THE EFFECTS OF CONGRUENT AMBIENT SCENT ON EMOTIONS AND EVALUATIONS

‘The Effects of Ambient Scent on Perception of Time, Buying Behavior, and Evaluations of Environment’
‘An Empirical Study for the Passengers at Budapest Airport’

"A rose by any other name would smell as sweet"
William Shakespeare, Romeo & Juliet

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1. INTRODUCTION

‘You are only here for a short visit. Don’t hurry, don’t worry. And be sure to smell the flowers along the way’ Walter Hagen

One of the most important and ancient senses is our sense of smell. It helps us in our journey of life by indicating objects that should be approached or avoided (Axel, 1995). Not only has it practically guided us to survive but it also by evokes our emotions (Hertz, 1997). Sense of scent has influenced sense of beauty, art and pleasantness. However, power of smell is usually undervalued compared to our other major senses such as vision, hearing or touch (Martin, Apena, Chaudry, Mulligan, & Nixon, 2001; Morrin, 2010).

Olfactory research literature has been continuously shaped by different disciplines such as anthropology, and psychology among others. After marketers realized the importance of sense of scents, it also became a research area for the last decade. The desire of marketers to capture the emotional experience of consumers motivates them to understand each sense of human. Visual elements are well-known and widely-used sense of human in case of advertising. Despite using visual elements is not the only way to evoke emotions of consumers and by doing so offering a unique experience. In the past decade, marketers realize also that scent can play a major role in differentiating brands in market place and as well as increasing the quality of service and satisfaction level of customers. That’s how ‘scent marketing’ terms is derived which refers; ‘to set a mood, promote products or position a brand by using the scents’ (Morrin, 2010; Vlahos, 2007). Marketers have used scents as primary product attribute for particular products such as deodorizers, personal cosmetics or room odors. In such examples, scent is the main determinant for the customer’s choice of the brand. However, scents can also be used as secondary product attribute which supports the brand to differentiate itself from products of competitors.

Scent marketing is not only about characterizing scents with certain products. It is popularized more in recent years due to the application of ambient scent which refers to emitting scent into the atmosphere of places in order to enhance the experience of customers (Kotler, 1973). Ambient scent is also defined as ‘scent that is not emanating from a particular object but present in the environment’ (Spangenberg, Crowley, & Henderson, 1996). Additionally, a small industry has appeared in recent years to meet
the demand comes from stores, hotels, casinos and museums for ambient scent (e.g.: AirAroma, AromaSys, ScentAir, and Prolitec and also The Scent Marketing Institute) (Morrin, 2010).

1.1. Problem Definition

Ambient scent have taken much attention for the last decade as an atmospheric stimuli and used by retailers to promote their stores or increase the perception of their customers. Ambient scent can be defined as ‘scent that is not emanating from a particular object but present in the environment’ (Spangenberg, Crowley, & Henderson, 1996). In this context, previous literature of ambient scent indicates that in-store scent researches have concentrated on different dimensions of ambient scent such as congruent scent and product evaluations (Bosmans, 2006; Mitchell, 1995), waiting lines and queuing (McDonnell, 2007), buying behavior and spending (Chebat & Michon, 2003; Dowdey, 2008; Vlahos, 2007; Knasko, 1989; Ravn, 2007) congruency of scent in store (Mattila & Wirtz, 2001) scents effect on memory (Engen & Ross, 1973) perception of spatial density and effects on anxiety (Poon & Grohmann, 2014), usage of ambient scent with music (Spangenberg, Grohmann & Sprott, 2005), gender related congruent scents (Thuvander & Fredriksson, 2015). Scents are also part of servicescape literature where it has been discussed with other environmental stimulus such as temperature, noise, decor and light (Zeithaml & Bitner, 1996). Despite, there are few studies that have discussed only the effects of ambient scent in service settings.

Even though there is large literature that has studied different dimensions of ambient scent effects, most of them were conducted in controlled laboratories (Mitchell, 1995), clothing stores (Doucé & Janssens, 2015), shopping mall (Teller & Dennis, 2011), retail store (Morrison, Gan, Dubelaar, & Oppewal, 2011), there is no research has found which studies effects of ambient scent in an airport security screening area.

There are studies for influence of physical attributes of service settings on travelers’ enjoyment and anxiety and also satisfaction in an airport (Vanja, Yang, Cobanoglu, Bilghihand, & Bujisic, 2016). Managers from different industries also increasingly pay attention to the atmosphere in the place where the interaction occurs between customers and products or services. Color, lighting, temperature, music, décor…etc. on the other
hand, there is scarce interest on any olfactory research so far that only focuses on the effects of ambient scent as an independent factor.

1.2. Aim of the study

The aim of this research is to explore the effects of pleasant ambient scent on passenger’s emotions in an airport setting. Passengers are expected to be more aroused and also have more anxiety and stress level than normal situation due to the airport security screening procedure and nature of traveling via plane. Moreover, it will also explore how these emotions influence behaviors, perceptions and buying tendencies of passengers. In order to do so, this research utilized Mehrabian and Russell (1974) S-O-R model which can be considered as the most common model for olfactory research. By modifying the model according to the airport setting, ambient scent’s effects on passengers are intended to be discovered.

Scents used in this research are provided by Aromamedia Kft. which is a commercial company and offers different scents to its clients. Thus, scents are industrial or commercial scents which practically were also used by companies in real life situation.

The field research of the paper was conducted in security screening area of Budapest Airport. The data collected in three weeks for three different setting conditions between August-September 2016.

1.3. Structure of the Research

The research paper starts with the introduction where it contains a research background about ambient scent literature. It continues with a more focused problem definition based on previous literature and justifies the research questions.

In the second part of the research, theoretical framework is given where it explains the previous literature about retail environment and atmospheric, continue with olfaction research where the question of definition of ambient scent, its effects on consumer behavior, definition of emotion, effects of scents on emotions, influence of scents on anxiety were discussed in detail. Moreover, it goes by explaining the Stimulus-Organism-Response Model by dividing it into the subcategories of original Pleasure-Arousal-Dominance model of Mehrabian and Russell, how the Mehrabian model is related with affective, cognitive and conative responses and explaining modified model of Mehrabian model which is used for this research. The aim of this section is for
understanding the model used in this research and summarizes the literature by explaining the terms related with it.

In the third part of the research, hypotheses were developed where it slightly explained the literature behind each hypothesis and their reasoning by categorizing them according to the model and according to the literature background.

In the fourth part of the research, methodology used in the research is presented systematically. It explains the research methodology and measures by showing the literature behind it. It explains each hypothesis step by step and reasoning behind it. Moreover, it explains how and which scale, also methods were applied in order to measure emotional and behavioral responses of the passengers, perceived quality of airport security screening, the passenger’s overall evaluation of security screening and the passenger's time perception. Moreover, it continues with sample size characteristic and composition and pretest. Subsection of pretest is described in detail by giving the methodology, purpose and setup of the test. The fourth part of the research ends with explaining the field work procedure where there are details of which dates and procedures were applied for conducting the main research.

In the fifth part of the research, the data acquired with fieldwork was analyzed deeply in order to test each hypothesis of the research. It explains what kind of structure was followed and which type of analysis were utilized in order to analyze the data. It has a structure where each hypothesis was tested step by step through analyzing the data acquired from fieldwork by using SPSS and AMOS software.

In the last section of the research, conclusions are drawn around the most interesting results. It also includes suggestions for the managers in the industry and future research in the area of research.
2. THEORITICAL FRAMEWORK

‘Nothing is more memorable than a smell. One scent can be unexpected, momentary and fleeting, yet conjure up a childhood summer beside a lake in the mountains’

2.1. Retail Environment and Atmospherics

Retail Environment is an important determinant of formation of consumer’s impression of the store. In order to induce positive reaction and emotions, the necessity of carefully designed environment is essential part of retailing. Published work about retail atmospherics can be traced back to the Kotler’s work ‘Atmospherics as a Marketing tool’ where it clearly states that one of the most significant feature of the total product is the place where it is bought or consumed. In some cases atmosphere of the place is more influential than the product. It can be even the main product in some cases (Kotler, 1973). Atmospherics can be described as the conscious designing of space to create distinctive and certain effects in buyers (Kotler, 1973). Atmosphere always refers as quality of surrounding space and perceived through the set of senses. Ambience, design and social factors of a store’s selling environment are forming the term of retail atmospherics. (Baker, Parasuraman, Grewal, & Voss, 2002) Previous researches have used various environmental factors and have conducted atmospherics research in field of environmental psychology (Spangenberg, Grohmann, & Sprott, 2005). Mehrabian and Russell’s PAD model mostly has been used to assess environmental effects on people. Scholars are now convinced that factors such as the time spent in store and emotional states of shoppers have a considerable impact on their purchasing process and satisfaction levels (Dawson, Bloch, Ridgway, 1990; Spangenberg, Grohmann, & Sprott, 2005).

One of the main sensory channels for atmosphere is scent. In order to induce positive reaction and emotions in retail settings, scent marketing can be considered as the latest frontier in an advertising landscape that has nearly exploit the all possibilities of auditory and visual marketing. The Retailers, hotels and restaurants already carefully consider what kind of smells that will help them to amplify consumer spending and
create memorable brands. Some brands also position scents as an integral part of their image (Dowdey, 2008).

2.2. Olfaction Research

2.2.1. What is ambient scent?

Ambient scent has received less attention than other atmospheric stimuli (Martin, Apena, Chaudry, Mulligan, & Nixon, 2001; Morrin, 2010). To further formulate the description of smell which is perceived inside of an environment is done with an introduction of the term of ‘Ambient Scent’. It commonly refers as a sum of generally presented odor in a particular environment which also has no relation to the specific product (Bone, & Ellen, 1999). Usage of ambient scent is common among the retailers and store owners due to the cheap and high effectiveness character in case of attracting consumers (Spangenberg, Grohmann, & Sprott, 2005). Large literature supports the idea that pleasantly scented environments foster approach behaviors while unpleasant environment evoke avoidance behaviors (Bone & Ellen, 1999).

2.2.2. Ambient Scent on Consumer Behavior

While there is a significant body of scientific research on the effects of odors on human physiology and psychology, the research corpus on the effect of ambient scent on consumer behavior is much more limited (Spangenberg, Crowley, & Henderson, 1996; Gulas & Bloch, 1995). Past researches of the effects of scent on consumer behavior can be grouped into three main categories; first category focuses on presence of a scent and it compares it with no presence, in result such research concludes that presence of scent will generates positive emotional and behavioral responses. Second category is to find out whether if there is a positive impact of selecting certain scents on certain environments to understand congruency of the scent with environment. Third category can be grouped into scent pleasantness where prior research reveals that presence of pleasant scent might result with positive affective or behavioral responses while having an unpleasant scent might result vice versa (Bone & Ellen, 1999; Meda & Ioan, 2013).
Scent effects the consumption of individual in two ways. First way can be associated with a product itself which basically refers if an object is scented with a pleasant congruent scent, evaluation of the item would be positive. In the second category, scent is considered inside of an environment.

Large relevant literature supported the idea that scent added to any product would increase their appeal. Dishwashing soups scented with orange, lemon or cleaning products with fresh scents can be good examples. On the other hand ambient scent has also direct impact on the consumer behavior. Marketers have long studied that the environment where products and services are delivered have an impact on the consumer responses (Belk, 1975; Lutz, 1975; Kotler, 1973; Donovan & Rossiter, 1982).

Ambient Scent have the ability to influence consumption activity. A study has showed that when a pleasant ambient scent was introduced to one section of a casino, slot machine gambling significantly increased compared to non-scented times. (Hirsch, 1992; Kirk-Smith & Booth, 1987) found out that people rate attractiveness of photographs with higher ratings when a pleasant scent is present in the environment. (Hirsch, 1991) also showed that respondents were tend to buy Nike shoes in a scented room rather than the same shoes in other un scented areas.

Large literature of olfactory research has already demonstrated that ambient scent has an impact on consumer behavior. Hirsh (1995) found that when there is ambient scent on the environment, amount of money gambling on a slot machine in casino has increased. Knasko (1995) examined whether if there is an effect of ambient olfactory stimuli on approach behavior, mood and perceived health. He eventually concluded that presence of ambient scent improved mood also resulted with approach behavior (Knasko, 1989; 1995).

Effects of ambient scent on evaluation, attention and memory also investigated by Morrin and Ratneshwar (2000) for unfamiliar brands and they concluded that; in a pleasantly scented environment, respondent’s memory and attention has been improved to brand stimuli. The impact of congruent and incongruent ambient scent were the same on brand recognition. Brand memory was affected only by the presence of ambient scent at the brand encoding. It increases the attention but despite, brand recall was not influenced by ambient scent at the brand retrieval stage (Morrin & Ratneshwar, 2003).
Paper of Donovan et.al (1982) which extends the Rossiter et.al (1982) can be one of the earliest example where it uses a broader sample of shoppers and measures emotions during the shopping experience rather than before or after and also explain the effects on shopping behavior by implementing Mehrabian and Russell Model (1974) with two dimensions of emotional states; pleasure and arousal. Results of the study can be summarized as pleasure level and arousal was a significant predictor of both extra time spent in the store and unplanned spending which confirms that pleasure experienced within the store and arousal level had a positively correlated with unplanned time spent and unplanned purchasing. Additionally, arousal was positively correlated with unplanned time purchasing in pleasant environments but inversely correlated in unpleasant environments.

