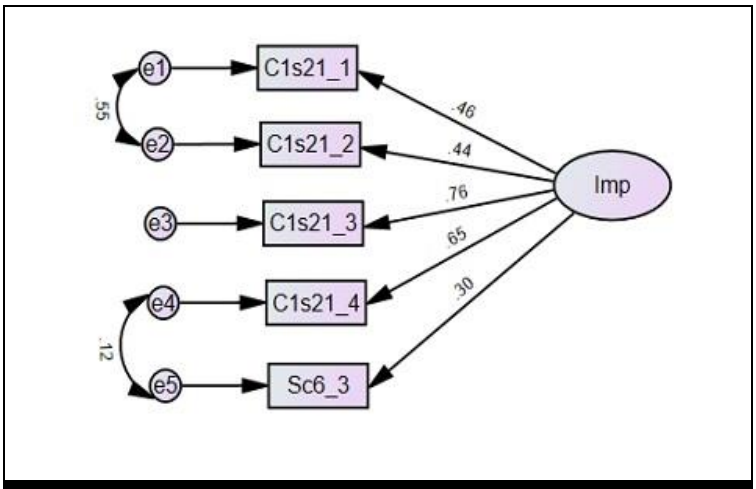


Figure 8. CFA Results for Impression Factor

Table 10. Fit Indices for Impression Factor

Model	χ^2/df	CFI	NFI	TLI	RMSEA	*P*<0.05
Imp	3.556	0.991	0.987	0.97	0.058	0.014

Where No. obs. Is 769; df is a degree of freedom; CFI is Comparative Fit Index; NFI is Normed Fit Index; TLI is Tucker Lewis Index; RMSEA is Standardized Root Mean Square Residual; p is p-value.

Fit indices for impression factor (Imp) represent how well indicators fit in the model (Mcdonald & Ho, 2002). Figure 8 illustrates the items loading for the impression factor. Based on Table 10, relative normed chi-square/df is within the recommended range (3.55), which is from 2.0 to as high as 5.0 and is consistent with the acceptable levels in the literature (Wheaton et al., 1977; Tabachnick & Fidell, 2007).

In addition, RMSEA value was estimated to be 0.058 that is considered to be an indication of the right fit (MacCalllum et al., 1996). Moreover, RMSEA cut off points for a well-fitting model is deemed to be 0.06, while RMSEA in the range of 0.08 to 0.10 indicates mediocre fit and below 0.08 shows a good fit (Hu & Bentler, 1999; Steiger, 2007).

In summary, all other indices including CFI, NFI, and TLI in Table 10 are higher than theoretically acceptable cut off values (NFI>0.95, CFI>0.95, TLI>0.8) pointing towards a good fit (Bentler, 1990; Kline, 2005; Tabachnick & Fidell, 2007). It can be concluded that the overall fit of the model is good.

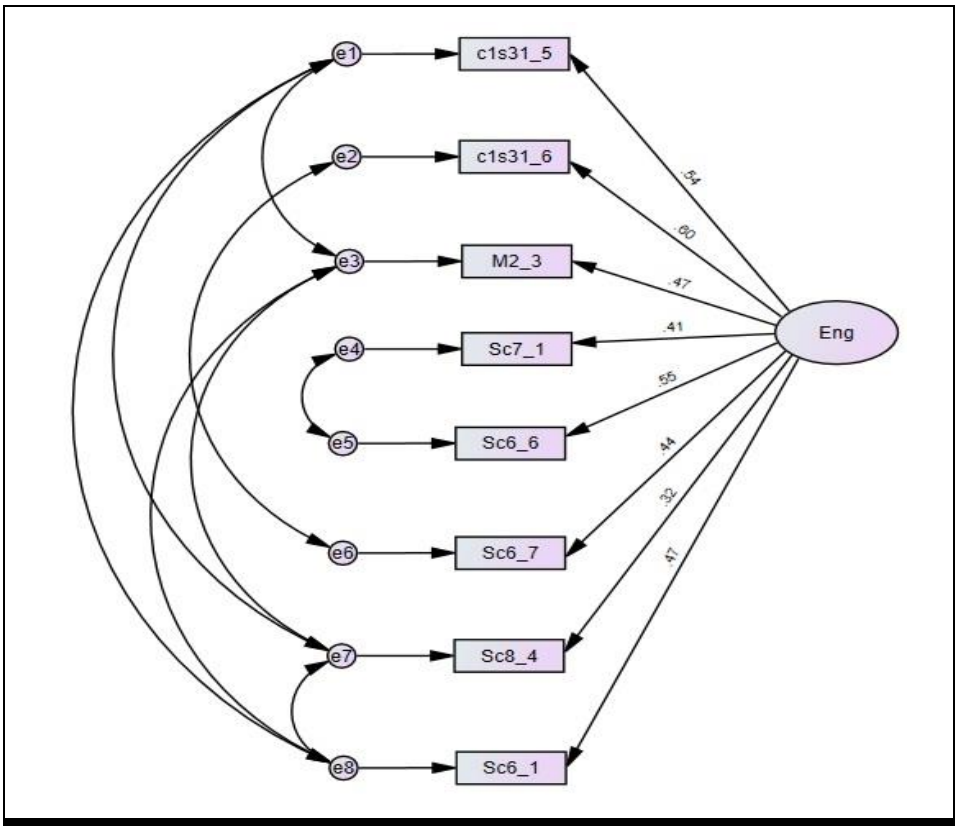


Figure 9. CFA Results for Impression Factor

Table 11. Fit Indices for Engagement Factor

Model	χ^2**/df**	**CFI**	**NFI**	**TLI**	**RMSEA**	***P*<0.05**
Eng	5.247	0.960	0.951	0.906	0.074	0.00

Where No. obs. Is 769; df is a degree of freedom; CFI is Comparative Fit Index; NFI is Normed Fit Index; TLI is Tucker Lewis Index; RMSEA is Standardized Root Mean Square Residual; p is p-value.

Fit indices for engagement factor (Eng) represent how well indicators fit in the model (Mcdonald & Ho, 2002). Figure 9 illustrates the items loading for the engagement factor. As seen in Table 11, relative normed chi-square/df is within 5.247, which is reasonably close to the recommended range from 2.0 to as high as 5.0 (Wheaton et al., 1977; Tabachnick & Fidell, 2007). Traditionally, the Chi-Square 'assesses the magnitude of discrepancy between the sample and fitted covariances matrices' (Hu & Bentler, 19920. Also, it has been known to show sensitivity to sample size, which means that the chi-square is relative statistic nearly rejects most of the model when large samples are used (>200) (Bentler & Bonnet, 1980; Joreskog & Sorbom, 1993).

In addition, the RMSEA value was estimated to be 0.074, which is considered an indication of a good fit (MacCalllum et al., 1996). Moreover, RMSEA cut off points for a well-fitting is regarded as 0.06, while RMSEA between 0.08 to 0.10 indicated mediocre fit and below 0.08 shows a good fit (Hu & Bentler, 1999; Steiger, 2007).

However, although the relative chi-square exceeds the cut off value fractionally (5.00 vs. 5.247), literature suggested that alternative indices can be used to assess model fit (Wheaton et al., 1977). Furthermore, all alternative indices, including CFI, NFI, and TLI are higher than theoretically acceptable cut off values (NFI>0.95, CFI>0.95, TLI>0.8) pointing to a good fit (Bentler, 1990; Kline, 2005; Tabachnick & Fidell, 2007). It can be concluded that the overall fit of the model is good.

4.12 Structural Analysis

The structural model for this research was assessed and analyzed with AMOS (Version 26). SEM has the ability to simultaneously evaluate multiple variables and their relationships by using a maximum likelihood procedure (Hair et al., 2014). The path analysis within SEM can

examine the relationships among latent constructs in a way that reduces the error in the model (Chin et al., 2008). In fact, the path analysis using the maximum likelihood estimation approach from the structural model is used to test the research hypotheses. The modeling analysis provides a comprehensive means of evaluating and modifying theoretical models on a substantive basis (Gyampah & Salam, 2004). After checking the construct validity, including checking the presence of multicollinearity, all the hypotheses have been tested in four different models: (i) Model 1: full effects of path diagram and control variables in cognitive layer (H1, H4 & H5); (ii) Model 2: full model effects of path diagram and control variables considering purchase intentions (PI) alterations within the central route (H2); (iii) Model 3: full model effects of path diagram and control variables considering purchase intentions alterations within the peripheral route (H3); (iv) Model 4: full model effects of path diagram and control variables regarding purchase intention alterations within the peripheral route and conative layer (H6). Table 12 presents a simplified form of hypotheses in each model.