Examples of ambient scent in commercial activities can be varied. Real estate agents have long taken the advantage of this influence by popping a pie into the oven or use the fresh smell of cookies right after they present the house in order to set up a cozy home stage. Fresh smell of baked cookies influence buyers by giving them a sense of ideal house. Another example can be for instance, the subtle fragrance of vanilla and mandarin orange which is specially designed for Sony, at Sony Style Store which aims to relax consumers and help them to buy (Fetterman & O'Donnell, 2006). Bloomingdales uses baby powder scent in the baby department while they use suntan lotion scent in the bathing suit area, and lilac scent in the lingerie department (Ravn, 2007) Thomas Pink which is a clothing chain company uses a scent of clean, pressed shirts in its stores in order to communicate cleanliness (Fetterman & O’Donnell, 2006). The importance of ambient scents for retailers and researchers arises from the argument that scent is one of the most powerful of the human senses (Rodriguez-Gil, 2004) because of its strong physiological links to human emotion (Chebat & Michon, 2003) and long-term memory (Goldman & Seamon, 1992). Thus, smell is an attractive tool for marketers also due to its ability to stay long in our memories. Ambient scent reveal emotional responses and arouses memories even from childhood (Engen & Ross, 1973). Wilkie (1995) also found out in his research that scent is one of the most emotional sense which can be considered to be the most closely attached to the emotional reactions. Odor identification stays long in our memory (Engen & Ross, 1973). These effects are result of the proximity of the olfactory bulb to the limbic
system. Limbic system is a neurological structure that is responsible for emotions and encoding long-term memory (Swenson, 2006). Limbic system is also considered as an emotional center of the brain (Swenson, 2006). The limbic system influences spatial memory, scents may have the potential to change the spatial perception through scent associations (Hirsch & Gruss, 1998). Process can be summarized as smells are perceived by olfactory cells and neurons which are bind to odorants. The odorant stimulates a receptor and the cells sends an impulse to the olfactory bulb where the smells are interpreted which is also part of limbic system. Smells are closely connected to the hippocampus and strongly influence our behavior mood and memory. Scent also enhances memory for information associated with a smell (Krishna, Lwin, & Morrin, 2010) Ambient scent enhances remembrance (Morrin & Ratneshwar, 2003) It also shape store and merchandise evaluations (Bone & Ellen, 1999) particularly when it is adequate with other ambient factors (Mitchell, 1995) and consumer characteristics (Spangenberg, Sprott, Grohmann, & Tracy, 2006).

A good example to prove the association can be the research which conducted by Hirsh (1998) Research result can be summarized as the scents that are highly associated with spacious or outdoor environments enhance perceptions of spaciousness of an environment (Hirsch & Gruss,1998). On the other hand, scents which are highly associated with indoor environments may decrease the perceived spaciousness of an environment (Hirsch & Gruss,1998). In result, smells associated with spacious outdoor environment can enhance the experience of consumers in limited size of store environment.

Another important research question in olfactory literature is the congruency of scent with the product and environment which plays a vital role in shaping the consumer’s attitude and emotions. It is proposed that rather than the simple congruent/incongruent dichotomy that earlier studies have assumed, there is a competing proposition that allows for some scents to be associated environment, and to have a positive relationship with consumer affect and behavior similar to the relationship which congruent scents have. Wirtz et al. (2007) show, in their study of service settings, that arousal-level affective expectations are important because satisfaction in pleasant service environments was maximized when there was congruency with the environment expectations. Furthermore, Mattila and Wirtz (2006) show that even an intrinsically
attractive store can be perceived as unpleasant if it fails to meet the shopper’s arousal expectations. Thus, selection of smell should be done in a harmony with the environment where it released and with the product. Otherwise wrong selection of scent can induce unpleasant emotions for consumers. A good example for a wrong selection of smell can be ‘Got Milk’ campaign. When California’s Milk Processor Board conducted a marketing series of ‘Got Milk?’ campaign and setting billboards in San Francisco’s bus stops by hoping to create a sense of crave milk, city officials ordered the immediate removal of cookie-scented strips from bus shelters due to the amid public concern over potential allergic reactions to scented products (Gordon, 2006). Poor choice of smell can have unfavorable effects on consumer perceptions. For example, floral scents in a store call the memories of funerals (Bone & Jantrania, 1992). Thus, as a result, pleasant ambient scents can also fail to have a desired effect if they are not suitable with consumers expectations or preferences. Appropriateness of the scent is a critical consideration and should be taken into account. An odor might be judged as a pleasant dependent from any environmental factor however, an odor in an environment judged contextually and should be congruent with context (Spangenberg, Grohmann, & Sprott, 2005).

2.2.3. What is the Emotion?

In this section, definition of emotion and how it differs from moods was evaluated. Definition of Emotion is still controversial and open to debate for scholars coming from different disciplines. Each attempt to describe emotions precisely ends up with intensified opposition from other scholars. Even though the term is used in studies so frequently, definition of the term is always different. The study of emotion has evolved and received different approaches like componential approaches. Componential Approaches are based on idea which emotional processes are caused and dynamically patterned as the individual continuously and recursively appraises objects, behaviors, events, and situations regarding to their influence on general well-being. Componential Approaches challenge the classic conceptualizations of emotion like dimensional and emotional theories by showing the role of different phases of cognition and repetitive cyclonic phases of emotion in the determination of emotion (Sander, Grandjean, & Scherer, 2005).
Component process definition of emotion proposed by Scherer to explain the emotions as follows; emotion is defined as an episode of interrelated, synchronized changes in the states of all or most of the five organismic subsystems in response to the evaluation of an external or internal stimulus event as relevant to major concern of the organism (Scherer, 1987; Scherer, 2001; Scherer, 2005).

‘Emotion is a phylogenetically continuous mechanism allowing increasingly flexible adaptation to environmental contingencies by decoupling stimulus and response and thus creating a latency time for response optimization’ (Scherer, 1984; Scherer, 1987).

Process includes respective states of the five subsystems and process consists of coordinated changes (Scherer, 2005). According to K. Scherer, a typical emotional episode can be explained with the relations between components and subsystems. There are distinctive characteristics of emotions which certainly help us to understand the term broadly. According to definition of emotion by Scherer, it should has the characteristics of being event focus, appraisal driven, synchronized response, changing rapidly, impact on behavior, certain level of intensity and duration. Thus according to that, all emotions are mostly evoked by an external or internal stimulator which trigger a response after it is processed. Another characteristic of emotions is that it is connected to the specific events rather than intentional decision. It can be recalling of a memory internally or direct external event such as person’s own behavior which might result with certain emotions (Scherer, 2004).

Another important characteristic of emotions is that, eliciting events of emotions are tied with the results. In other words, they should be connected to or relevant to major concerns of the organism. That means, we usually cannot make an empathy or get emotional with the problems of the things or people that are not familiar to us. As Mark Zuckerberg stated ‘a squirrel dying in front of your house may be more relevant to your interest right now than people dying in Africa’ Thus we can conclude that emotions are tied to the relevancy of the eliciting event to our lives (Scherer, 1984; Scherer, 2005).

Intesity of the emotions is an important determinant when it comes to separate it from moods. Emotions play crucial role in behavioral adaptation and we can assume intesity of emotions can be a good feature to separate emotions from moods which are more generalized and required more input (Scherer, 2005). Moods are long lasting and cannot
be changed so quick. Duration of the emotions is also relatively short in order to allow us to behave in a flexible manner. Emotions purport a highly massive response mobilization. Despite, low intensity moods have little impact on behavior yet it takes much longer time (Scherer, 2005).

2.2.4. Effects of scents on emotions

Our responses are formed according to the scents that we are exposed every day. Each individual might rather prefer some scents and their choice of scent is different for the different places and situation. Most of our preferences of scent are based on emotional associations (Fox, 2008; May, Mindawati, 2010). Thus we can say that we form our feelings and ideas about scents depends on how scents are related with our emotions. Such linkages occurs between our limbic system and scents. Limbic system can be summarized as a part of our brain where we evaluate or process the emotions. Limbic system receives information or stimulus from our five main senses and link those stimulus with certain emotions.

Each scents can be associated with certain feelings, places, objects, experiences, time and people. We usually associate pleasant scent with good emotions and unpleasant scents with negative emotions. Since our limbic system is highly influencing our emotions, we can be easily satisfied with a good smell or reduce our anxiety and stress. Strong emotional experience in the process smelling a certain scent will most probably result with associations between scent and the current environment (Hertz, 1997).

According to large relevant olfactory literature, presence of a pleasant scent have a positive impact on evaluations of, and behavior within, a store; (Spangenberg, Crowley, & Henderson, 2000); or a shopping mall (Gulas & Bloch, 1995; Chebat & Michon, 2003). It can also improve evaluations and recall for brands (Morrin & Ratneshwar, 2000). The presence of a pleasant scent can even counteract negative aspects of a store experience such as having to wait in a queue (McDonnell, 2007).

How does scent influence anxiety?

Hirsch and Gruss (1998) show in their research that spatial perceptions of people can be changed by ambient scents. In addition, ambient scents are associated with anxiety reduction (Hirsch & Gruss, 1998) due to a strong physiological link between olfaction and emotion (Chebat & Michon, 2003). This suggests that the use of ambient scent in
retail environments might be an effective tool in the management of retail consumers’ space perceptions and anxiety levels.

The retail environment plays an important role in attracting consumers and creating a positive impression of the store (Baker, Parasuraman, Grewal, & Voss, 2002). Well-designed retail environments induce positive emotions and enhance purchase likelihood (Diefenbach, Conroy, Warren, James, Baker & Hon 1994; Kotler, 1973). Numerous studies demonstrate that that retail atmospherics – the ambience, design and social factors of a store’s selling environment (Baker, Parasuraman, Grewal & Voss, 2002) positively influence consumer’s perception of a store (Spangenberg, Crowley, & Henderson, 1996) and entail positive outcomes for retailers (Mattila, & Wirtz, 2001; Milliman, 1982; Spangenberg, Crowley, & Henderson, 1996).

Hirsch and Gruss (1998) conducted a lab study with eight participants (four men and four women). Following an administration of a series of depression, anxiety, and odor perception/identification measures, participants were seated in a space deprivation booth measuring 2.5 feet in diameter and 4.5 feet in height. They evaluated the perceived size of the space and then wore an unscented surgical mask (i.e. the no scent control condition) for 30 seconds before they evaluated the room size again. This procedure was repeated with ten surgical masks infused with two drops of scented oil (i.e. the scent conditions) that were provided in random order. The scents included in the study consisted of commercially available and pleasant indoor (barbecue smoke, vanilla, buttered popcorn, and charcoal roasting meat) and outdoor (tranquility, evergreen, seashore, cucumber, coconut, and green apple) scents that were classified by a sensory panel not involved in the main experiment.

Hirsch and Gruss (1998) suggest that the use of green apple scent could alleviate patient anxiety due to claustrophobia in clinical settings, such as during MRI scans, although it is important to note that the authors did not empirically test the impact of scent on measures of anxiety in this study

2.2.5. Effects of scents on cognitive processing of people

The link between odors and cognition dates back to 1932, when Laird investigated how scented hosiery influenced women’s perceptions of quality. Scents that are congruent with specific product actually improved product evaluation (Bone, Jantrania, 1992; Laird, 1932). Laird (1932) found that scent of hosiery affected the way homemaker’s
perception of quality for the hose. He used in his research four stockings with different scent and resulted that the stockings with narcissus scent performed better and generates more positive results.


Pleasant or unpleasant odors appear difficult to identify. They are thus significantly different from visual and audio cues (Schab, 1991). Consumers must depend on neighboring cues to identify odors for example, individuals are more likely to recognize a lemon-scented product if presented in a yellow container (Bone & Ellen, 1999).

2.3. S-O-R MODEL

2.3.1. Original PAD Model of Mehrabian and Russell

Pleasure, Arousal and Dominance Model developed in 1974 in order to assess environmental perception and experience, also to understand psychological responses. After that, many researchers have already applied this model to assess the experience of the physical environment. It uses the paradigm of Stimulus-Organism-Response (S-O-R) which offers us description of environment by including variables and behaviors to the retail settings.

S-O-R model has to possess a requisite of a stimulus taxonomy, a set of mediating variables and a taxonomy of responses. Stimulus, intervening and response variables have to be clear, comprehensive and also operationally measurable. There must be a well-defined expression of the relationship between stimuli and responses via variables (Donovan & Rossiter, 1982).

Response Taxonomy

Mehrabian and Russell assumes that all responses to an environment should be considered as approach or avoidance behaviors. Approach and Avoidance behavior have four aspects;
1- Willingness to stay in *physically* (approach) or to leave the current environment (avoid)
2- Willingness to look around and *explore* or avoid moving around or interacting with the environment
3- Willingness to communicate with others (approach), or to avoid interacting with others
4- Degree of approach or avoidance of performance and satisfaction with task performances

According to Donovan and Rossiter work on 1982; four aspects can be bound with the behaviors in retail environment. Physical approach and avoidance can be related with store patronage intentions at a basic level. Second aspect which is exploratory approach and avoidance can be related with in store search and exposure to a range of offerings. Third aspect which is communication approach and avoidance can be related with interaction with sales personnel and floor staff. Lastly, forth approach which is performance and satisfaction approach and avoidance can be related to repeat-shopping frequency as well as time and money expenditures in the store.

**Emotional States; Pleasure, Arousal and Dominance**

According to Mehrabian and Russell; Pleasure, arousal and dominance are perceived as three main dimensions of emotional responses to indicate state of feeling which was formulated as approach-avoidance behaviors (Mehrabian & Russell, 1974).
Figure 1. Three Faces of Emotion


**Pleasure**

Pleasure is defined as positive versus negative affective states. Pleasure is interpreted as ranging from extreme happiness or happiness to extreme pain or unhappiness. Pleasure-displeasure is linked to cognitive judgments of evaluation with higher evaluations of stimuli being associated with greater pleasure induced by the stimuli (e.g., excitement, relaxation, love and tranquility versus cruelty, humiliation, disinterest and boredom) (Mehrabian & Russell, 1974; Mehrabian, 1996).

**Arousal**

Arousal interpreted as a mental activity which describes the state of feeling. Mehrabian defined arousal as a combination of mental alertness and physical activity (Mehrabian, 1996). Arousal was proposed initially to account for the intensity but not the quality or direction of a behavior. Arousal is a feeling state which varies along a single dimension ranging from sleep to frantic excitement such as stimulated, relaxed, excited, and sleepy. In other words, it is the level of mental alertness and physical activity such as sleep, inactivity, boredom and relaxation at the lower end versus wakefulness, bodily tension, strenuous exercise, and concentration at the higher end (Mehrabian & Russell, 1974; Bakker, van der Voordt, Vink, 2014).
**Dominance**

Judgements of stimulus potency corresponded to state dominance-submissiveness. Higher potency stimuli cause lower dominance responses. Dominance was described as to what extend an individual feels limited by social or physical barriers in his behavior. It is connected to behavior such as controlling, influential and autonomous (Mehrabian & Russell, 1974; Mehrabian, 1996). Dominance also described as feelings range from a lack of control or lack of influence on events and surrounding to the opposite extreme of feeling influential and in control. Mehrabian (1996) used adjectives such as anger, relaxation, power and boldness versus anxiety, infatuation, fear and loneliness.

The PAD dimensions are orthogonal however there is a conditional interaction between pleasure and arousal in determining approach-avoidance. In a controlling environment (natural), moderate level of arousal will enhance the approach behavior while low arousal or high arousal leads avoidance behaviors. In a pleasing environment, more arousal will generates higher approach behavior while in an unpleasant environment, the higher the arousal, the greater the avoidance behavior would occur. Thus, two dimension of model is interacting with each other in that context.

**Stimulus Factors**

Since there is countless number of stimuli is involved in any environment setting, to create a complete stimulus taxonomy is extremely hard. To understand which kind of emotional responses would result of in store stimulus factors such as color arrangements, store layouts, noise level, and type of lighting and etc. cause approach or avoidance behaviors (Donovan & Rossiter, 1982).

According to the Mehrabian and Russell 1974, environmental stimulation can be explained with a general measure. They explain the load of environment depending on its degree of novelty and complexity. Novelty refers to what extend the stimuli is surprising, new and unfamiliar to the person who is exposed. Complexity can be defined as the number of elements, features and degree of motion in a particular environment. Load of environment determines the degree of arousal brought by the environment. If an environment is high load of novelty, surprising and also high in the number of variables, it will make the person feel stimulated, excited and alert. Despite, a low load
environment will cause the opposite result such as feeling of calm and relaxation (Donovan & Rossiter, 1982).

Moreover, arousal levels of individuals are also mediated by their characteristic way of receiving external information. According to Mehrabian, there is two kind of category for individuals depending on whether they screen or filter the incoming stimuli. ‘Screeners’ is one side of the dimension are relatively more selective in what they intend to, thus, they screen out unnecessary details of environment to focus on what they intend to do. Thus they prefer to decrease the load of environmental information. On the other hand, ‘non-screeners’ which is the opposite side of dimension, are not selective as ‘screeners’. They experience the environment in a more complex and novel way than ‘screeners’. In result, they are more aroused and more sensitive to changes in novelties than the ‘screeners’ (Donovan & Rossiter, 1982).

In conclusion, ‘Approach’ and ‘Avoidance’ Behavior can explain the behaviors toward and within an environment. Approach behaviors stands for the desire of staying longer or moving towards, interacting more and performing well in and return to the environment. On the other hand, ‘avoidance’ behaviors connect to the unwillingness to stay longer and opposite of the behaviors mentioned above. Avoidance behavior go along with feelings of anxiety, boredom, and dissatisfaction.

Behaviors mentioned above derived from the emotional states emerged within the environment. According to Mehrabian-Russell model, all emotional states can be explained by two major dimensions which are pleasure and arousal and also to some level, third dimension-dominance- plays a role. Pleasure and Arousal conceptualized in a way that they interact with each other. More arousal result with more approach behavior in a pleasant environment and more avoidance behavior in unpleasant environment.
Level of arousal produced by an environment is considered to be the direct function of the information load of the situation. Furthermore, information load of the situation is also shaped by the individual’s characteristics to what extend an individual ‘screen’ the environment or not.

2.3.2. Mehrabian Model on Retail Setting

One of the initial test of Mehrabian-Russell Environmental Psychology model in retail setting is the work of Robert Donovan and John Rossiter named ‘Store Atmosphere: An Environmental Psychology Approach.’

There are reasons that researchers had difficulties to prove the strong effects of store atmospherics. Firstly, store atmospherics are depending on the emotional states which are difficult to express and secondly they are transient and difficult to remember and lastly they have a strong effect on behavior inside of store rather than external behaviors such as selecting (Donovan & Rossiter, 1982).
Table 1. Approach and Avoidance Behaviour

Four aspects were argued in order to assess the consumer behavior in a retailing environment. According to the theory, approach – avoidance behavior relates whether individual would like to stay physically. Exploratory approach-avoidance behavior takes into account the degree of each individual’s in store searchings’ and experiencing the retail offerings to a broader or closer range. Communication aspect of approach-avoidance behavior measures the interaction of individuals with sales personal or with others in the environment. Lastly, performance and satisfaction aspect related with whether person performs the task or that can be explained as whether spending in a retail setting increased or not.

2.3.3. Connection of Pleasure Arousal and Dominance to Affective Cognitive and Conative Responses

Although the dimensions in the Mehrabian and Russell developed are useful, interpretation of pleasure arousal and dominance and the mechanism perceived as complicated for researches. Researchers are using different terminology and adjectives when it comes to interpretation of the results according to the Mehrabian Model. That’s there are some researches about the revitalized version of Mehrabian and Russell Model
by Bakker, van der Voordt, Vink, and Boon (2014) where they link the three dimensions of Mehrabian model into the current ABC model of Attitudes. Pleasure, arousal and dominance dimensions are linked respectively to affective, cognitive and conative responses, for example; Affect, Cognition and Behavior (ABC). Based on this revitalized version, it is reintroduced the three dimensions and replace two dimensional model with pleasure and arousal by three dimensional model including dominance as third dimension represent all range of human responses.

ABC psychology was developed by (Rosenberg, Hovland, McGuire, Abelson, & Brehm, 1961) where it adds behavior as a third dimension in addition to affect and cognition. In this view, behavior is added as conative dimension. ABC model is showing a strong connection with the Plato’s three function of soul which are feeling, thinking and acting. Depending on this view, people show three different responses when they are exposed of a stimuli which is affect behavior and cognition in this context. These experiences result with feeling and thoughts also acting. People make verbal statements regarding the affect and also give perceptual responses and verbal statement of belief (cognition) and also reports of behavioral intentions. ABC trilogy has many similarities with three response model of Mehrabian and Russell where the pleasure corresponds with affect and arousal to cognition and lastly dominance refers to conative dimension.

Russell and Pratt (1980) interpreted pleasure and arousal as indicators of affect and considered dominance dimension to be more a cognitive indicator. Cognitive recognition has a considerable value since experiencing a physical environment will be meaningful when there is meaning which comes with a cognitive recognition (Russell & Pratt, 1980). Due to the adjectives used to explain arousal such as stimulated, excited etc. it can be concluded that arousal refers to a cognitive but not an affective factor. Even though Mehrabian and Russell (1974) perceive arousal as an affective factor, it seems to be a cognitive one which can be explained with thinking and thoughts. On the other hand, dominance is related to freedom or limitation to someone’s behavior which means that dominance is not only affective nor cognitive but conative instead ( Russell & Pratt, 1980; Bakker, van der Voordt, & Vink, 2014).
2.4. Modified Model for the Research

2.4.1. Eliminating ‘dominance’ dimension

Shever (1987) analyzed 135 emotion terms with 2 (Evaluation, Intensity) and 3 (Evaluation, Intensity and Potency) dimension models and concluded that three-dimensional model was justifiable and highly interpretable. Moreover Mehrabian (1996) has used pre-calibration method to expand and improve the preliminary PAD emotion scales. It led to progressive renewal of scale items and resulted in the following three PAD emotion scales where a 16 item state Pleasure Scale (Eight positive and eight negatively), a 9-item State Aroused Scale (four positive and five negative) and a 9-item state dominance scale (four positive and five negative) (Mehrabian, 1996) Mehrabian and Russell provided reasonable empirical support for their three intervening variables. They also compare their model with Osgood’s results in 1957 which offers us three dimensions as well such as evaluation activity and potency. They are responsible for people’s cognitive interpretations of various physical objects and social events. General description of emotions can be made with three factors which are semantically differential from each other.

On the other hand, researches have long been discussed that the dominance dimension needs cognitive interpretation by the individual. Thus when affective response is needed to be tested, it is not easy to implement when we consider the conditions and circumstances when calling for affective response.

Russell showed that two dimensions of the PAD model can explain the significant portion of the affective states. Part of remaining can be explained with State Dominance which is also the third part of PAD model. Russell and Pratt (1980) have modified the Mehrabian-Russell theory by deleting the dominance dimension because even though pleasure and arousal dimensions have very convincing results over a spectrum of different situations, evidence for the usage of dominance dimension is more questionable. Afterwards Russell discussed his later work that dominance requires a cognitive interpretation by the person (Donovan & Rossiter, 1982). Russell and Pratt (1980) has done modifications on model to exclude the dominance dimension which does not significantly change the result of the research than other dimensions. According to their findings, dominance does not necessarily connected to in-store
behaviors thus Pleasure and Arousal dimension seems more suitable for such experiment.

The same justification was applied for this research as well. Difficulty of measuring dominance dimension of the model and also the fact that dominance has no connection with feelings of people during security screening process, dominance dimension was eliminated and led the usage of only 2 dimension pleasure and arousal which was also tested and supported by strong evidence as representing people’s emotional or affective responses.

**Two Dimensions of Emotion and Eight Major Emotional States**

![Diagram of Two Dimensions of Emotional States]

Figure 3. Two Dimensions of Emotional States

Source: (Russell & Pratt, 1980).
Modification of Behavioral Responses

Due the reason that this research based on security screening area, Four components of approach-avoidance behaviour were modified. Because components of approach-avoidance behaviour were formed for retail setting. In our modified model, instead of using those behavioural results, ‘evaluation of environment’, ‘evaluation of service’, ‘purchase intention’ and ‘perception of time’ were added to be observed.

There are many different kinds of stimuli involved in security screening area such color, arrangements, layouts, noise, type of lighting, complexity of the procedure etc. In this research, only the effect of scent stimuli was evaluated. A stimuli can be evaluated in many different ways such as its complexity and novelty. Novelty refers to what extend the stimuli is expected in a particular environment and complexity refers number of elements in a particular environment. Load of environment and high novelty would affect the arousal level. Thus, scent as a stimuli should be in low intensity to generate positive feelings of calm and relaxation (Donovan & Rossiter, 1982).
According the modified version of the model, this research will test effect of ambient scent on ‘pleasure’ and ‘arousal’ (Stimulus-Organism). Moreover, also will test whether pleasure and arousal have an influence on evaluation of ‘environment’ and purchase ‘intentions’. Lastly, due to the airport management request, ‘perception of time’ and
‘service quality’ are also added but will not be analyzed with the proposed model rather independently will be evaluated.

2.4.2. Why to select PAD model for this research?

After evaluating PAD and ABC model, it was decided that usage of Mehrabian and Russell Model, by modifying behavioral responses and evaluations, for this research due to couple of reasons which can be mentioned as follows;

Firstly, Mehrabian and Russell model is the long environmental research culture of Mehrabian Model. In the last four decades, pleasure, arousal and dominance (to lesser extend) have been implemented and are still used by many researchers in the field of environmental psychology (Chebat & Michon, 2003; Dowdey, 2008; Maureen & Ratneshwar, 2003; Spangenberg, Grohmann, & Sprott, 2005; Spangenberg, Crowley, & Henderson, 2000).

Secondly, Mehrabian and Russell (1974) model fits more into this research’s questions than ABC model which was previously elaborated. ABC model is well designed and concrete where it states that effect of a stimuli has a direct impact on behavior rather than indirect effect via changing the emotions. Moreover, according to ABC model, ‘affect’ can have a direct cognitive impact on people which follows as conative response afterwards.

On the other hand, Mehrabian Model process has a different approach for the process of scent effects on human behavior. It can be summarized as affect has a direct impact or influence on human emotions which the emotions result with behavioral and cognitive changes on human. Since the research hypothesis is for understanding the scent effects on purchase intentions and time perception, instead of testing with direct impact of scent on purchase intentions, I find it more reasonable to claim changed emotions due to the scents have a direct impact on purchase intentions and time perception. In other words, relevant olfactory literature shows that scents can also have a direct behavioral changes in some context such named as ‘impulse buying behavior’. For example, scents diffused from a bakery or street food market can cause a direct buying behavioral or cognitive changes on human. Despite in our case, I would like to test purchase intentions of people who are in high arousal level and stressed due to the security screening process and due to the fact that they are preparing to travel somewhere else. I
intuitively believe that travelers purchase intentions in duty free areas are not directly determined by scented areas instead their intentions are fostered by their emotions due to the contend of shopping activity in duty-free area.

3. HYPOTHESIS DEVELOPMENT

‘Feelings aroused by the touch of someone’s hand, the sound of music, the smell of a flower, a beautiful sunset, a work of art, love laughter, hope and fate…’ Bernie Siegel

In this section, hypothesis of the research are designed by supporting the each of them with previous literature. It should be noted that, main hypothesis of this research was formed by following Mehrabian and Russell (1974) where it was previously explained. Despite, there are some hypothesis which are also designed to test whether there is a direct impact of ‘stimulus’, which is the ambient scent in this research, on ‘responses’ which are such as environmental evaluation, service quality and buying behavior in this research. Hypothesis which are designed to figure out the possible direct effects of ambient scent on behavior and responses were shown in italic form in each section in order to avoid confusion of reader.