Table 12. Summary of Hypotheses Analysis in Models

Hypotheses	*Simplified Summary*	*Model*
H1	$PF \sim Eng$	*Model 1*
H4	$Imp \sim Eng$	*Model 1*
H5	$PF \sim Imp$	*Model 1*
H2	$PF \times AA \sim PI$	*Model 2*
H3	$Imp \times AA \sim PI$	*Model 3*
H6	$Eng \times AA \sim PI$	*Model 4*

PF → Personal factor; Imp → Impression factor; Eng → Engagement factor; AA → Ambien Awareness development index; PI → Purchase intentions' alterations.

According to the theoretical foundations employed in this research model, we evaluated four separate models to test this research hypotheses for the involved constructs and variables demonstrated in Table 12. Model 1 performed to evaluate ambient awareness development effect as the suitability of provided information cues (ambient information) to participants along with the research experiment (H1, H4 & H5). In model 2, the mediating effect of ambient awareness development on purchase intentions alterations within the whole experiment (stage 1 to 3) considering the personal factor examined (H2). Model 3, the mediating impact of ambient awareness development on purchase intentions alterations along with the experiment from stage 1 to 2 evaluated by including impression factor (H3). Model 4, the mediating effect of ambient awareness development on purchase intentions alterations from stage 2 to 3 of the experiment examined with the consideration of the engagement factor (H6).

We performed a path analysis by using AMOS. Figure 8 depicts the path analysis and summary of models with standardized regression weights for testing this research hypotheses. As the endogenous variable in Model 2, 3 and 4 represent whether the purchase intentions toward a

specific multivitamin has been altered across different stages of the experimental stages of the research (i.e., PI13 presents the PI alteration across stage 1 and 3), it has been considered as a dummy variable (i.e., Yes=1 & No=0) in the models and its estimation. Then, the report of modification indices from the SEM analysis in AMOS has been followed to include the reasonable covariances between the exogenous variables in all related models. Table 13 illustrates the final models with acceptable fit indices. Model 1 showed a good model fit with the relative/normed chi-square (χ^2/df less than 5), CFI (higher than the cut-off of 0.9), NFI (higher than the cut-off of 0.9), TLI (higher than the cut-off of 0.9), and RMSEA (less than the cut-off of 0.08) regardless of insignificant p-value (less than the cut-off of 0.05) (Wheaton et al., 1977; MacCallum et al., 1996; Hu & Bentler, 1999; McDonald & Ho, 2002, Kline, 2005). All the noted fitting indices for models 2 and 3 were satisfactory, which demonstrated a good model fit in both cases (i.e., CFI, NFI, TLI, RMSEA, etc.). Model 4 demonstrated a good model fit with a satisfactory value for the relative/normed chi-square (4.091), RMSEA (0.06), and significant p-value. Based on the previous literature, there are no golden rules for assessment of model fit because different indices reflect a different part of model fit (Hooper et al., 2008; Crowley & Fan, 1997). While other fitting indices for Model 4 (i.e., CFI, NFI, and TLI) are not higher than the cut-off value ($\geq$0.9), Kline (2005) strongly support the use of the Chi-Square statistic, its degrees of freedom (df), the RMSEA and p-value as substitutes. Therefore, we preferred to rely on these indices over other indices for Model 4 as they are the most commonly reported.

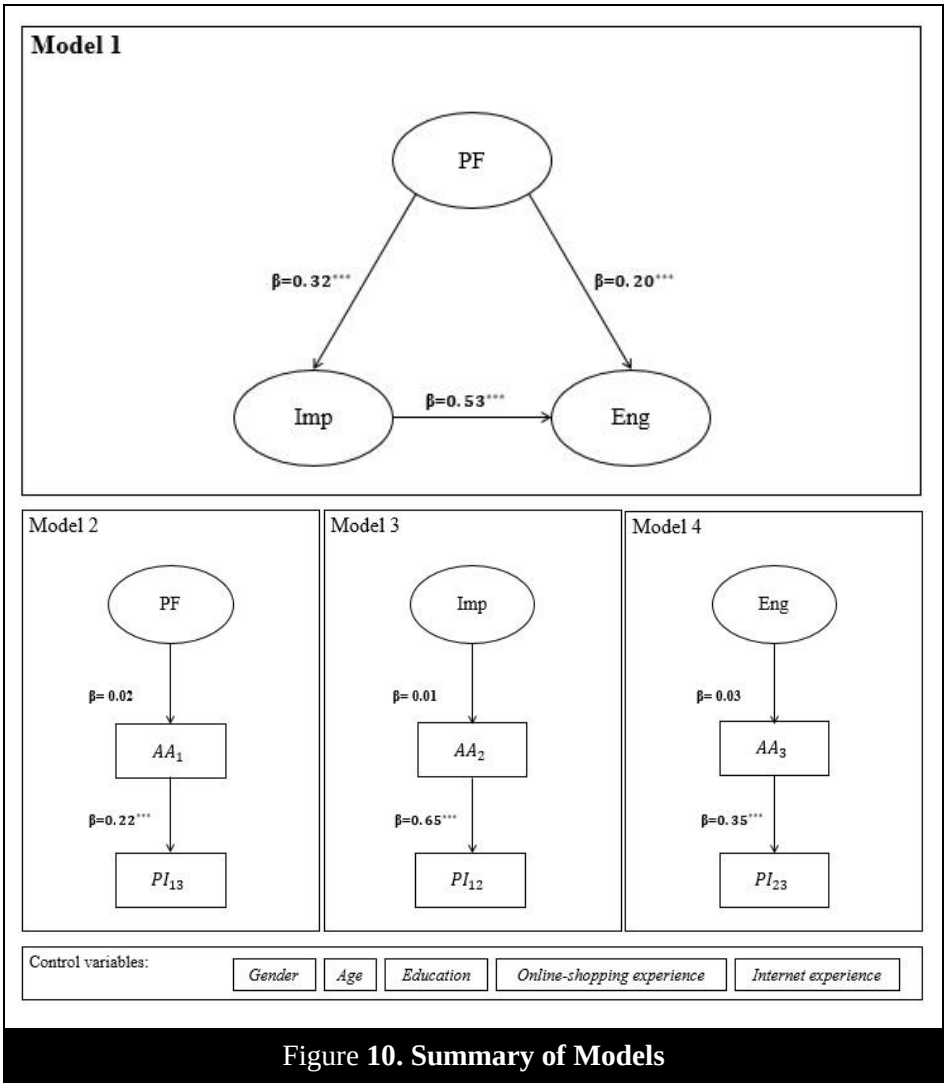


Figure **10. Summary of Models**

Table 13. Comparative Model Indices

Model	χ^2**/df**	**CFI**	**NFI**	**TLI**	**RMSEA**	***P-value***
Recommended Value	*≤5*	*≥0.9*	*≥0.9*	*≥0.9*	*≤0.08*	*≤0.05*
Model 1	0.78	1.00	0.992	1.00	0.00	0.585
Model 2	4.17	0.95	0.943	0.93	0.064	***
Model 3	2.65	0.72	0.649	0.553	0.046	***
Model 4	4.091	0.84	0.807	0.773	0.063	***

Where No. obs. Is 769; df is a degree of freedom; CFI is Comparative Fit Index; NFI is Normed Fit Index; TLI is Tucker Lewis Index; RMSEA is Standardized Root Mean Square Residual; p is p-value.