3.1. Effect of Stimulus (Ambient Scent) on Organism (Pleasure-Arousal)

Firstly, I will try to investigate whether there is a difference between the presences of a pleasant ambient scent versus no scent affects evaluations of approach and avoidance behaviors in an Airport setting. An airport can be considered as a service environment since there is a wide range of departmental stores with tax-free advantages for shopping. On the other hand, an airport is also a formal check in/out place where people have to wait a certain time amount of time for formal procedures.

Arousal was proposed initially to account for the intensity but not the quality or direction of a behavior. According to the Hebb (1949) ‘in most sensory modes there is an intensity limen at which avoidance appears. Below this point the stimulation may be sought out-that is, it is ‘pleasant’ above it, the same kind of stimulation produces
avoidance and if the avoidance is unsuccessful, behavioral disturbance.’ Hebb (1949) also continue to explain the relationship between pleasure and arousal by giving the example of ‘pleasant fear’ where people seek out to certain degree such as riding roller coasters. He further explain the relationship by showing inverted U-curve. Thus, intensity of the stimuli can directly influence on the pleasure level of the people.

According to the optimal arousal theory, minor changes in the environment should result with increases in the environment’s perceived novelty and pleasantness. Such minor changes can be such as adding a scent to the environment (McClelland, Atkinson, Clark & Lowell, 1953; Berlyne, 1971). Thus our hypothesis will be as follows;

**H1: Presence of a pleasant ambient scent increases the pleasure level of people in an Airport security screening area**

**H2: Presence of a pleasant ambient scent has an influence on arousal level of people in an airport security screening area**

**H2a: Arousal has also an influence on pleasure level of people**

### 3.1.1. Congruity of Ambient Scent

The congruity of ambient scent refers to the interrelationship or interconnectedness between environment atmospheres and odor (Bone & Ellen, 1999). Thus a pleasant scent can be perceived as unpleasant or inappropriate in certain context. A pleasant scent congruent with airport security area versus pleasant scent that is incongruent with airport security area on evaluation of approach and avoidance behavior will be tested. Incongruent environmental scent usually results in lower customer perceptions of the environment (Bell et al. 1991). Thus lower customer perceptions of the entire airport security check experience is expected.

Depending on PAD model, I assume that pleasant congruent scent will positively affect emotional states of pleasure and arousal level which will result with an increase on purchase intentions and also will result with positive evaluation of time and environment in general.
H3: Presence of pleasant ambient scent congruent with the airport generates higher pleasure level than in-congruent ambient scent

H4: Presence of pleasant ambient scent in-congruent with the environment generates higher pleasure level than when ambient scent is not present

Airports are unique retail environments where travelers have feelings of anxiety, stress and excitement. Passengers have a certain degree of anxiety and expectations about their journey (Yi-Hsin, Ching-Fu, 2012; Crawford, Melewar, 2003). Passengers are also likely to have pressure for a couple of reasons such as the security screening process, distance between gates, passport control and gates. Un-familiarity with the environment is also another driver of pressure on passengers. (Yi-Hsin & Ching-Fu, 2012).

Thus, it is assumed that passengers would likely to have a high arousal level in an airport because of a couple of reasons. Firstly, the formal process of security screening exerts a certain level of pressure on passengers which result with higher arousal levels. Secondly, passengers feel excited because of traveling to another place which also cause an increase in arousal level. Thus, a pleasant congruent scent was expected to decrease high arousal levels of passengers which results with better pleasure results and a better mood.

H5: Presence of pleasant ambient scent congruent with the environment generates lower arousal level than in-congruent ambient scent

H6: Presence of pleasant ambient scent in-congruent with the environment generates higher arousal level than when ambient scent is not present
3.2. Effect of Organism on Responses

3.2.1. Overall Evaluation of Environment

Depending on the evidence from literature on olfaction research, presence of a scent tends to increase or enhance evaluations opposed to non-present environment. The author expect adding pleasant to the Airport security environment should enhance the perceived positive state of environment. Combining these evaluative and behavioral responses, I expect that presence of a pleasant ambient scent will increase evaluations of the positive state of the security check environment.

It is a well-known knowledge that pleasant ambient scent has a positive effect on consumer store or physical environment evaluation compared to a non-scented environment (Spangenberg, Crowley, & Henderson, 1996). Atmosphere of physical place is perceived to be nicer and favorable. Spangenberg et al. (2005) also found out that combination of different atmospherics cues like Christmas background music and an ambient Christmas scent have a positive effect on the consumer’s perception of the store environment.

H7a: Pleasure produces positive evaluations of overall airport security screening environment.

H7b: Arousal produces positive evaluations of overall airport security screening environment.

H7c: Pleasant congruent scent produces better evaluations of overall airport security screening.

H7d: Pleasant in-Congruent scent produces better evaluations of overall airport security screening than no scent.

3.2.2. Buying Behavior

Consumer buying behavior also influenced by the store environment. Donovan and Rossiter (1982) research suggest that approach behavior of spending money in the store is affected by the cognitive factors. Despite store induced pleasure can also change the consumer intention of spending money. Thus emotions derived from a stimuli might
influence on consumer spending money. Hirsch (1995) indicated in his research that usage of pleasant odor in a casino located in Las Vegas result with a significant increase on the money gambled on the slot machines. Parsons (2009) found that by emitting an appropriate pleasant scent in the lingerie store, it could increase the shopping behavior while an inappropriate scent would generate opposite results.

On the other hand, airport environments have unique characteristics when it comes to shopping because they are filled with ‘excitement of air travel’, an ‘image of exclusivity’ and also offering duty free prices and good discounts (Bohl, 2016). Moreover, shopping is one of the common activities that travelers engage, thus retailing at airport has a vital role in airport operations. It also generates revenue (Crawford, 2003). As it mentioned before, passengers in an airport have certain degree of anxiety and pressure due to the security screening process. In this context, they are different than general shoppers in street or other retailing setting. According to Guens et al. (2004) there are four types of airport shopping motivations; functional motivation which is related with good price and quality, experimental motivation which refers to the promotions, airport infrastructure related motivation like service in the shops and most importantly for this research, airport-atmosphere-related motivation such as impulse purchasing. Results of Guens et al (2004) indicated that almost 35% of airport travelers are converted to purchasers which clearly shows the impact of the airport environment on purchasing behavior.

In conclusion, hypothesis 9 and 9a are formed whether the effects of positive emotions derived from a pleasant scent effect on passenger’s likeliness of buying or not.

**H8a:** The Level of Pleasure has a positive effect on passenger’s likeliness of buying

**H8b:** The Level of Arousal has a positive effect on passenger’s likeliness of buying

**H8c:** Passenger’s likeliness of buying improves in presence of pleasant ambient scent

**H8d:** Passenger’s likeliness of buying improves in presence of pleasant ambient scent congruent with the environment
3.2.3. Evaluation of the Service

Performance and satisfaction aspect in original model related with whether person performs the task. That can be implemented in this research as how fast a person completes the task of check-in process. Justification behind to check whether ambient scent has an impact on the perception of speediness of the service depends on the literature which states the speediness of service as one of the most important determinant of ‘service quality’. Customer evaluation of many services is highly influenced by waiting time. Many studies in past researches revealed that there is a negative impact of waiting lines on people’s evaluations (Karl et al 1991; Taylor, 1994). It is also common for people to overestimate the time that they have spent during receiving a service (Hornik, 1984). More perceived time of waiting increases, people’s evaluation of service and satisfaction decreases (Katz et al., 1991). People also think that long waiting lines are an indicator of poor service. People are becoming less and less tolerant of waiting and perceive the waiting time as a ‘waste’ (Katz et al 1991).

Spangenberg et al (1996) also indicated that having pleasant or inoffensive ambient scent in the store environment, the consumer’s perceived that they spent less time in the store compared to non-scented environment. Depending on the findings of Spangenberg, decrease in people’s perception of spent time during check-in process will effect on increase in evaluation of service quality. Thus our hypothesis will be as follows;

H9a: Perceived service quality of passengers improves in presence of pleasant ambient scent

H9b: Perceived service quality of passengers improves more in presence of pleasant ambient scent congruent with the airport than in-congruent ambient scent.

3.2.4. Perception of Time

What impact do ambient scent and other kinds of stimulus have on shopper’s perception of time is also an interesting research question because they can be important determinant of customer satisfaction, anxiety and emotional mood levels (Morrin, Chebat & Gelines-Chebat, 2010).
People’s perception of time can be manipulated depending on the previous literature (McDonnell, 2007; Leenders, Smidts & Haji, 2016; Hirsch, 1992). If the activity of people is somewhat pleasant, service provider would like to increase the perception of time duration for the attendants (Guiry, Magi, & Lutz, 2006). If the activity of people is a procedure or boring to a certain degree, service provider would obviously like to decrease the people’s perception of time (Katz, Larson, & Larson, 1991). By doing so, it might influence on the emotions of people positively and results with satisfaction. In retailing, pleasant ambient scent might increase the time spent in the store (Knasko, 1995) and increase the money spent (Hirsch, 1995).

According to the research by Spangenberg et. all (1996), pleasant ambient scent did not have an impact on actual time spent by people in a simulated shopping environment, despite it did reduce the perception of how much time had passed.

In result, hypothesis 10 are formed in order to measure effect of ambient scent on passenger’s perception of time during security screening process.

**H10a:** Passenger’s perception of time spent during security screening area decreases in presence of pleasant ambient scent.

**H10b:** Passenger’s perceptions of time duration on the security screening area decreases more in presence of pleasant ambient scent congruent with the airport than in-congruent ambient scent.
Figure 5. Hypothesis Overview
4. METHODOLOGY

‘No man can taste the fruits of autumn while he is delighting his scent with the flowers of spring’ Samuel Johnson

4.1. Research Method

The research approach can be named as deductive which tests correlations between variables depending on theory by measuring them and also tries to indicate if the theory is compatible with the findings of the research.

Thus, this research was required to obtain quantitative data in order to test the hypothesis regarding the model and the theory behind it. Quantitative research also requires the collection of data from people who can project or reflect the larger population (Morris, 2003). Like other previous similar researches (Mattila & Wirtz, 2001; Hirsch & Gruss, 1998; Spangenberg, Crowley, & Henderson, 1996; Spangenberg, Crowley, & Henderson, 2000; Spangenberg, Sprott, Grohmann, & Tracy, 2006), this study used a quantitative research approach as well. Quantitative research is a method which quantifies observations, phenomenon and findings which can be analyzed and presented with graphics and tables.

In this research, there are three different groups where the data was acquired from. The first group was exposed to congruent ambient scent, the second group was exposed to the in-congruent ambient scent and the third group was exposed to no ambient scent condition. Experiment of the research was held in real-life environment by doing a field research in airport security screening area of Budapest Airport.

4.2. Questionnaire Design

Using questionnaires is one of the most common and familiar data gathering method. In design process of questionnaire in this research, special attention was given to Morris (2003) suggestions which are keeping questions short, asking relevant questions, using
a logical order, usage of codified responses with semantic differential scale, avoiding ambiguity as much as possible, and conducting a pilot survey to test clarity of questionnaire (Morris, 2003). Usage of the multi-item scales was due to the past similar researches which have also relied on the same technique (E.g. Spangenberg et al. 1996, 2005, 2006; Chebat & Michon, 2003). The questionnaire has six different sections. Structure of questionnaire is as follows;

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<td>SECTION 5</td>
<td>Purchase Intentions</td>
<td>H 8a, H8b</td>
</tr>
<tr>
<td>SECTION 6</td>
<td>Gender and Age</td>
<td></td>
</tr>
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</table>

Table 2. Design of Questionnaire

Section 2, 3 and 4 used semantic differential scale where there are two opposite adjectives on either side of the scale. Negatively charged adjectives were placed on the left side while the positively charged adjectives positioned on the right side. Section 5 and 6 utilized Likert scale consists of ‘unlikely’ and ‘likely’. Since 5 and 7 point scales were widely used as a standard in similar research, 7-point scale, where answers below four are considered as a negative, was used for both semantic differential scale and Likert scales in this research. The questionnaire was pre-tested with six respondents. After some small changes in order and layout of questionnaire were made, actual study took place. Final questionnaire was three page long. The Questionnaire used in this research can be found in appendix.
4.3. Measures and Validation

4.3.1. Emotional and Behavioral Responses

Mehrabian and Russell’s (1974) twelve-item semantic scale in seven point Likert-type scale was used to measure emotional responses to environment after modification. In order to measure the arousal dimension of emotions, four-items such as sluggish-frenzied, dull-jittery, unaroused-aroused, calm-excited and also to measure the pleasure dimension, five-items such as unhappy-happy, annoyed-pleased, dissatisfied-satisfied, melancholic-contented, despairing-hopeful were used, after modification of items, like Robert J. Donovan, John R Rossiter, Gilian Marcoelyn, Andrew Nesdale (1994) have implemented in their research. 12 item scale were deduced into 9 item scale due to the setting of the research. According to the expert view of the Airport Marketing Director, ‘sleepy-wide-awake’ and ‘calm-excited’ from arousal dimension and ‘bored-relaxed’ from pleasure dimension were not used in our questionnaire. The reason behind this choice was that measurement items of Donovan (1994) were applied for a commercial store setting. Not all of the items were applicable or suitable for the security screening process of airport due to the formal character of the process. Another reason was that passengers in general have a high arousal emotional state during the security screening. After passengers pass through security screening, being ‘sleepy’ not sound suitable for the setting. The same reason applied for ‘bored-relax’. Neither bored nor relax apply for the setting for security screening because purpose of process is formal rather than commercial. In results, 5 pleasure items; unhappy-happy, annoyed-pleased, dissatisfied-satisfied, melancholic-contented, despairing-hopeful and 4 arousal items; sluggish-frenzied, dull-jittery, unaroused-aroused, calm-excited were used in this research.

4.3.2. Overall Evaluation of Security Screening Area

Fisher’s 13-item environmental quality scale (1974) adapted to measure the subjects evaluation of Airport security screening environment. (e.g., unattractive/attractive, tense/relaxed, uncomfortable/comfortable, closed/open, drab/colorful, negative/positive,
boring/stimulating, bad/good, unlively/lively, dull/bright, un-motivating/motivating, uninteresting/interesting, and unpleasant/pleasant)

In order to assess impressions of the security screening, three additional items such as; bad/good, unfavorable/favorable, and negative/positive were added. A forth item on 7-point scale where subjects were asked if they liked or dislike the security screening area by asking ‘how strongly do you like or dislike the security screening area?’ with a rating scale from 1(not strongly) to 7 (strongly) was added. In the combination of these four items was used for the measurement of evaluation of the security screening environment.

4.3.3. Quality of Airport Security Screening

The Survey includes five questions on service evaluation which was adapted from the SERVQUAL measure. (Zeithaml & Bitner, 1996). Those questions were validated with previous research on waiting (Taylor, 1994) and used to measure the evaluation of a service. These responses are; ‘Organization X offers friendly service’, ‘Organization X give prompt service’, ‘Overall, Organization X offers excellent service’, ‘Organization X performs the service right the first time’ and ‘Organization X is open to customer views’

After a consultation meeting with an industrial expert (Marketing Manager of Budapest Airport), five questions were modified according to the airport environment as follows; question of ‘Organization X give prompt service’ was eliminated. Justification behind this exclusion was due to the formal process of security screening because security screening requires a strict procedure which usually takes a certain time. Thus it can be said that airport stuff has a small impact on the promptness of security screening service. Another reason was individual differences in the perception of time spent in that formal process. While some people understand the necessity of formal procedure and more tolerated to time spent during process, others are frustrated and has no tolerant for waiting for the formal process. In result, related question was excluded.

Additional question related with security was also added to the service quality section depending on advice of the marketing director of Budapest Airport and also due to the assumption that feeling safe might play a vital role in the passengers overall airport experience.
In result, modified responses were as follows ‘Budapest Airport offers friendly service’, ‘Budapest Airport makes me feel safe when I travel’, ‘Budapest Airport offers excellent service’, ‘and ‘Budapest Airport is open to customer’s views’

4.3.4. Time Perception

Previous research also reported that the perception of time spent in an environment can be influenced by external stimuli such as music and scent (Baker, Levy & Grewal, 1992) Actual versus perceived time spent in security screening area were also measured. Before passengers enter the airport security screening area, passengers have to scan their boarding pass in the entrance. That’s how information of exact time of entrance to the security screening area was acquired. Another barcode scanner positioned right after security screening area and used to record amount of time spent during security check-in process. It’s used only for the ones who agreed to be part of the research.

Perceived time was measured with same method as Spangenberg (1996) by asking ‘About how much time do you think you spent for airport security check-in service? (Please write down your best guess without looking at your watch) ’. This question positioned in the beginning of survey for better results in estimation.

4.3.5. Purchase Intentions / Intentions to Visit Store

In order to measure purchase intentions and intentions to visit store, questions from research of Spangenberg (1996) were used. Intentions to visit store were measured by asking ‘Assuming you were going to purchase this type of merchandise and had money, How likely would you visit stores in Budapest Airport?’ with a seven-point Likert type scale. (Very unlikely/very likely)
4.4. Sample Size and Composition

While studying a sample, it is not possible to obtain a complete data. Thus, sampling is a necessity to balance what is desirable and what is practically possible. In practical cases, constrictions such as time and money are important determinant for the size of sample (Morris, 2003). That’s why we have to take a sample from a large population to understand the phenomenon which can be applicable for whole population.

The suitable sampling technique for this research is non-probability self-selection sampling which means when the researcher allow anyone to show their willingness to take part in the research. Researcher publicize their need for research by advertising and asking each individual to take part and then collected data from those who responded.

There are many ways to determine sample size either by using statistical techniques or through ad hoc methods. For this research, two criteria was considered in selecting proper data. First criteria was looking for other similar research studies in the same subject were examined and suitable sample size was decided according to it (Aaker, 2004). Before using similar studies for deciding sample size, comparable studies must have achieved a satisfactory level of reliability.

Second criteria was considering SEM analysis and method for reaching good sample size. Bentler and Chou (1987) note that researchers should go at least five cases per parameter estimate in SEM analysis. He also noted after that data should be perfectly well-behaved (normally distributed, no missing data etc.). Thus considering our proposed model, there would be 53 number of variables which means minimum number of sample size should be at least 265 respondents. Thus, the sample size for this research aimed to be more than 265 respondents. Despite, targeted number was not met due to the scarcity of resources.

In order to avoid misunderstanding of questions, only English native speakers and people who lived in any English speaking country at least three years are approached.
randomly. Only people who just completed security screening procedure was eligible to attend. People who passed before were not accepted by considering that they would lose effect of scent.

In results, Total number of the respondents was 208 people. Despite, actual entrance time to security screening area was available for 173 respondents out of 208. 35 respondents with missing information was excluded only from the part of time perception analysis.

4.5. Scent Selection and Pretest

4.5.1. Purpose of Pretest

Aromamedia KFT, operates in Hungary and provided scents to some well-known companies such as Hilton Hotels, Carinthia, OTP Bank and Tezenis. Thanks to Aromamedia for also providing all of the scents and the additional two dispenser machine for the research.

I included three floral scents which are named as Airy, Fresh Clean and Rain Shower due to the fact that floral scents are generally rated favorably by humans along with two fruity, intensive and sweaty scents named as Red Apple and Vanilla. I believed these scents would provide higher results and could potentially serve as congruent scents for the category of Airport Screening.

In selecting specific certain scents for our research, I sought to understand two main goals. Firstly, to see that selected scents for main research will be considered as ‘pleasant’ by people. Pleasantness of an odor is characterized by two characteristics; quality and intensity (Bone & Ellen, 1999). The quality of an odor can be described with affective tone (pleasantness) and intensity (concentration of scent). Intensity level has a direct impact on the pleasantness of a scent. If intensity level of the odor increases more than optimal level, same scent can be perceived as unpleasant.

After confirming that scents are perceived pleased, second purpose was to understand congruency of each scent for airport security screening area. The congruity refers to the interrelationship or interconnectedness between environment atmospheres and odor. (Bone & Ellen, 1999). Thus a pleasant scent can be perceived as unpleasant or inappropriate in certain context. To give a relative comparison opportunity to the
respondents, four other places added into questionnaire but only results for Airport
security screening area was considered.

In results, it was essential to conduct a pretest due to aforementioned reasons such as
confirming that scents used in main research will perceived as pleasant and congruent
with Airport security screening area.

4.5.2. Description of Scents used in Pretest

‘Airy’ is part of designer collection and described in Aromamedia’s catalog as which
opens with a sparkling green wet floral texture of natural white flowers wrapped with a
creamy nuance of milk. Notes of amber and wood provides a contrast and texture and
elegance all softened with a touch of musk. Airy is part of floral scent family and
adjectives used in the company’s catalog as follows; bright, calm, comfortable, relaxed
and fresh.

‘Fresh Clean’, which is designed by Christophe Laudamiel, can be summarized as the
smell of fresh air, tinged with sweet orange and honeysuckle. ‘Fresh air’ scent is also
kind of floral scent. That simple fragrance is defined as bright and refreshing and
creates a clean and crisp atmosphere in the company’s catalog.

‘Rainshower’ is designed by Raymond Matts, and described as a fresh from a spring
storm. The scent is enlightened by crushed bergamot and mellowed by mossy notes and
wet teakwood. It is also part of floral scent family. It’s characterized as airy, bright and
relaxed in company’s catalog.

‘Soothing Vanilla’ is considered as part of ‘oriental’ family and it is characterized as
intense, sweet and friendly scent.

‘Red Apple’ is part of primary collection and considered to be part of ‘fruity’ family of
company’s collection. It is characterized with vibrant, warm and refreshed.

In result, three different floral scents and two relatively intensive and sweater scents in
order to select one congruent pleasant and one incongruent pleasant scent to be used in
main research were tested via pretest. Performance of each scents for ‘congruency’ with
environment, ‘pleasantness’ and ‘likeliness’ will be discussed in next section

4.5.3. Methodology of Pretest
In order to measure pleasantness of each scent, Fisher’s Environmental quality scale and additionally two questions of Morrin and Ratneshwar’s research was used (Fisher, 1974; Morrin & Ratneshwar, 2003). Fisher’s scale has been widely implemented into environmental marketing research (Crowley, 1993; Spangenberg, Crowley & Henderson, 1996). 7-point scale of Fisher are composed of positive/negative, pleasurable/unpleasurable, comfortable/uncomfortable, good/bad, attractive/unattractive, pleasant/unpleasant, like a lot/do not like a lot.

In order to measure the arousal of the each scent, four items by Mehrabian, like Bosman’s research (2006) has implemented in his work, tense/relaxed, stimulating/boring, lively/unlively, bright/dull with 9-point scale has been used. Even though my research does not require to check ‘arousal’ level of each scent, it was useful to see results whether the ‘pleasure’ and ‘arousal’ dimensions were working well together and also because arousal scores helped me in the selection process of one congruent and one in-congruent scent.

Lastly, to measure the congruency of scent with airport security screening, Rathneshwar and Morrin’s (2003) method was used where there were two words on the two extremes of the scale ‘not at all appropriate’ and ‘highly appropriate’ on a nine point scale. (Maureen & Ratneshwar, 2003). Rathneshwar and Maureen has examined the impact of ambient scent on brand memory depending on the extent of congruity between a particular scent and the product class of the stimulus brand. They selected two scents that were quite disparate in regard to congruity with the focal product category of toiletry and household cleaning products that they wanted to use in their main studies. I implemented the same scale which was tested and worked well before in order to avoid additional tests to check whether the scales and the questions worked properly or not.

4.5.4. Setup of the Pretest

Each respondents at a time took a seat in a large hallway with intensive air circulation and received information about the purpose of the pretest. At first, each respondents received a questionnaire and after the first scent sample, a paper strip placed in an opaque cup with no color. The sample was prepared before the interview by applying the scented liquid provided by the company ‘Aromamedia KFT’ to the strip using the roller ball at the tip of the bottle. Each respondent were instructed to smell the sample by holding it 10-15 cm from their noses. After, the pictures of places were handled to
the respondent one after the other, relating to the relevant questions and respondents started filling in the first section of the questionnaire. Then next scent handled to the respondent and the pictures again and this procedure continue until all samples are tested. At the end of questionnaire, each respondents received a small gift. Two researchers administrated the questionnaires and each handling about half of the respondents.

4.5.5. Results of Pretest

Subjects of pretest were a convenience sample of 21 (n=21) people who are working for the Budapest Liszt Ferenc Airport. Eleven of attendants were male and nine of them were female. Eleven of attendants were in age between 30-39 years and two of them were between 20 and 29, six of the respondents were between 40 and 49 and one of them was between 50 and 59. There was one attendant who did not provide age information.

Scores of Likeliness/Pleasure and Arousal Dimension for each Scent type

The scents were evaluated on several nine-point semantic differential scales including measures of pleasantness (1 = ‘pleasurable’ to 9= ‘very un-pleasurable’), positive/negative, pleasurable/un-pleasurable, comfortable/uncomfortable, good/bad, attractive/unattractive, like a lot/do not like a lot. The results were averaged the pleasantness and liking scales in order to acquire a scent preference measure.

I averaged the pleasantness and liking scales in order to acquire a scent preference measure (α =, 95) Figure 1 depicts descriptive statistics for the pretest data. A repeated-measures analysis of variance (ANOVA) confirmed that some scents were preferred more than others.
Follow up paired comparisons showed that Airy (Scent Type C) was preferred more than the other two scents. It was rated more favorable than Red Apple (Paired t = -3.810, sig. 0.001), Fresh Clean (Paired t = -3.345, sig. 0.003) but did not show any significant result for Rain Shower (Paired t = -1.965, sig. 0.063) and Soothing Vanilla (Paired t = -1.626, sig. 0.120). Depending on the significance level of each paired samples test, Scent type C airy is not significantly preferred over Scent type B. (Sig. (2-tailed) = 0.120) Despite Scent type C (Airy) is significantly differs from Red Apple (Sig. (2-tailed) = 0.001), Fresh Clean (Sig. (2-tailed) = 0.003) and barely not significant with Rain Shower (Sig. (2-tailed) = 0.063)

Figure 6. Pleasure Scores of Scents
Arousal Scores of Each Scent

Main purpose of pretest was set for selecting pleasant-congruent and pleasant-incongruent scent. Thus, arousal scores of scents are not important for this particular research. By considering the future results of main research, having arousal scores of each scent was thought to be useful.

Scent Type A (Red Apple) has the highest score for arousal which was previously described as mental alertness, physical activity or for the intensity but not the quality or direction of a behavior. Scent Type A (Red Apple) generated significantly higher arousal scores than Scent Type B (Soothing Vanilla) (t=2,246, sig.0, 036), Scent Type C (Airy) (t=5, 041, sig.0, 000) and Scent type E (Rain Shower) (t=2,730, sig. 0,013) but not significantly different from Scent Type D (Fresh Clean) (t=1,266, sig.0, 220)

Congruency of Each Scent
Congruency of each scent type with security screening area was measured by asking; ‘to what extend does the scent suits the environment in the picture’ on the two extremes of the scale ‘not at all appropriate’ and ‘highly appropriate’ on a nine point scale. Pictures of places were belong to ‘hospital’, ‘fashion store’, ‘airport security screening’, ‘office’ and a ‘bathroom’ in order to help respondents in their evaluation of congruency.