The path estimates (coefficients) from the structural model are used to test the hypotheses. For each hypothesis, estimates of t-statistics and their significance levels are tabulated, as shown in Table 14. Model 1 was designed to evaluate the association between the personal factor and customers' impression and engagement rate (H1, H4 & H5). Model 1 focuses on the impact of ambient awareness development in the conative layer and, indeed, to the degree that customers found the ambient information helpful to shape the impression and engage in. H1 examines the effects of the importance of personal factor for a person on its subsequent importance or helpfulness of engagement index along with the ambient awareness evolvement. Table 14 shows the unstandardized positive estimate ($\beta = 0.114$, $t = 6.89$, $p < 0.05$) for the path from personal factor (PF) to further engagement factor (Eng) indicates that personal factor positively associated to the subsequent engagement factor. The positive effect was found to be statistically significant; thus, H1 is supported.

Similarly, H4 measures the importance of impression formation (impression factor) on further engagement factor along with the development of ambient awareness. The positive unstandardized estimate/coefficient ($\beta = 0.633$, $t = 18.15$, $p < 0.05$) for the path from impression factor (Imp) to engagement factor (Eng) indicates that a person with raised impression factor is likely to engage in more (higher engagement factor). Since the positive association between these factors has been found statistically significant, there is evidence that H4 is supported.

Table 14. Maximum Likelihood Estimates (Regression Weights)

Path	Model	Estimate	S.E.	t-statistics	*P-value*
Control Variables					
Imp <-- Age	1	-.005	.002	-2.894	***
Imp <-- Gender	1	-.018	.024	-.761	.447
Imp <-- Education	1	.010	.016	.624	.533
Imp <-- Online Shopping Experience	1	.029	.017	1.684	.092
Imp <-- Internet Experience	1	.011	.013	.810	.418
Eng <-- Age	1	-.005	.002	-2.964	***
Eng <-- Gender	1	-.011	.023	-.474	.635
Eng <-- Education	1	-.019	.015	-1.233	.217
Eng <-- Online Shopping Experience	1	.032	.016	1.966	***
Eng <-- Internet Experience	1	.047	.013	3.71	***
Imp <-- PF	1	.152	.016	9.35	***
Eng <-- PF	1	.114	.017	6.89	***
Eng <-- Imp	1	.633	.035	18.15	***
Control Variables					
PI13 <-- Age	2	-.003	.002	-1.229	.219
PI13 <-- Gender	2	.024	.033	.731	.465
PI13 <-- Education	2	.003	.021	.163	.870
PI13<-- Online Shopping Experience	2	.014	.023	.605	.546
PI13 <-- Internet Experience	2	-.026	.017	-1.464	.143
AA1 <-- PF	2	.016	.018	.927	.354
PI13 <-- AA1	2	.196	.03	6.475	***
Control Variables					
PI12 <-- Age	3	-.002	.002	-1.123	1.26
PI12 <-- Gender	3	.042	.031	1.372	.17
PI12 <-- Education	3	.026	.020	1.288	.261
PI12 <-- Online Shopping Experience	3	.009	.022	.434	.665
PI12 <-- Internet Experience	3	-.025	.016	-1.498	.134
AA2 <-- Imp	3	.004	.013	.279	.780
PI12 <-- AA2	3	3.274	1.135	2.885	***
Control Variables					
PI23 <-- Age	4	-.003	.002	-1.705	.088
PI23 <-- Gender	4	.036	.028	1.299	.194
PI23 <-- Education	4	.025	.018	1.351	.177
PI23 <-- Online Shopping Experience	4	.007	.019	.362	.717
PI23 <-- Internet Experience	4	-.009	.015	-.605	.545
AA3 <-- Eng	4	.025	.026	.935	.350
PI23 <-- AA3	4	.498	.054	9.151	***

H5 examines the effect of personal factors on the subsequently raised impression factor along with the ambient awareness evolvement. Table 14 shows that unstandardized positive estimate ($\beta = 0.152$, $t = 9.35$, $p < 0.05$) for the path from personal factor (PF) to further impression factor (Imp) indicates that personal factor positively associated to the subsequent impression factor. The positive effect was found to be statistically significant; thus, H5 is supported.

Ambient awareness development indexes (AA1, AA2, and AA3) shown in models 2, 3, and 4 (Figure 10) have been considered as the combination of presenting the ambient information to the respondents along each experimental stage. The information with respect to the AA index is represented in Table 15. Basically, ambient awareness that is developed along the whole experiment section (from stage 1 to 3) is the result of the ambient information exposed to the participant across stages 1, 2 and 3. In fact, the only factor that is changing across the experiment stages is the amount of ambient information demonstration that is likely to cause the purchase intention alteration for a specific multivitamin since all other variables have been consistent along the stages in every 40 experimental conditions. Thus, it would be correct to conclude that an individual (e.g., customer) is developing ambient awareness based on the different amounts of ambient information available in subsequent stages of the experiment in such a way that impacts the intention to purchase a multivitamin. Accordingly, the ambient information changes across the experiment stages for the multivitamin with the higher purchase intention by the participant in each stage was assessed to form the ambient awareness index. Please see Table 15 in the following.

Table 15. Ambient Awareness Development Index Along the Experiment Stages

Name	Index	No. variables	Variables (Numeric)
Ambient Awareness Development Factor in stage 1 to 3	AA1	7 items	The alteration between the following items for the associated multivitamin: - The available description of the multivitamin provided by the vendor - The overall multivitamin rate - Numbers of available reviews - The overall positivity index for the available online reviews - The overall negativity index for the available online reviews - The number of images uploaded by previous customers - The average rate of available online reviews in the experiment
Ambient Awareness Development Factor in stage 1 to 2	AA2	3 items	The alteration between the following items for the associated multivitamin: - The available description of the multivitamin provided by the vendor - The overall multivitamin rate - Numbers of available reviews
Ambient Awareness Development Factor in stage 2 to 3	AA3	4 items	The alteration between the following items for the associated multivitamin: - The overall positivity index for the available online reviews - The overall negativity index for the available online reviews - The number of images uploaded by previous customers

			- The average rate of available online reviews in the experiment

Since the endogenous variables (i.e., purchase intention alteration) are represented as dummy variables across various stages (i.e., PI13 is whether the highest purchase intention in stage 1 has been changed in stage 3 across the multivitamins that were represented in a specific condition), separate models have been developed for testing H2, H3 and H6.

Subsequently, Model 2 was designed to evaluate the indirect effect of ambient awareness development (AA1) on purchase intention change (PI13) as the dummy dependent variable from the start points of the experimental stage 1 to the endpoint of the experimental stage 3 for each participant. The path analysis results as shown in Table 14 indicates a statistically significant association between the developed ambient awareness within stage 1 to 3 and the purchase intention change. The unstandardized positive estimate ($\beta = 0.196$, $t = 6.475$, $p < 0.05$) indicates when a participant processed ambient information in stage 3, he/she developed a specific amount of ambient awareness. Subsequently, it is likely to alter its purchase intention toward the represented multivitamins. It provides enough evidence to support H2. Thus, H2 is supported.

The next path analysis, which is associated with Model 3, was designed to evaluate the indirect effect of ambient awareness development (AA2) on purchase intention alteration (PI12). PI12 is the dummy dependent variable that compares the start point of the experimental section (stage 1) to the second step of the experiment (stage 2) for each participant. The path analysis

results shown in Table 14 indicate a statistically significant association exists between the developed ambient awareness within stage 1 to 2 and the purchase intention change. The unstandardized positive estimate ($\beta = 3.274$, $t = 2.885$, $p < 0.05$) indicates that when a participant processed ambient information in stage 2 and subsequently, developed a specific amount of ambient awareness, it is more likely to alter its purchase intention toward the represented multivitamins. It provides enough evidence to support H3. Thus, H3 is supported.

Finally, Model 4 was designed to evaluate the indirect effect of ambient awareness development (AA3) on purchase intention change (PI23) as the dummy dependent variable from the start point of the experiment section (stage 2) to the endpoint of the experiment (stage 3) for each participant. The path analysis demonstrated in Table 14 shows the statistically significant association of the developed ambient awareness within stage 1 to 3 and the purchase intention alteration. The unstandardized positive estimate ($\beta = 0.498$, $t = 9.151$, $p < 0.05$) indicates that when a participant processed ambient information in stage 3 and accordingly, developed a specific amount of ambient awareness, it is more likely to alter its purchase intention toward the represented multivitamins. It provides enough evidence to support H6. Thus, H6 is supported.