In result, it is concluded that Scent Sample C which corresponds to ‘Airy’ has the highest mean score and followed by Rain Shower (Scent type E), Fresh Clean (Scent type D), Soothing Vanilla (Scent type B) and Red Apple (Scent type A) respectively. Lowest scores for Airport security area (3.38, 3.47) belong to Scent type A and Scent Type B which corresponds to Red Apple and Soothing Vanilla respectively. It can be concluded that ‘floral’ type scents are outperform compared to Red Apple and Soothing Vanilla which can be considered as sweater and intensive relatively. Floral Scents of Airy, Fresh Clean and Rain Shower performs more or less similar results in terms of congruency in a semantic scale of 1 = Not At All Appropriate to 9 = Highly Appropriate

![Figure 8. Scores of Scent's Congruency in Pretest](image)

In order to test if the difference between mean values of each scent, paired sample-t test was utilized. Scent type C (Airy) had significantly higher scores than scent type a (t=-9.551, sig. 0.000), Scent type B (soothing vanilla) (t=-4.292, sig. 0.000), and was not
significantly different than Scent type D (Fresh Clean) (t=-0, 84211, sig. 0,096) and Scent type E (Rain Shower) (t=-0,760, sig. 0,457)

Highest results of congruency belong to Scent type C (Airy) generates best congruency results for Fashion Store, Airport, Bathroom, Office and Hospital respectively. Score of Scent C for Airport Security Area is 6.19 which is the second highest score for Airy scent compared to other places. Most of respondents have found the ‘Airy’ scent as ‘freshening’, ‘refreshing’ and ‘relaxing’ on their comments. They stated that ‘Airy’ scent is not ‘sweet’ and ‘heavy’ despite it is refreshing and light. It can be concluded from the comments of attendants that the description of ‘airy’ scent is not contradicting with pleasure and arousal scores of scent and the description inside the company’s catalog.

Selection of the scent for Main Research

According to the statistical results of each scent type, results indicated that Scent Type C (Airy), D (Fresh Clean) and E (Rain Shower) had highest score as a pleasant congruent scent. Thus any of these three scents can be chosen as a pleasant-congruent ambient scent for this research. On the other hand, Scent type A (Red Apple) and Scent type B (Soothing Vanilla) were below the mid-point of 9-point scale and significantly generates lower scores than Scent Type C, D and E.

In result, two scents have to be selected, which one of them should be considered as pleasant-congruent and other as pleasant in-congruent scent. Thus, Scent type C (Airy), which has the highest mean score for congruency, was selected among Scent type D (Fresh Clean) and E (Rain Shower). Additionally, Scent type A ‘Red Apple’, which has lowest score for congruency with Scent type B (soothing vanilla) was selected as a pleasant in-congruent scent to test my research questions.

4.6. Field Work Procedure

Two dispensing machines (Air Q1200, size: 39,4cm x 34 cm x 17.2) provided by AromaMedia company have been used for this research. Two scent dispenser machines were placed inside of the air ventilation pipes in the ceiling (Appendix: 1.3. Plan of the scent dispensers located in air vents). Intensity level of one of them was set into 8 of 50
and the other 16 of 50. Additionally, a small unit was placed near to the questionnaire desk with intensity level 3 of 50 (Appendix: 1.4. Small Dispensing Machine). Please also see appendix 1.2. For plan of the field research procedure.

Questionnaires were conducted between 22.08.2016 - 11.09.2016. Timing for field research was as follows;

1st week: 22-28 August 2016, the pleasant congruent scent (Airy) was placed into the dispensing machines for this week until the end of the week

2nd week: 29 August - 04 September 2016, dispensing machines were switched off for this week

3rd week: 05-11 September 2016, the pleasant incongruent scent (Red Apple) was placed into the dispensing machines for this week

The same questionnaire was used in three different setting. Since questionnaires were handed out by the researcher, potential misunderstandings of respondents were avoided as much as possible. Majority of questionnaires were filled between 16.00 - 20.00 because of the high intensity of flights from Budapest to English Speaking cities.

First week of the research, 79 respondents were attended when there is the pleasant congruent scent (Airy) was diffused. Second week, 68 respondents were part of the research under no scent condition and lastly, third week, 61 respondents were participated to the research when there is in-congruent pleasant ambient scent in the environment. In total, 208 individuals participated in the research. Because of challenges in measuring emotional responses, measurement was made as closely in time and place as possible. A desk was poisoned right after the security screening area in order to avoid losing positive impact of scents on passengers and also to have better results for time estimation of respondents for the security screening process. A sign was present on table stating ‘Airport Service Quality Research’ and also additional informative poster which states that the research is only for native English speakers and a free water will be given for attendants of survey (See Appendix: 1.1. Survey Desk).
5. EMPIRICAL FINDINGS

‘The first condition of understanding a foreign country is to smell it’
Rudyard Kipling

5.1. Manipulation Check

The respondents were asked in order to check whether they realize there is a scent in the security screening area by asking ‘I could smell a pleasant odor in the security screening area’ on a scale of seven where one stands for ‘strongly agree’ and seven stands for ‘strongly disagree’. One-way ANOVA results of the question shows statistically significant positive result at $\alpha = 0.05$. ($F=4.732$, Sig: 0.031).

Moreover, average scores of congruent and in-congruent scents for manipulation check were analyzed if they are higher than the mid-point of response scale. ($X_{mid-point} = 3.5$ out of 7). Unfortunately, the results were not as expected. Around 35% of the respondents, when the ambient scent was present, had a lower rate than mid-point. Thus, this research did not achieved the necessary condition (Spangenberg, Crowley, & Henderson, 1996).

Despite, there might be couple of reasons that the manipulation check did not achieved the necessary condition. Firstly, Spangenberg et.al (1996) research was conducted in retailing setting where they diffuse the scent into the store with a certain degree of frequency and pleasant ambient scent was kept in place. Thus, respondents continuously were under the effect of scent. Despite, in this research, there is a short distance between questionnaire desk and the end of security screening section. Respondent’s time spent in that distance between the desk and security screening, can vary depending on their process of collecting personal items from the x-ray machine. That short distance and short time might cause respondents to forget presence of ambient scent which was diffused from air conditioning.

In result, even though manipulation check result was not fulfill the condition which was set by a previous research, this research will continue to analyze the results due to the couple of reasons; firstly, positive emotions derived from a pleasant ambient scent can continue even though the respondents were not consciously aware of the existence of
ambient scent in an environment. This effect can be sub-conscious and not result with a cognitive response. Moreover, as it is also mentioned before airports are unique retailing environment where travelers have feel of anxiety, stress and excitement. Passengers have a certain degree of anxiety and expectations about their journey. (Yi-Hsin & Ching-Fu, 2012; Crawford & Melewar, 2003). Passengers have more likely to have more pressure due to the reasons such as the security screening process, distance between gates, passport control and gates. Thus the passengers are exposed higher load of feelings and environmental factors than normal retail customer.

In result, it is hard to say that this research cannot be proceed depending on a manipulation check measure which was previously decided on a different setting with different respondents who don’t share the same conditions.

5.2. The Research Analysis Plan

In this chapter, results of the main experiment was analyzed. Preformed hypothesis of the main research was evaluated and showed whether they were approved or rejected by showing results in graphs. In order to analyze the data, SPSS 22 and to test the model AMOS was utilized. The plan of the chapter was presented in graph as follows;

Hypothesis Testing
1st Section: ANOVA analysis

In the 1st section, there are four steps. In the first step, the results of descriptive statistics were presented by visualizing general characteristics of the respondents such as gender, age, manipulation check etc. In the second step, one-way ANOVA testing was used to
test the research hypothesis in order to reveal if there is a significant difference between results of emotions, environment evaluations, service quality and time perception depending on the three different settings. (Airy Scent, Red Apple Scent and No Scent). This section is designed to show the different results in different settings but not answer the main question of direct or indirect effect of stimuli (ambient scent) on behavior (response).

In the 2\textsuperscript{nd} section of empirical findings, this research assumed that scents have indirect effect on approach and avoidance behaviors like Mehrabian and Russell model (1973). In order to test the presumed modified model, relations between dependent and independent variables and path of model was analyzed by utilizing AMOS Graphics 22 version.

5.3. **Hypothesis Testing**

5.3.1. **Descriptive Statistics**

In this section, each question was analyzed separately by giving distributions, means and tables in order to provide an overview of the empirical results.

**Age and Gender Distributions**

Mean of the age for all respondents who attended our main research in all three settings (Airy Scent, Red Apple Scent and No Scent) is roundly 40 years old. Total number of the participant was 208 people. Majority of respondents were in between 25-34 years old with 28, 02% of all respondents. Other distribution information of age were as follows; second highest respondents group was in between 18-36 with 18, 36%, 13, 04% was in between 34-44 years old, 17, 87% was in between 45-54 years old, 10, 14% was in between 55-64, and lastly 12, 56% of respondents was over than 64 years old.

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<tr>
<th>AGE</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
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<td>208</td>
<td>18,00</td>
<td>85,00</td>
<td>40,3990</td>
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50, 96% of all respondents (N: 208) were female and 49, 04 % was male. Female number is slightly higher than male. Since the main research conducted in three different settings, gender information of respondents were checked in separately. When there is airy scent was present, 56, 96% of 79 respondents were female and 43, 04% was male. While there was Red Apple scent was present, 54, 10% was female and 45, 90% was male. Lastly, when there was no scent present in the security screening, 58,8% of respondents were male and 41,18% were female.

![Age Distribution Chart, Field Research](image)

**Means of Distributions**

In this section, means of distributions of emotional states (2nd section of questionnaire), environmental quality (3rd section of questionnaire), service quality (4th section of questionnaire) and purchasing behavior (5th section) were given in three different settings.
In the second section of questionnaire, respondents were asked to answer for nine emotional variables on a semantic scale from one to seven. According to the results, extreme difference between different setting conditions can be seen between airy scent and no scent for ‘despairing-hopeful’ which is a part of ‘pleasure’ construct. In general, it can be also seen in the figure that scores of pleasure items (un-happy-happy, annoyed-pleased, dissatisfied-satisfied, melancholic-contented, despairing hopeful) shows a visible difference for airy scent and no scent in general. On the other hand, arousal items (sluggish-frenzied, dull-jittery,unaroused-aroused, and relax-stimulated) does not show the same difference for three different setting. Mean score of pleasure construct (mean scores of un-happy-happy, annoyed-pleased, dissatisfied-satisfied, melancholic-contented, despairing hopeful) for different conditions is as follows; airy scent with 5, 32, red apple scent with a score of 4, 93 and no scent with a score of 4, 80. Thus it can be said there is a small difference between each different condition. For arousal

Figure 10. Line Chart for each item of 'Emotional States'

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</tr>
</thead>
<tbody>
<tr>
<td>Airy</td>
<td>5.1392</td>
<td>5.0633</td>
<td>5.4177</td>
<td>5.3797</td>
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<td>4.4684</td>
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<td>3.7076</td>
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</table>
construct (Mean of sluggish-frenzied, dull-jittery, unaroused-aroused, and relax-stimulated), scores as follows; airy scent with a score 4, 11, red apple scent with a score of 4, 15 and lastly 4, 01 for no scent diffused. Difference between arousal scores is really low.

Environmental Evaluations

![Figure 11. Line Chart for Respondent's Environmental Evaluations](image)

In this figure, it can be observed that red apple scent performed as same as airy scent on the contrary to the previous scores of emotional states. When there is no scent in the environment, respondents rated relatively less than when there is airy and red apple scent is visible in the environment. All Fisher’s 13-items which previously designed to measure the respondents evaluation of the environment, indicated a better result when a scent diffused into the environment than when there is no scent. It seems there will be significant differences which will appear in the ANOVA results for some items between
when there is scent and no scent. Highest increase on mean score was observed for ‘drab-colorful’ item. Mean scores of each item for three different conditions as follows; airy scent diffused into the environment with a score of 4, 72, red apple scent with a score of 4, 76 and no scent with a score of 4,32. Red apple slightly indicated better result than airy scent and no scent.

![Overall Environment Evaluations](image)

**Figure 12. Line Chart of Scores for Overall Environment Evaluations**

Apart from the Fisher’s 13 scale, four additional question was previously added to understand evaluations for security screening area. According to the figure number eleven above, the highest difference between respondent’s’ evaluations occurs for ‘dislike-like’ variable. Diffusing ambient scent apparently increase the score of likeliness which has a mean score of 4, 63 for no scent, 5, 10 for airy scent and 5, 24 for red apple scent. Red apple scent again performed better in all four items than airy and no scent in this section.

**Service Quality**
Four questions were designed to measure the quality of service. Scores for service quality does not really reflect any consistent difference between each item. While red apple scent performs slightly better in the first three question, the score of red apple for the fourth question suddenly decreased and become even lower than when there is no scent. Airy scent generated slightly better scores in all four question than when there is no scent. Depending on the mean scores of each question, a significant difference was not really expected between three different conditions in one way ANOVA analysis.

**Buying Behavior**

Likeliness of buying was measured by asking the question of ‘Assuming you were going to purchase this type of merchandise and had money, how likely would you visit stores in Budapest Airport?’ Mean scores of respondents in three different setting was calculated and shown in figure number twelve below. According to the results, mean score of red apple scent (5, 16) performed better than no scent condition. (4, 85).
Generally, when a scent diffused into the environment, scores for likeliness of buying was slightly increased.

![Likeliness of Buying](image)

**Figure 14. Bar Chart for Scores of 'Likeliness of Buying'

5.3.2. One-Way ANOVA

In this section, results of ANOVA will be evaluated to verify some of the research hypothesis which was previously designed. In descriptive analysis part, differences between mean values of different variables were previously showed with figures and tables. Despite there is visible differences in the scores for different setting condition, in order to understand whether differences between variables were significant statistically, ANOVA was needed to be applied for comparing the scores.

**H1: Presence of a pleasant ambient scent increases the pleasure level of people in an airport security screening area**

The results from ANOVA test provided significant difference on pleasure when scent was diffused and no scent diffused (Scent diffused; N=140, No Scent Diffused; N: 68) at $\alpha = 0.05$. Results for one-way ANOVA between groups (Scent and No Scent) is $F$: 5.031 with Sig. 0.026. When the scent diffused into the security screening area, respondents feel more ‘pleased’ ($F=4.320$, Sig.0, 039), ‘satisfied’ ($F=3.995$, sig.0, 047), ‘contented’ ($F=5.962$, sig. 0,016) and ‘hopeful’ ($F: 6.819$, sig. 0,010)
In order to avoid type 1 error in ANOVA due to the different sample size ambient scent (N=140) and no scent (N=68), following Brown-Forsthe which was previously compared with other alternative analysis of variance for testing mean differences under variance heterogeneity and on the basis of control of Type 1 errors, the Welch test proved to be the procedure of choice when means were paired (Tomarken,A.J., Serlin, R.C., 1986), was utilized. According to the robust tests of equality of means, Brown-Forsythe test generated 0.029 significance level which also proves that there is a significant difference between presence of ambient scent and no scent condition.

**H2: Presence of a pleasant ambient scent increases the arousal level of people in an airport security screening area**

The ANOVA test and followed-up Tukey post hoc test did not provide any significant differences for arousal construct in the different setting. (F: 0.715, sig. 0.399) Following Brown-Forsthe test due to the sample size difference, did not also generate any significant result. (0.674). Despite this, there is a slightly increased effect on the arousal level of respondents when the scent is diffused but it does not generate a significant difference. For more detailed scores of arousal items, please view the table 4. Thus it leads the second hypothesis to be rejected.

**Figure 15. One Way ANOVA for 'Pleasure'**
Figure 16. One way ANOVA for 'Arousal'
<table>
<thead>
<tr>
<th>Variables</th>
<th>Airy (1) vs No Scent (2)</th>
<th>N</th>
<th>Mean</th>
<th>F Value</th>
<th>Sig.</th>
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</thead>
<tbody>
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<td><strong>PLEASURE</strong></td>
<td></td>
<td></td>
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<td></td>
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<td>Un-Happy-Happy</td>
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<td>79</td>
<td>5.1392</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>68</td>
<td>4.6765</td>
<td>3.680</td>
<td>.057</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>147</td>
<td>4.9252</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annoyed-Pleased</td>
<td>1.00</td>
<td>79</td>
<td>5.0633</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>68</td>
<td>4.5294</td>
<td>4.320</td>
<td>.039</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>147</td>
<td>4.8163</td>
<td></td>
<td></td>
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<tr>
<td>Dissatisfied-Satisfied</td>
<td>1.00</td>
<td>79</td>
<td>5.4177</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>68</td>
<td>4.9706</td>
<td>3.995</td>
<td>.047</td>
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<td><strong>Total</strong></td>
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<td>147</td>
<td>5.2109</td>
<td></td>
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<tr>
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<td>5.3797</td>
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</tr>
<tr>
<td></td>
<td>2.00</td>
<td>68</td>
<td>4.7794</td>
<td>5.962</td>
<td>.016</td>
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<td>147</td>
<td>5.1020</td>
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<tr>
<td>Despairing-Hopeful</td>
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<td>79</td>
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<td><strong>AROUSAL</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
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<td>Sluggish-Frenzied</td>
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<td>2.00</td>
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<td>.331</td>
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<td></td>
<td>2.00</td>
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<td>.632</td>
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<td></td>
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<tr>
<td>Un-Aroused-Aroused</td>
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<td>4.0000</td>
<td></td>
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<tr>
<td></td>
<td>2.00</td>
<td>68</td>
<td>3.8382</td>
<td>.493</td>
<td>.484</td>
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<tr>
<td><strong>Total</strong></td>
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<td>Relax-Stimulated</td>
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<td>.824</td>
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<td>147</td>
<td>3.7340</td>
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<td></td>
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</table>

Table 4. One Way ANOVA for each item of 'Pleasure' and 'Arousal'
H3: Presence of pleasant ambient scent congruent with the environment generates higher pleasure level than in-congruent ambient scent

Data from different environment setting provided a significantly different results through ANOVA analysis (F: 4,996, Sig. 0,027) which means, presence of pleasant ambient scent (Airy) congruent with the security screening environment generated more pleasure level than in-congruent ambient scent (Red apple). Thus it leads the third hypothesis to be accepted.

![Anova](image)

**Figure 17. One Way ANOVA for 'Pleasure' scores (Congruent-In-Congruent)**

H4: Presence of pleasant ambient scent in-congruent with the environment generates higher pleasure level than when ambient scent is not present

One-Way ANOVA result for in-congruent ambient scent (Red Apple) and no scent does not indicate any significant difference. (F: 0,554, Sig. 0,458). On the other hand, even the difference between the mean scores were not significant, there is slightly increase in the level of pleasure when there is pleasant incongruent scent. Since there is no significant difference was found, fourth hypothesis was also rejected.
Figure 18. One-Way ANOVA for 'Pleasure' (In-Congruent-No Scent)

H5: Presence of pleasant ambient scent congruent with the environment generates lower arousal level than in-congruent ambient scent

Data from different environment settings did not provide significantly different results through ANOVA analysis (F: 0.072, Sig. 0.789) which means, the presence of pleasant ambient scent (Airy) congruent with the security screening environment did not generate a statistically significant difference which refers to generating lower arousal level than in-congruent ambient scent (Red apple). Thus it leads the fifth hypothesis to be rejected. Despite congruent ambient scent has an insignificant decreasing effect on arousal level of respondents.
Figure 19. One Way ANOVA Scores for 'Pleasure' (In-Congruent Ambient Scent-Congruent Ambient Scent)

H6: Presence of pleasant ambient scent in-congruent with the environment generates higher arousal level than when ambient scent is not present

One-Way ANOVA result for in-congruent ambient scent (Red Apple) and no scent does not indicate any significant difference. (F: 0.777, Sig. 0.380) for respondent’s level of arousal. Oppositely, the results of ANOVA indicated that in-congruent ambient scent slightly has more arousal than when no scent diffused into the environment. Since there is no
significant difference was observed, sixth hypothesis was also rejected.

**H7c: Pleasant congruent scent produces better evaluations of overall airport security screening**

**H7d: Pleasant in-Congruent scent produces better evaluations of overall airport security screening than no scent.**

Results of One way ANOVA and Brown-Forsythe robust tests of equality of means, clearly indicated that presence of pleasant ambient scent significantly increases the likeliness of the environment. (F: 6,104, Sig. 0,014) (Brown-Forsythe:0, 023) Mean scores of Fisher’s 13-item was used to analyze the relationship. On the other hand, each 13-item was also analyzed separately in table five. According to the results, presence of pleasant ambient scent has positively influence on judgements of respondents who perceived the environment more ‘attractive’ (F: 6,976, Sig. 0,009), ‘colorful’ (F: 10,974, Sig. 0,001), ‘stimulating’ (F: 7,903, Sig. 0,005), ‘lively’ (F: 6,865 sig. 0,009), ‘motivating’ (F: 4,990, Sig. 0,027), ‘interesting’ (F: 3,856, Sig. 0,050). Environmental items of ‘relax’ and ‘comfortable’ were also really close to the significant level with score of 0,053 and 0,052 respectively. Only the item of ‘closed-open’ generates a poor significant score in overall. Apart from that, it can be said all other scales worked pretty well so that sum of all items scores generates really good significant score.
<table>
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<tr>
<th>Condition 1</th>
<th>Condition 2</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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</thead>
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<td>Un-Attractive-Attractive</td>
<td>Between Groups</td>
<td>11,850</td>
<td>1</td>
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<td>6,976</td>
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<td>Within Groups</td>
<td>349,915</td>
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<tr>
<td>Un-Attractive-Attractive</td>
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<td>361,764</td>
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<td></td>
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<tr>
<td>Tense-Relax</td>
<td>Between Groups</td>
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<td>6,809</td>
<td>3,779</td>
<td>.053</td>
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<td>Tense-Relax</td>
<td>Within Groups</td>
<td>371,171</td>
<td>206</td>
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<td>Tense-Relax</td>
<td>Total</td>
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<td>Un-Comfortable-Comfortable</td>
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<td>6,415</td>
<td>3,836</td>
<td>.052</td>
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<tr>
<td>Un-Comfortable-Comfortable</td>
<td>Within Groups</td>
<td>344,465</td>
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<td>Un-Comfortable-Comfortable</td>
<td>Total</td>
<td>350,880</td>
<td>207</td>
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<td>Closed-Open</td>
<td>Between Groups</td>
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<td>4,582</td>
<td>2,810</td>
<td>.095</td>
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<td>Within Groups</td>
<td>335,875</td>
<td>206</td>
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<td>Closed-Open</td>
<td>Total</td>
<td>340,457</td>
<td>207</td>
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<td></td>
</tr>
<tr>
<td>Drab-Colorful</td>
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<td>22,643</td>
<td>10,974</td>
<td>.001</td>
</tr>
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<td>Drab-Colorful</td>
<td>Within Groups</td>
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<td>206</td>
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<td>Drab-Colorful</td>
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<td>6,102</td>
<td>3,466</td>
<td>.064</td>
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<td>Negative-Positive</td>
<td>Within Groups</td>
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<td>1,760</td>
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</tr>
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<td>Negative-Positive</td>
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<td>Boring-Stimulating</td>
<td>Between Groups</td>
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<td>Bad-Good</td>
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<td>Unlively-Lively</td>
<td>Within Groups</td>
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<td>Dull-Bright</td>
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Table 5. One-Way ANOVA result for Fisher's Environmental Scale
After analyzing pleasant ambient scent vs no scent effects on environmental evaluations, Tukey post hoc test was conducted to further analyze the scores of congruent (airy) and in-congruent (red apple) scent. According to the table five below, there is no significant difference between congruent and in-congruent scent in terms of scores for environmental judgements. (Mean Difference btw Airy and Red Apple: -0.04265, sig. 0.966). Despite, the in-congruent scent surprisingly performed slightly better scores for environmental evaluation but this difference was not statistically significant which can be just because of coincidence or luck itself.

On the other hand, both the congruent scent (Mean Difference: 0.040279, sig. 0.043) and the in-congruent scent (Mean Difference: 0.44544, sig.0, 034) generated significantly different scores than when there is no scent in the environment. That means, both in-congruent and congruent scent used in this research increase positive evaluations of environment.

**Multiple Comparisons**

**Dependent Variable: Environment**

Tukey HSD

<table>
<thead>
<tr>
<th>(I) Environmental Setting</th>
<th>(J) Environmental Setting</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval Lower Bound</th>
<th>95% Confidence Interval Upper Bound</th>
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</thead>
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<td>Airy</td>
<td>RedApple</td>
<td>-0.04265</td>
<td>0.17120</td>
<td>0.966</td>
<td>-0.4468</td>
<td>0.3615</td>
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<td>NoScent</td>
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<td>0.16616</td>
<td>0.043</td>
<td>-0.0105</td>
<td>0.7951</td>
</tr>
<tr>
<td>RedApple</td>
<td>Airy</td>
<td>0.04265</td>
<td>0.17120</td>
<td>0.966</td>
<td>-0.3615</td>
<td>0.4468</td>
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<tr>
<td></td>
<td>NoScent</td>
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<td>0.034</td>
<td>0.0273</td>
<td>0.8636</td>
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<td>RedApple</td>
<td>-0.44544*</td>
<td>0.17713</td>
<td>0.034</td>
<td>-0.8636</td>
<td>-0.0273</td>
</tr>
</tbody>
</table>

*. The mean difference is significant at the 0.05 level.

**Table 6. Multiple Comparisons of Respondent's Environment Evaluation (Congruent, In-Congruent and No Scent)**
Result of one way ANOVA for ‘likeliness’ indicated that the presence of pleasant ambient scent shows significant positive influence on respondent’s likeliness of the security screening area. (F: 6,104, Sig. 0,014) (Brown-Forsythe: Sig.0, 023). In order to further analyze the influence of each pleasant scent (the congruent and the incongruent), the Tukey post hoc test was conducted. Airy scent which considered as more congruent and red apple considered as in-congruent was not significantly different from one another in terms of their impact on likeliness. On the other hand, congruent airy scent surprisingly did not generate better result than no scent significantly (Mean Diff. Airy and No Scent: 0, 46891, sig. 0,129) while red apple which was considered as less congruent or in-congruent with the security screening area in this research generated significantly more positive results than when there is no scent in the environment (Mean Diff. btw Red Apple and No Scent: 0, 61355, sig. 0,047).

According to the statistically significant result of ANOVA comparing the pleasant ambient scent with no scent diffused, it can concluded that respondent’s likeliness of the security screening environment in an airport can be enhanced with a pleasant scent.

**Figure 21. Means plot of 'environment' (Congruent, In-Congruent and No Scent)**
### Multiple Comparisons, 'Likeleness'

**Dependent Variable:** How strongly do you like or dislike security screening area at Budapest Airport?

<table>
<thead>
<tr>
<th>(I) Environmental Setting</th>
<th>(J) Environmental Setting</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airy</td>
<td>RedApple</td>
<td>-1.14464</td>
<td>.24866</td>
<td>.830</td>
<td>-.7317</td>
<td>.4424</td>
</tr>
<tr>
<td>NoScent</td>
<td>Airy</td>
<td>0.46891</td>
<td>.24133</td>
<td>.129</td>
<td>-.1008</td>
<td>1.0387</td>
</tr>
<tr>
<td>RedApple</td>
<td>Airy</td>
<td>1.14464</td>
<td>.24866</td>
<td>.830</td>
<td>-.4424</td>
<td>.7317</td>
</tr>
<tr>
<td>NoScent</td>
<td>RedApple</td>
<td>0.61355*</td>
<td>.25727</td>
<td>.047</td>
<td>-.0062</td>
<td>1.2209</td>
</tr>
<tr>
<td>NoScent</td>
<td>Airy</td>
<td>-0.46891</td>
<td>.24133</td>
<td>.129</td>
<td>-1.0387</td>
<td>.1008</td>
</tr>
<tr>
<td>RedApple</td>
<td>NoScent</td>
<td>-0.61355*</td>
<td>.25727</td>
<td>.047</td>
<td>-1.2209</td>
<td>-.0062</td>
</tr>
</tbody>
</table>

* The mean difference is significant at the 0.05 level.