As shown in Table 14, 5 control variables have been included as the background variables. These variables include gender, age, education, the online shopping experience, and the internet user experience. In model 1, age was identified as statistically significant over both endogenous variables (Imp & Eng) that indicates the negative association between age and the further impression and engagement factors. However, the unstandardized estimate is -0.005 that is very close to zero and is likely to present a very low association. Also, the unstandardized positive estimate ($\beta = 0.032$, $t = 1.966$, $p < 0.05$) indicates that when a participant has more online shopping experience, it is more likely to have a higher degree of engagement factor since the positive association is statistically significant. Also, the unstandardized positive estimate

($\beta = 0.047$, $t = 3.71$, $p < 0.05$) indicates that when a participant has more internet experience, it is more likely to have a higher degree of the engagement factor since the positive association is statistically significant. However, the next models (Model 2, 3 & 4) represent non-significant associations between control variables and the relative endogenous variables to ensure that the differences of these control variables do not confound the experimental results and, therefore, can reflect the genuine relationship between the treatment and outcome variable.

CHAPTER V

DISCUSSION, THEORETICAL CONTRIBUTIONS, PRACTICAL CONTRIBUTIONS, LIMITATIONS, AND FUTURE RESEARCH

5.1 Discussion

This dissertation was set out to address two key research questions:

1. Which aspects of customers' state of mind are influenced by the development of ambient awareness?
2. How does ambient awareness development influence overall attribute-level customers' decisions (i.e., purchase intentions)?

According to Table 14, we tested H1, H4 & H5 to explore the answer further the first question that explains the unique development of ambient awareness in each individual as an exclusive product of processing disclosed information ambiently in each step of the experiment. These hypotheses were considered to explore the ambient awareness impact on two aspects of individuals' mindsets; cognitive and conative layers (i.e., impression formation, engagement), specifically by asking individuals whether the displayed ambient information in each step of the experiment was sufficient to form a degree of perceived impression and persuade further engagement. The result provided the evidence needed to statistically support a positive associative relationship between the personal factors and further impression formation and engagement factors. Path analysis was used as the statistical test to empirically test this hypothesis (as represented in Table 14). In fact, the ambient awareness development was shown to have positively affected customers' impressions and their further engagement factor among

those who perceived the ambient information more relevant. Also, it turned out that the strength of the noted impact is associated with the strength of the relevancy to customers' personal factors. Regarding Table 14, to answer the second question, we tested H2, H3 & H6 to investigate the influence of ambient awareness development on customers' purchase intentions concerning customers' personal factors, impression factors, and engagement factors. These hypotheses designed to measure the effect of ambient awareness development as the result of exposed information ambiently concerning the formation of the impression and further engagement with the product purchase decision (i.e., the multivitamin). Thus, the indirect effect of ambient awareness development on purchase intention assessed with respect to the customer's personal factor by exposing the customer to information ambiently along with the experiment (H2). In other words, the results of stage 3 (full exposure) and stage 1 (without any so-called ambient information) have been compared to understand the ambient awareness growth impact. Next, the indirect effect of the ambient awareness development associated with the ambient information for forming impressions (step 2 of the experiment) on purchase intentions was evaluated by comparing the results of stage 2 to stage 1 of the experiment (H3). Finally, the indirect effect of the ambient awareness development on purchase intentions within the existence of ambient information that requires further engagement was measured by comparing the results of stage 3 and 2 of the experiment (H6). It was concluded that there is sufficient evidence that ambient awareness development positively impacts customers purchase intentions by comparing the purchase intentions shifts at each stage of the experiment.

In summary, these findings suggest the significant role of ambient awareness development on online customers' decision making (i.e., purchase intentions). In fact, online shopping websites with social media features, so-called social commerce such as Amazon, enable customers to be aware of topics that they weren't purposefully intended to explore at the start of

their decision to make a purchase. These cues have been displayed in the background via the accessible ambient environment enabled by social commerce websites. Exposure to such background cues by customers, called ambient information, result in the development of additional awareness about the product (i.e., multivitamins) that influences various aspects of customers' mindset (i.e., cognitive and conative layers) and eventually impact customers' purchasing intentions. Table 16 summarizes the results of all hypotheses tests in this dissertation, shows consistent results across the research questions.

Table 16. Summary of the Findings

Hypotheses	**Predicted Sign**	**Result**
H1: The personal factor through ambient awareness development within the central route is positively associated with customers' further engagement rate.	+	Supported
H2: The ambient awareness development impact within the central route that is highly relevant to the personal factor is positively associated with customers' purchase intentions.	+	Supported
H3: The first impression generated through ambient awareness development within the peripheral path is positively associated with customers' purchase intentions.	+	Supported
H4: The ambient awareness development through first impression formation via the peripheral path is positively associated with customer's further engagement.	+	Supported
H5: The personal factor is positively associated with the formation of the first impression generated by ambient awareness development.	+	Supported
H6: The customer's engagement through ambient awareness development is positively associated with the customer's purchase intention.	+	Supported

5.2 Theoretical Contribution

This dissertation makes several contributions to IS research. Our theoretical approach differs from the literature in the following ways. First, prior research refers to ambient awareness as the awareness that individuals develop in workplace communications (Leonardi, 2015), social

networks (Thompson, 2008; Levordashka & Utz, 2016) in terms of "who knows whom?" or "who knows what?" whereas this research aimed to extend that definition and to establish an operationalize this extended conceptualization of ambient awareness. The theoretical foundation of this new conceptualization was grounded in SCT and ELM theories to develop a broader understanding of ambient awareness and its impact on customers' purchase intention in social commerce platforms.

Initially, this dissertation employed SCT, which provided the foundational theoretical capability to explain the unique grow of ambient awareness in each individual as a product of sensing and exchanging ambient information. Second, the elaboration likelihood model (ELM) was used in this study to rationally explain the impact of ambient awareness development by considering cognitive and conative layers that represent participants' mind processing. ELM was used as the foundational theory to clarify how individuals process information by engaging in central and peripheral routes (Petty & Cacioppo, 1986; Cummings & Dennis, 2018). Admittedly, the current dissertation investigated ambient awareness development and its effective mechanism in different psychological layers to explain customers' attitudinal changes (i.e., purchasing intention). Accordingly, ambient awareness development is the product of the cognitive and conative mechanisms through processing the additional displayed online content via recommendation agents, basic visual representations (images), and customer commentaries as a part of public social features in social commerce websites. Next, ambient awareness development takes in conative information processing through absorbing information ambiently as a motivator of individual's engagement and interaction with the social commerce and by extension, with previous customers and the e-commerce vendors via the available cues (e.g., previous customers reviews, the vendor description about the product, etc.). It includes any activity beyond just merely searching for the product, such as any persuading prior customers to upload pictures of

their previous purchases and writing online reviews about the products. Thus, the cognitive representations and conative motivations serve as drivers of subsequent customers' changes of attitudes and, specifically, any change to their purchase intentions. To the best of our knowledge, this is one of the initial studies in IS research that attempts to establish a linkage between ambient awareness development and its influence on customers' attitudes as the predictor for customers 'behavioral and purchase intentions.

Another distinctive theoretical contribution of the present dissertation is that it integrates cognitive and motivational theories (i.e., SCT and ELM). Although prior research has acknowledged the importance of cognitive processes (e.g., Hinds & Pfeffer, 2003; Olivera et al., 2008), most of them have only focused on motivational explanations. This research focuses on conceptualization of the ambient awareness development and studies its effects at the intersection of cognition and motivational theories in the frame of SCT and ELM to more fully understand customers' purchasing decisions.

5.3 Practical Contribution

With recent developments in the field of e-commerce and the fast transformation of online shopping platforms to integrate social media features, this dissertation provides essential lessons in that can enables revenue growth in online shopping businesses, thus confirming the positive impact of ambient awareness growth through optimizing the type of ambient information with the most impact on customers' decision making (i.e., purchase intention). Expressly, the results indicated that ambient awareness likely was developed as the reflection of the information that is ambiently available to the customers. This so-called ambient information was the exclusive product of displaying the overall product rate, online reviews, the vendor description about the product, and the relative pictures that were taken by prior customers as a part of social commerce

public features. Ultimately, the developed ambient awareness contributed to form an initial impression, further engagement and consequently altering customers' attitude toward purchasing helps customers to decide.

Additionally, the results of this research could be used to develop a conceptual model for explaining the role of ambient awareness as a decision aid. Based on the literature, it has been stated that interactive decision aids such as shared information, user-generated contents help customers make informed decisions among several available online product offerings (Maes et al., 1999; Xiao & Benbasat, 2007). Decision-aids' primary role is to help customers make choices in situations that there are multi-criteria with multi-attribute preference choices (Keeney & Raiffa 1976). Besides, these aids are perceived as valuable assets to business owners, e-commerce retailers, as strategic tools that allow them to take actions to increase the sales of their products. Several studies have noted this potential opportunity by mentioning the importance of different types of decision aids. For example, Chen et al. (2008) reported that the helpfulness of customer reviews positively influences sales. Moreover, Clemons et al. (2006) claimed that strongly favorable customer ratings could positively impact the growth of product sales.

In addition, Kohli et al. (2004) suggested that customers can also benefit from decision aids to search and obtain information about alternatives in a way that helps them in making better decisions and experience greater satisfaction with the online aids (Kohli et al. 2004). While this dissertation discusses how customers can effectively consume all ambient information (i.e., shared information, online reviews, comments, rating) available on social e-commerce to develop ambient awareness of its contribution on customers’ purchasing intentions, it is accurate to call ambient awareness evolvement as a decision aid that guides customers about what, where and from whom to buy.

5.4 Limitations and Future Research

While every attempt was made to conduct the current dissertation most efficiently and comprehensively, there are a few limitations that need to be acknowledged. This dissertation used quantitative methods to formulating and testing hypotheses through a controlled experiment. However, some argue that quantitative methods miss the real story (Venkatesh & Brown, 2013). Specifically, the simplification and abstraction of experimental design come with a tradeoff in "objectivity" and "a deeper understanding of what actually is occurring" (Kaplan & Duchon, 1988). Future research can adopt additional methods that allow for a closer examination of underlying processes.

Although we provide a simulated tool to the real online shopping platform to run the experiment and collect the data needed for our study, additional research may be required to validate and further understand the observed effects using real-time data such as clickstream data. The online instrument applied random scenarios within a survey. Thus, this study collected only purchase attitudes by asking a general feeling about buying a multivitamin in terms of asking to rate their purchase intentions. While the significant relation of attitude-actual behavior widely investigated and posited among IS researchers (Fishbein & Ajzen, 1980; Petty, 2018), some argued the individuals' behaviors might differ from their self-reported prejudgments (LaPiere, 1934). Thus, future research can focus on ambient awareness impacts by measuring actual customers' behaviors.

5.5 Conclusion

It has been speculated but not previously demonstrated that displaying and processing the information on social commerce websites that integrate social media and e-commerce features (Curty & Zhang, 2011) such as Amazon can be a source of ambient awareness development. The

current dissertation conducted an experiment using an online survey that empirically showed that people experience ambient awareness from processing ambient information without any deliberate intention to seek that received information. To this end, we conducted an experimental study to test the six hypotheses regarding the research model. We could be able to provide sufficient evidence to support the hypotheses by using SEM. Finally, we could conclude that ambient awareness growth in the experiment treatments positively contributed to shifting customers' attitudes toward purchasing (i.e., purchase intention). Furthermore, this research provided evidence that ambient awareness impacted customers' decisions, and eventually altered customers' purchase intentions. In particular, the study showed that ambient awareness in social commerce websites could lead to the development of sensing and exchanging any cognitive stimuli by browsing social commerce (e.g., online shopping platforms) websites that are equipped to social features such as customers rating, online reviews, and recommendation agents. We synthesized and applied two complementary theories in the research model to answer the research questions regarding ambient awareness development and also investigated its impact on customers' decisions as to the result of presenting the background information, ambiently, along with our experimental phases.

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APPENDIX A

QUESTIONNAIRE

Section 1: Consent Form

You are invited to participate in a web-based online survey on the information impact on shopping decisions. This survey is part of a research study being conducted by Zahra Yarmohammadi, a doctoral student as part of her dissertation at UNC at Greensboro. It should take approximately 15 [minutes] to complete.

Your Possible Risks and Benefits
The risks to your participation in this online study are minimal and are those associated with basic computer tasks, including boredom, fatigue, or mild stress. Some of the survey questions ask about your personal shopping preferences and may be distressing to you as you think about your experiences. However, your responses may help us advance our knowledge about information propagation in e-commerce context.
The major benefit to you is the learning experience from participating in a research study. The benefit to society is the contribution to scientific knowledge.

Confidentiality
Your Mechanical Turk Worker ID will be used to distribute payment to you but will not be stored with the research data we collect from you.
MTURK guarantees the complete anonymity of the participants such as identifying information like your name, email address, or IP address unless you voluntarily replied to demographic questions in survey questions. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

Compensation
You will receive 1(one) US Dollar ($) for participating in this research study. MTURK does not allow for prorated compensation. You will receive the total amount of payment if you complete the entire study.
Please Note: This study contains a number of checks to make sure that participants are finishing the tasks honestly and completely. As long as you read the instructions and complete the tasks, your submission will be approved. If you fail these checks, your submission will be rejected.

Subject's Rights
Your participation is voluntary. You may stop participating at any time by closing the browser window or the program to withdraw from the study. Partial data will not be analyzed. If you feel you have not been treated according to the descriptions in this form, or that your rights as a participant in research have not been honored during the course of this project, or you have any questions, concerns, or complaints that you wish to address to someone other than the investigator,

you may contact the chair supervisor, Dr. Hamid Nemati, Professor at the Bryan School of Business at UNCG, or email hrnemati@uncg.edu.

Please indicate, in the box below, that you are at least 18 years old, have read and understand this consent form, and you agree to participate in this online research study.

▼ Yes, I agree. (1) ... Yes, I agree. (1)

Section 2: Screen

2.1 We would appreciate it if you complete the following information:
Gender:

- ○ Male
- ○ Female

2.2 How old are you?

2.3 Education

- ○ High School or less
- ○ High School Diploma and Some College
- ○ College Degree
- ○ Graduate Degree

2.4 How frequently do you do your shopping online?

- ○ I have never done online shopping before this survey.
- ○ I have done online-shopping a few times before this survey.
- ○ I do online-shopping a few times a month.
- ○ I do online-shopping every week.
- ○ I do online-shopping every day.

2.5 How much times do you spend on an average using the internet every day?

- ○ Never use internet
- ○ Less than 30 minutes
- ○ 30 minutes to 1 hour
- ○ 1 hours to 2 hours
- ○ 2 hours to 3 hours
- ○ More than 3 hours

2.6 Please indicate how important is each of the following in your purchase decisions?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
Customers' comments	○	○	○	○	○
Product price	○	○	○	○	○
Product description	○	○	○	○	○
Seller reputation	○	○	○	○	○
Brand reputation	○	○	○	○	○
Customer service	○	○	○	○	○

2.7 Please indicate how important is each of the following in your decision NOT to purchase?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
Poor customer service.	○	○	○	○	○
I'm afraid that my personal information would be disclosed easily.	○	○	○	○	○
I'm afraid of buying the fake product.	○	○	○	○	○
I don't know how to shop online.	○	○	○	○	○

2.8 Please indicate how important is each of the following in you purchase a product that you DID NOT intend to?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
Cheap price	○	○	○	○	○
Discount	○	○	○	○	○
Advertising	○	○	○	○	○
Word of mouth	○	○	○	○	○

2.9 Please indicate how much you agree or disagree with each of the following statements.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I will experiment with an online shopping website and then decide whether or not to use it in the future.	○	○	○	○	○
I would be willing to shop online again.	○	○	○	○	○
I would have positive things to say about shopping online.	○	○	○	○	○
I will keep shopping online, even if I have had a bad shopping experience in the past.	○	○	○	○	○
I enjoy online shopping more than in-store shopping.	○	○	○	○	○

Section 3: Main

Suppose, you are looking to buy a multivitamin from an online shop.

3.1 Please indicate how important is each of the following in your purchase decision.

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
Reputation of the supplement.	○	○	○	○	○
Health and personal care dietary specialty (i.e., organic, no-gmo, gluten-free, vegetarian, etc).	○	○	○	○	○
Health and personal care format (i.e., pill, gummy, capsules, gels).	○	○	○	○	○
Quantity per serving.	○	○	○	○	○

3.2 How much do you regularly spend to buy a bottle of multivitamin?

- ○ Less than $10
- ○ Between $10 to $20
- ○ Between $20 to $30
- ○ More than $30
- ○ I have never bought any multivitamin.

3.3 Which format of multivitamins, you prefer to have?

- ○ Pill
- ○ Gummy
- ○ Capsule
- ○ No difference

3.4 Do you prefer any dietary specialty to follow? (You can choose multiple choices).

- [ ] Organic
- [ ] No- GMO (Non- Genetically Modified Organisms)
- [ ] Gluten free
- [ ] Vegan
- [ ] No diary
- [ ] None

3.5 Please indicate how important is the quantity of multivitamins per serving for you.

- ○ Extremely likely
- ○ Somewhat likely
- ○ Neither likely nor unlikely
- ○ Somewhat unlikely
- ○ Extremely unlikely

3.6 Please indicate how important is the price of multivitamins per serving for you.

- ○ Extremely likely
- ○ Somewhat likely
- ○ Neither likely nor unlikely
- ○ Somewhat unlikely
- ○ Extremely unlikely

An Experimental Condition

Stage1

Please assume that you are willing to buy a multivitamin from an online shop and your budget is $30. The online vitamin shop that you are using will show you three random multivitamins with basic information including ID, counts per serving, price, and etc. For the following questions, please carefully read each multivitamin information.

ID	**W82**
Name	Vitafusion Women's Gummy Vitamins
Size	150 count
Format	Gummy
Dietary Type	Gluten Free
Price	$9.39 ($0.06 / count)
Ingredients: Retinyl palmitate, ascorbic acid, cholecalciferol, dl-alpha-tocopheryl acetate, inositol niacinate, pyridoxine HCl, folic acid, cyancobalamin, biotin, calcium d-pantothenate, tricalcium phosphate, potassium iodide, chromium picolinate, choline bitartrate, inositol niacinate, boron citrate, glucose syrup, sucrose, water, gelatin; less than 2% of: blend of oils (coconut and/or palm) with beeswax and/or carnauba wax, citric acid, colors (blueberry and carrot concentrates, lycopene, purple carrot juice concentrate), lactic acid, and natural flavors. Contains tree nuts (coconut).	

ID	**W73**
Name	Women's Daily Multivitamin/Multimineral Supplement
Size	60 count
Format	Capsules
Dietary Type	Gluten Free/ No diary
Price	$18.97 ($0.31 / count)
Ingredients: Per serving (2 capsules): Folic Acid 400mcg, Biotin 300mcg, Vitamin A (Beta Carotene) 2000IU, Vitamin C (Ascorbic Acid) 150mg, Vitamin D (Cholecalciferol) 400IU, Vitamin E (DI-Alpha Tocopherol Acetate 50%) 30IU, Vitamin B1 (Thiamine Mononitrate) 7mg, Vitamin B2 (Riboflavin) 7.5mg, Vitamin B3 (Niacin) 30mg, Vitamin B6 (Pyridoxine HCL) 7.5mg, Vitamin B12 (Cyanocobalamin) 27mcg, Vitamin B5 (D-Calcium Pantothenate) 10mg, Calcium 50mg, Magnesium (Oxide 58%) 50mg, Zinc (Oxide 80%) 15mg, Selenium (AAC 0.2%) 30mcg, Copper (gluconate 13%) 2mg, Manganese (Chelate 20%) 2mg, Chromium (Picolinate 20%) 120mcg, Molybdenum (1% Trit) 75mcg, Female Support (Wild Yam Extract, Red Clover Extract, Lutein, Cranberry Extract, Alpha Lipoic Acid, Lycopene) 192mg, Immune Blend (Goldenseal Root, Echinacea, Spirulina, Garlic) 115mg, Antioxidant Fruit & Energy Blend (Green Tea (caffeine), Hawthorne Berries, Cinnamon Bark Extract, Bilberry Fruit Extract, Grape Seed Extract, Black Currant Fruit Extract, Pomegranate Fruit Extract) 187mg. Other ingredients: Cellullose (Vegetable Capsule), Rice Flour, Magnesium Stearate, Silicon Dioxide. Contains Caffeine (Green Tea).	

ID	**W06**
Name	One A Day Women's Multivitamin
Size	120 count
Format	Pills
Dietary Type	Regular
Price	$10.66 ($0.04 / count)
Ingredients: Calcium Carbonate, Microcrystalline Cellulose, Dicalcium Phosphate, Ascorbic Acid, Ferrous Fumarate, Maltodextrin; Less than 2% of: Beta-Carotene, Biotin, Cholecalciferol, Chromium Chloride, Croscarmellose Sodium, Cupric Oxide, Cyanocobalamin, DCalcium Pantothenate, dl-Alpha-Tocopheryl Acetate, FD&C Blue #2 Aluminum Lake, FD&C Yellow #5 (tartrazine) Aluminum Lake, FD&C Yellow #6 Aluminum Lake, Folic Acid, Gelatin, Hydroxypropyl Methylcellulose, Magnesium Oxide, Manganese Sulfate, Niacinamide, Phytonadione, Polyethylene Glycol, Potassium Iodide, Pyridoxine Hydrochloride, Riboflavin, Silicon Dioxide, Sodium Selenite, Stearic Acid, Thiamine Mononitrate, Titanium Dioxide (color), Vitamin A Acetate, Zinc Oxide.	

3.7 How likely would you be buying these products?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
W82	○	○	○	○	○
W73	○	○	○	○	○
W06	○	○	○	○	○

stage 2

The online vitamin shop wishes to provide you more information about the multivitamins including customers' overall ratings, commercial images and description of the product.

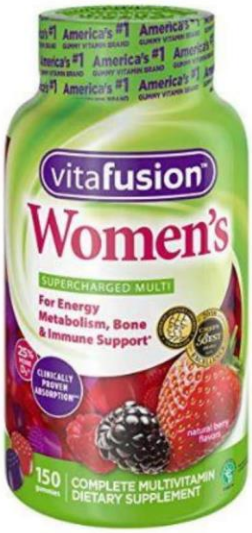
Customer reviews

3,177

4.4 out of 5 stars

5 star	71%
4 star	12%
3 star	6%
2 star	4%
1 star	7%

ID: W82
Vitafusion Women's Gummy Vitamins, 150 count
Price: $9.39 ($0.06 / count)



About the product

- A complete multivitamin + Antioxidant vitamins C and E specially formulated to support the specific health needs of women
- Clinically Proven Absorption[4]
- A convenient alternative to hard-to-swallow pills.
- Contains NO high-fructose corn syrup, NO artificial sweeteners, NO gluten, NO dairy and NO synthetic (FD&C) dyes
- "Recipient of the 2018 ChefsBest Excellence Award. The ChefsBest Excellence Award is awarded to brands that surpass quality standards established by independent professional chefs."

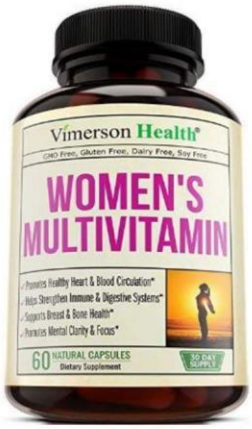
Customer reviews

745

4.4 out of 5 stars

5 star	73%
4 star	12%
3 star	6%
2 star	2%
1 star	7%

ID: W73
Women's Daily Multivitamin Supplement, 60 count
Price: $18.97 ($0.31 / count)



About the product

- WHY CHOOSE US: Unsatisfactory Health? Lack of motivation for your tasks daily? Vimerson Health may have you feeling healthier and more energized* with this perfectly combined daily multivitamin and mineral supplement; Our blend promotes heart health and blood circulation*, helps strengthen immune and digesitive systems*, supports breast and bone health* as well as promoting mental clarity and focus*
- DESIGNED FOR WOMEN: This multivitamins health supplement is tailor made to meet the everyday nutritional needs of women;* It's fortified with vitamins and minerals to boost energy, manage weight, strengthen the immune system, and slow down the aging process*
- BETTER OVERALL HEALTH: Look and feel great with this multivitamin for women formula;* It may help facilitate better energy conversion from food while boosting energy levels, and strengthen bones while promoting breast health*
- SAFE & GENTLE: Vimerson Health's Women's Multivitamin is formulated with the safest and most gentle ingredients; A friendly supplement with no hormones, or preservatives, also, is soy-free, yeast-free, sugar-free, GMO-free, gluten-free, and dairy-free
- THE BEST INGREDIENTS MADE FOR YOU: Folic Acid Biotin Vitamin A (Beta Carotene) C D E B1 B2 (Riboflavin) B3 (Niacin) B5 B6 B12, Calcium, Magnesium, Zinc, Selenium, Copper Manganese, Chromium, Molybdenum, Wild Yam Extract, Red Clover Extract, Lutein, Cranberry Extract, Alpha Lipoic Acid, Lycopene, Goldenseal Root, Echinacea, Spirulina, Garlic, Green Tea, Hawthorne Berries, Cinnamon Bark Extract, Bilberry Fruit Extract, Grape Seed Extract, Black Currant Fruit Extract & Pomegranate Fruit Extract

182 customer reviews

4.4 out of 5 stars

5 star	73%
4 star	16%
3 star	2%
2 star	3%
1 star	6%

ID: W06
One A Day Women's Multivitamin, 250 count
Price: $10.66 ($0.04 / count)

About the product

- One A Day Women's Multivitamin is a complete multivitamin specially designed for the leading concerns of women like bone health
- Contains key nutrients like Vitamins A, B6, C, D, E, and K, Riboflavin, Thiamin, and Niacin
- Formulated to support: bone health, immune health, skin health, heart health(1), and physical energy by helping convert food to fuel
- Adult women should take one tablet daily with food
- One A Day Women's Multivitamin is free of gluten, wheat, dairy, artificial flavors, and artificial sweeteners

3.8 Please indicate how helpful is each of the following in your purchase decision?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
The product overall rate	○	○	○	○	○
The number of customers' reviews	○	○	○	○	○
The image of the product	○	○	○	○	○
The company's description	○	○	○	○	○

3.9 Considering the additional information, how likely would you be buying these products?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
W82	○	○	○	○	○
W73	○	○	○	○	○
W06	○	○	○	○	○

Stage3

For the following questions, the online vitamin shop is willing to provide even more detailed information about the multivitamins. This information includes prior customers' reviews and uploaded images.

Customer reviews

3,177

4.4 out of 5 stars

5 star	71%
4 star	12%
3 star	6%
2 star	4%
1 star	7%

ID: W82

Vitafusion Women's Gummy Vitamins, 150 count

Price: $9.39 ($0.06 / count)

Melinda Brown

Perfect vitamin for women!

June 22, 2019

Style: Complete | Verified Purchase

If you not fond of swallowing vitamins in the pill form, THIS IS THE VITAMIN TO TAKE!

Helpful | Comment | Report abuse

JASON P

They are ok

June 21, 2019

Style: Complete | Verified Purchase

Value for price - good. Flavor - it's fine but not wonderful. Texture - a little too gummy. Not my fav.

Helpful | Comment | Report abuse

PKDobbs

Not keeping my nails from breaking.

June 21, 2019

Style: Complete | Verified Purchase

Seems as good as any other. Except my nails are breaking off. I take 2 at a time.

Helpful | Comment | Report abuse

jeramie workman

It works

June 21, 2019

Style: Complete | Verified Purchase

They cleared up my acne which was nice and I feel a difference in how I feel when I take them

Helpful | Comment | Report abuse

roxana

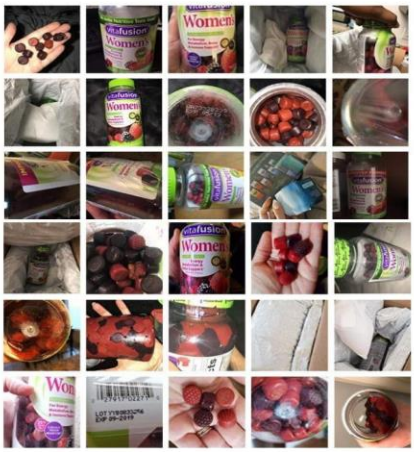
love the flavor

June 20, 2019

Style: Complete | Verified Purchase

good flavor

Helpful | Comment | Report abuse



Customer reviews

745

4.4 out of 5 stars

5 star	73%
4 star	12%
3 star	6%
2 star	2%
1 star	7%

ID: W73
Women's Daily Multivitamin Supplement, 60 count
Price: $18.97 ($0.31 / count)

Alexa soto

Happy

June 22, 2019

Size: 60 Count | Verified Purchase

Aswome

Helpful | Comment | Report abuse

ROB

Use Caution when consuming

June 22, 2019

Size: 60 Count | Verified Purchase

Be careful of these vitamins, they made my cyst in my breast expand in size.

Helpful | 1 comment | Report abuse

Mich2014

Its a vitamin

June 20, 2019

Size: 60 Count | Verified Purchase

I guess its ok

Helpful | 1 comment | Report abuse

Amazon Customer

Highly recommend

June 19, 2019

Size: 60 Count | Verified Purchase

Contains alot of ingredients I need. Never makes me nauseous with or without food. I love them.

One person found this helpful

Helpful | Comment | Report abuse

Lester Ellis

easy on the stomach

June 18, 2019

Size: 60 Count | Verified Purchase

It gives good energy

One person found this helpful

Helpful | Comment | Report abuse

182 customer reviews

4.4 out of 5 stars

5 star	73%
4 star	16%
3 star	2%
2 star	3%
1 star	6%

P.J.

In

June 22, 2019

Verified Purchase

Like

Helpful | Comment | Report abuse

Anabel perla

Pricd

June 22, 2019

Verified Purchase

Like product

Helpful | Comment | Report abuse

chiara

Good quality vitamins

June 22, 2019

Verified Purchase

Recommended! Good quality vitamins for an affordable price

Helpful | Comment | Report abuse

gladysschulte

It is a good quality vitamins.

June 21, 2019

Verified Purchase

It is a vitamin.

Helpful | Comment | Report abuse

Laniah Robey

Easy to take

June 21, 2019

Verified Purchase

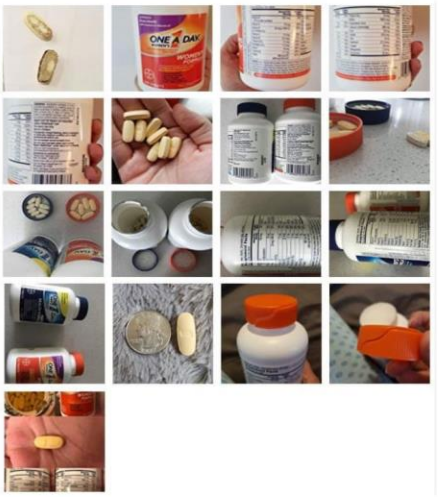
The smell of the bottle is a little different, but the pill is easy to swallow. I have been taking these for about 2 months now and I feel less tired and achy.

Helpful | Comment | Report abuse

ID: W06

One A Day Women's Multivitamin supplement, 250 count

Price: $10.66 ($0.04 / count)



3.10 Please indicate how helpful is each of the following in your purchase decision?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
Company description	○	○	○	○	○
List of ingredients	○	○	○	○	○
Commercial image	○	○	○	○	○
Customers overall rating	○	○	○	○	○
Customers online reviews	○	○	○	○	○
Uploaded images by customers	○	○	○	○	○

3.11 Considering the additional information, how likely would you be buying these products?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
W82	○	○	○	○	○
W73	○	○	○	○	○
W06	○	○	○	○	○

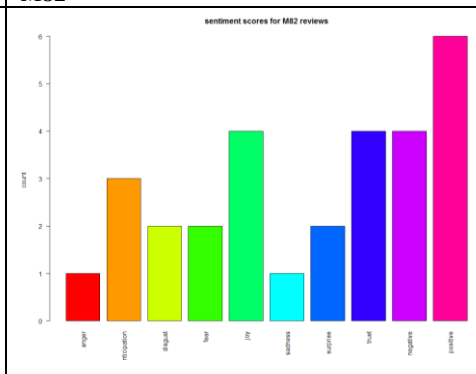
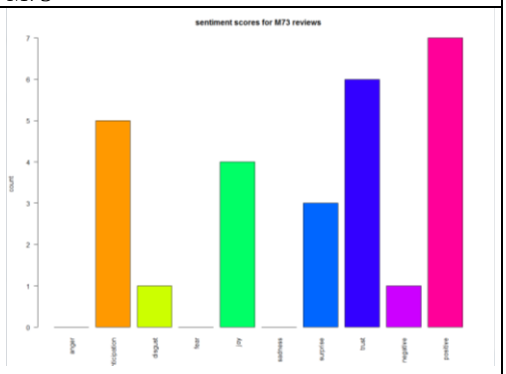
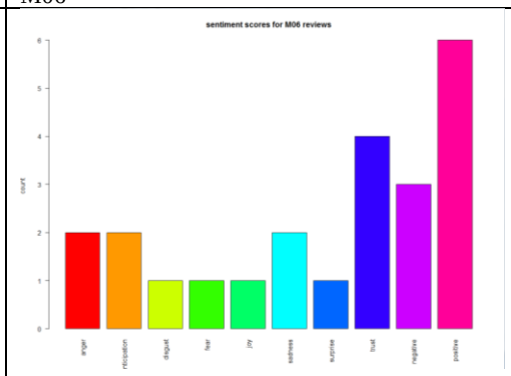
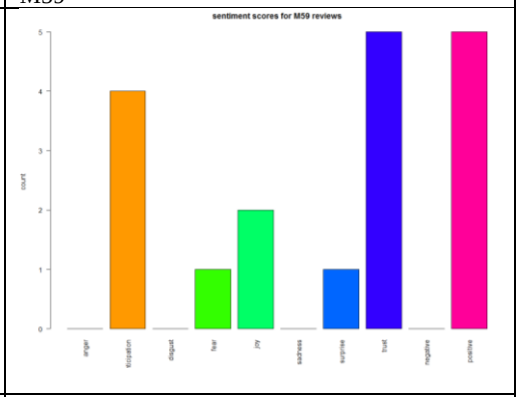
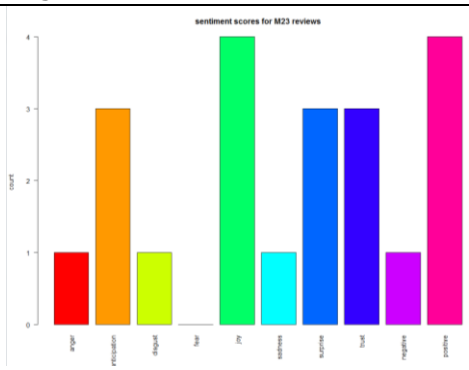
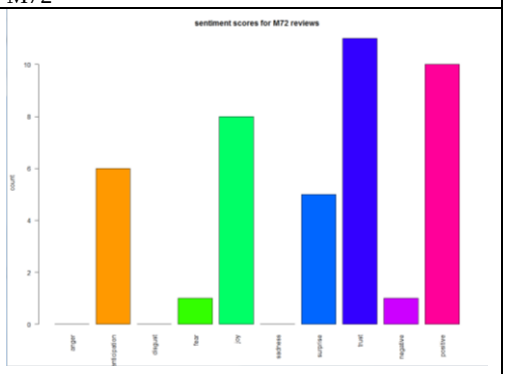
APPENDIX B

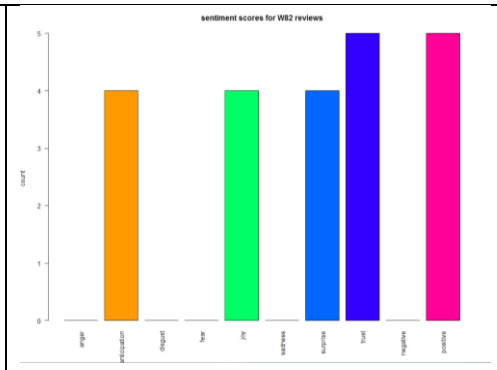
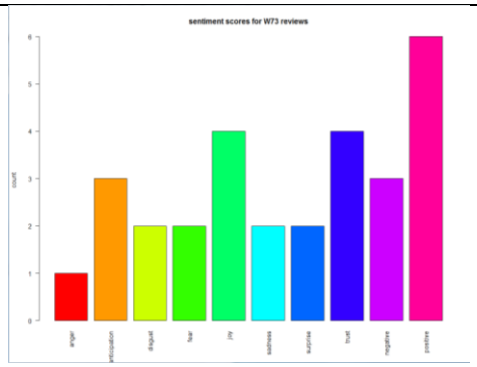
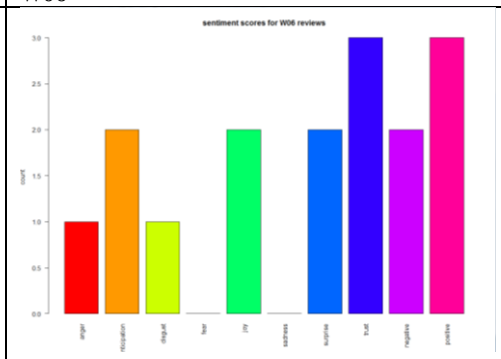
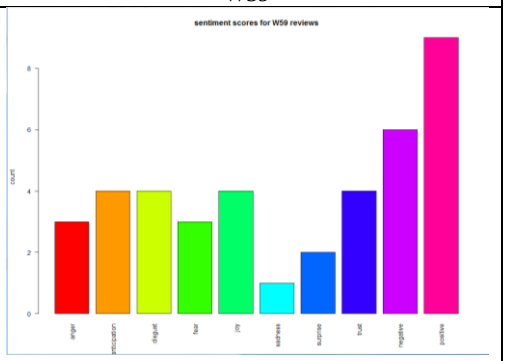
MULTIVITAMINS PROFILES

Product ID	Price Per Count ($)	Size	Customers Overall Rate out of 5	No. All Available	Ave of Reviews Rates	Number of Images	Reviews Negativity	Reviews Positivity	Ingredients Index	Vendors' Description Index
M06	0.11	150	4	2465	4	36	3	6	79	168
M23	0.07	200	4.4	894	4.4	16	1	4	53	87
M59	0.32	60	4.5	519	4.5	30	0	5	79	107
M72	0.16	120	4.2	1315	4.2	26	1	10	9	99
M73	0.22	60	4.1	561	4.1	0	1	7	364	16
M82	0.06	150	4.3	1538	4.3	24	4	6	58	72
W06	0.04	250	4.4	182	4.8	21	2	3	79	81
W23	0.11	180	4.3	60	5	17	0	10	148	64
W59	0.13	75	3.6	433	3.2	11	6	9	130	131
W72	0.09	180	4	928	4.8	23	4	10	43	117
W73	0.31	60	4.4	745	3.6	30	3	6	153	234
W82	0.06	150	4.4	3177	4.8	30	0	5	70	69

APPENDIX C

RESULTS OF TEXT MINING

ID	M82	M73
Sentiment Scores		
ID	M06	M59
Sentiment Scores		
ID	M23	M72
Sentiment Scores		
ID	W82	W73

Sentiment Scores		
ID	W06	W59
Sentiment Scores		
ID	W23	W72
Sentiment Scores