**Table 7. Tukey Post Hoc Test for 'likeleness' of environment**

![Means Plot of 'Likeleness of Buying'](image)

**Figure 22. Means Plot of 'Likeleness of Buying'**
H8c: Passenger’s likeliness of buying improves in presence of pleasant ambient scent

H8d: Passenger’s likeliness of buying improves in presence of pleasant ambient scent congruent with the environment

According to the one ANOVA results of likeliness of buying, there was not any significant difference between airy, red apple and no scent condition. Red apple slightly generated better scores than airy scent and no scent. Post hoc analysis of Turkey did not also provide any significant difference for three different setting environment by doing so, it leads to a conclusion that there is no direct impact of presence of ambient scent on likeliness of buying.

Figure 23. Means Plot of Respondent's 'Likeness of Buying' (the Conruent, the In Congruent and No Scent)

Multiple Comparisons
Dependent Variable: Assuming you were going to purchase any type of merchandise and had money, How likely would you visit stores in Budapest Airport?

Tukey HSD

<table>
<thead>
<tr>
<th>(I) Environmental Setting</th>
<th>(J) Environmental Setting</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval Lower Bound</th>
<th>95% Confidence Interval Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airy</td>
<td>RedApple</td>
<td>-.08799</td>
<td>.2105</td>
<td>.944</td>
<td>-.7279</td>
<td>.5519</td>
</tr>
<tr>
<td>NoScent</td>
<td></td>
<td>.22301</td>
<td>.26306</td>
<td>.674</td>
<td>-.3980</td>
<td>.8441</td>
</tr>
</tbody>
</table>
**Table 8. Tukey Post Hoc Test for 'Likeliness of Buying'**

<table>
<thead>
<tr>
<th>Environmental Setting</th>
<th>RedApple</th>
<th>Airy</th>
<th>NoScent</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airy</td>
<td>.09946</td>
<td>.14045</td>
<td>.14099</td>
<td>.08799</td>
<td>.27105</td>
<td>.944</td>
<td>-.5519</td>
<td>.7279</td>
</tr>
<tr>
<td>NoScent</td>
<td>-.22301</td>
<td>.26306</td>
<td>.31099</td>
<td>.3510</td>
<td>-.5519</td>
<td>.944</td>
<td>-.8441</td>
<td>.3980</td>
</tr>
<tr>
<td>RedApple</td>
<td>-.04985</td>
<td>.19133</td>
<td>.26306</td>
<td>.3510</td>
<td>-.5519</td>
<td>.944</td>
<td>-.9731</td>
<td>.3511</td>
</tr>
</tbody>
</table>

**H9a: Perceived service quality of passangers improves in presence of pleasant ambient scent**

**H9b: Perceived service quality of passangers improves more in presence of pleasant ambient scent congruent with the airport than in-congruent ambient scent.**

According to the one-way ANOVA analysis, there was no statistically significant difference between the mean values of the scores. Pleasant ambient scent did not generate any significantly different scores than no scent diffused into the environment. Even though there is slightly insignificant difference between each setting variable of red apple, airy and no scent, it was not strong enough. Thus it leads us to reject the direct relationship between presence of pleasant ambient scent and passenger’s perception of service quality.

**Multiple Comparisons**

Dependent Variable: Service Quality

Tukey HSD

**Table 9. Tukey Post Hoc Test for 'Service Quality'**
H10a: Passenger’s perception of time spent during security screening area decreases in presence of pleasant ambient scent

H10b: Passenger’s perceptions of time duration on the security screening area decreases more in presence of pleasant ambient scent congruent with the airport than in-congruent ambient scent

In order to analyze the effect of the pleasant ambient scent on time perception, information of real time spent during security screening area was acquired from IT service of Airport. Valid data was only for 172 respondents out 208 due to the privacy policy of some companies on barcode. Afterwards, time difference between real time spent and estimated time of each respondents are calculated.

Figure 24. Means Plot of 'Service Quality'

![Means Plot of 'Service Quality']
On figure 22, it is clearly visible that when there is a pleasant ambient scent on security screening area, estimation time was shorter than actual time on the other hand, when there is no scent on the environment, estimated time was bigger than real time spent. In conclusion, it can be said that presence of pleasant ambient scent positively effects on perception of time spent during security screening.

In order to understand how ambient scent influence on ability of estimation, one way ANOVA test was conducted for a newly created variable which shows difference between estimated and real time spent during the security screening area. The difference did not indicate any significant result between the ambient scent and no scent conditions. Although there is in-significant difference between no scent and scent condition. According to the result, passenger’s ability to estimate correctly how long time has passed since they entered to the security screening process until the survey desk, was better when there is a pleasant scent or in other words, difference between real time spent and estimated time was small.
In result, presence of pleasant ambient scent positively influence on perception of time and also increase the accuracy of estimation. It leads hypothesis 10a and 10b to be accepted.

### Multiple Comparisons

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Difference between Estimated and Real Time Spent During Security Screening</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>(I) Environmental Setting</th>
<th>(J) Environmental Setting</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tukey HSD</td>
<td>Airy</td>
<td>-2.0519</td>
<td>1.66094</td>
<td>.992</td>
<td>-4.1326 - 3.7222</td>
</tr>
<tr>
<td></td>
<td>RedApple</td>
<td>-1.10516</td>
<td>1.59178</td>
<td>.767</td>
<td>-4.8690 - 2.6587</td>
</tr>
<tr>
<td></td>
<td>NoScent</td>
<td>1.0516</td>
<td>1.61545</td>
<td>.843</td>
<td>-2.6587 - 4.8690</td>
</tr>
<tr>
<td></td>
<td>Airy</td>
<td>.20519</td>
<td>1.66094</td>
<td>.992</td>
<td>-3.7222 - 4.1326</td>
</tr>
<tr>
<td></td>
<td>NoScent</td>
<td>.89997</td>
<td>1.61545</td>
<td>.843</td>
<td>-2.9198 - 4.7198</td>
</tr>
</tbody>
</table>

Table 10. Tukey Post Hoc Test for Actual and Estimated Time Difference

![Figure 26. Means Plot of Difference Between Estimated and Actual Time](image_url)

Figure 26. Means Plot of Difference Between Estimated and Actual Time
5.3.3. Model Testing With AMOS

In this section of the research, the modified research model will be tested by using AMOS software. This section will also test some of hypothesis which were previously designed depending on S-O-R model.

Reliability Analysis of Cronbach’s Alpha for each of the Constructs

As mentioned earlier, this study first conducted a confirmatory factor analysis (CFA) with a maximum likelihood to estimate the measurement model by verifying the underlying constructs. Reliabilities of the factors were also checked before testing the model. The level of each internal consistency in each construct was acceptable with Cronbach’s alpha estimates (Nunnally, 1978). Cronbach’s alpha scores for the constructs were as follows; 0.792 for ‘Pleasure’ construct, 0.702 for ‘Arousal’ construct, 0.942 for ‘Environment’ and lastly 0.830 for Service Quality (This construct is not be part of proposed model). All of the composite reliabilities of the constructs were over the cutoff value of 0.70 which ensures adequate internal consistency of multiple items for each constructs (Hair, Anderson, Tatham, & Black, 1998).

Model Fit Indexes

Before testing hypothesized paths in AMOS; it is necessary to indicate model fit indexes. A fit index is a measure to indicate how well a specified model reproduces the variance-covariance matrix among the indicator variables (Arbuckle & Wothke, 2016). Current practices suggest that the following set of fit indices may be used and reported (Groenland & Stalpers, 2012).

- Chi square with the corresponding degrees of freedom which a non-significant chi square suggest model fit. Chi Square supports the existence of a relationship in a cross table. In SEM, non-significant values of chi square suggest that there is no difference between the sample variance-covariance matrix and the estimated variance-covariance matrix or shows that researcher’s model is correct (Groenland & Stalpers, 2012).
- CFI or TLI: values range from 0 to 1; a high level of this scores shows a good fit.
- RMSEA range between 0-1 and a low level indicated a good fit.
- PNFI is also used to compare models of varying complexity range of between 0-1 as well and high level indicates a good fit.

In our model, Chi-square value is 459,791 with degree of freedom of 241 and probability level equals to 0,000 with sample size of 208. Since the probability value of the chi-square test is smaller than the 0, 05 level, null hypothesis was rejected. Thus dataset does not fit into our research model. It might happen due to the small sample size for the number of parameters to be estimated. Chi Square test is highly sensitive to sample size and can result with inflation of chi-square values with a large sample size. Thus it might lead a poor data to model fit.

Due to the chi square test of absolute model fit is highly sensitive to sample size, usually researchers prefer to use various descriptive fit statistics to assess the overall fit a model to the data. In this case, even the model is not fit due to chi square test, it might perform well in comparison to other models and that might be substantive interest.

Other fit indexes of the research model as follows; CFI=, 914, TLI=, 901, IFI= 0,915 and RMSEA= 0,066. CFI(Comparative Fit Index) score of the research model indicated a very good fit which is considered to be more than 0,9 or close to 0,95. CFI compares the absolute fit of specified model to the absolute fir of the independence model. There are many rules of thumb for the various measures of fit indexes. RMSEA values below 0, 6 is rather preferable and Tucker-Lewis Index values of 0, 95 or higher. According to the values of proposed model, it can be concluded that model does not fit well according to the descriptive measures of fit (see appendix 2.2.1. Fit Indexes).

Acceptability of a model does not merely depend on the value of one index (Groenland, E. & Stalpers, J., 2012). Thus, since the research model performs satisfactory for CFI, TLI, IFI and RMSEA, the research hypothesis will be tested according to the model in the next section.
Figure 27. AMOS Diagram of the Proposed Research Model

Note: Significant Paths are colored

Error theory and justification of correlated errors between indicators

A common source of CFA model misspecification belongs to the relationship among the indicator residual variances (Brown & Moore, 2012). When error covariance is not specified, the researcher can assert all of the covariation among indicators is due to the latent variables. The reason behind error covariance is that some of the covariance of
the indicators not explained by the latent variables due to the independent (exogenous) common cause (Brown & Moore, 2012). On the other hand, before placing error covariance, a substantive rationale should be established and should not be freely estimated only to improve model fit (Brown & Moore, 2012). For this research, in order to be consistent in the decision rules to specify correlated errors, reason for correlating the errors of two indicators only occur for questionnaire items that are reverse-worded. For instance, in this research model, the reason behind the covariance between ‘melancholic-contented’ and ‘despairing-hopeful’ (0, 41) most probably arises from similarly worded and reverse worded items thus a correlation was placed between two error items. The same reasoning for correlating the errors of two indicators was applied for the all pairs with the same issue (‘tense-relax’-‘un-comfortable-comfortable (0, 41), ‘negative-positive’-‘bad-good’ (0, 35), ‘un-motivating-motivating’- un-interesting-interesting (0, 31), ‘un-pleasant-pleasant’-‘boring-stimulating’ (-0, 31).

Regression Weights and Hypothesized Paths

In this section, by analyzing the regression results between exogenous and endogenous items, the research hypothesis was tested.

**H1: Presence of a pleasant ambient scent increases the pleasure level of people in an Airport security screening area**

Previous findings of one-way ANOVA was compatible with the results of regression weights derived from AMOS. Hypothesis 1, hypothesized a positive relationship between presence of a pleasant ambient scent and pleasure level of people and the sign was in expected direction (P=0,027, C.R= 2,213). Thus it leads to us to accept the hypothesis 1.

**H2: Presence of a pleasant ambient scent has an influence on arousal level of people in an airport security screening area**

According regression weights table, there is no significant effect of pleasant ambient scent on the arousal level of respondents (P=0,464, C.R=0,733). The result of the regression analysis was compatible with One-Way ANOVA result.
**H2a: Arousal has also an influence on pleasure level of people**

Hypothesis 2a, which states there is an existing influence of arousal on pleasure level was supported with the results of regression, and the sign was in the expected direction as well. (P<0,001, C.R=4,605).

**H7a: Pleasure produces positive evaluations of overall airport security screening environment.**

According to the result of regression, hypothesis 7a, which states ‘pleasure’ produces positive evaluations of overall airport security screening environment was supported and the sign was in the expected direction (P<0,001, C.R=5,337). Thus it leads us to accept H7a.

**H7b: Arousal produces positive evaluations of overall airport security screening environment.**

Depending on the results of AMOS, there is no significant relationship between arousal and positive evaluation of overall airport security screening environment (P=0,195, C.R=1,297). Thus, it leads the hypothesis 7b to be rejected.

**H8a: The Level of Pleasure has a positive effect on passenger’s likeliness of buying**

Hypothesis 8a which states that there is a one-way positive relationship from pleasure to likeliness of ‘buying’ was accepted (P=0,054, C.R=1,931). On the other hand, an unidentified in-direct relationship was found between pleasure and buying by adding a positive one way relationship from ‘environment’ to ‘buying’ which indicated that there is a highly significant positive influence of ‘environment’ on ‘buying’(P=0,002, C.R=3,034). Thus it leads us to conclude, even though there is a weak relationship between ‘pleasure’ and ‘buying’, it does not mean that there is no in-direct effect. Thus, it can be said that ‘pleasure’ significantly influence on ‘environment’ which also significantly influence on ‘buying’.
**H8b: The Level of Arousal has a positive effect on passenger’s likeliness of buying**

H8b consider that there is a positive one-way effect of arousal on passenger’s likeliness of buying despite no significant positive relationship was found according to the result (P=0, 353, C.R. = -929). On the other hand, the result of regression showed that there is insignificant negative impact of arousal on passenger’s likeliness of ‘buying’. Thus it leads the hypothesis 8b to be rejected.

Regression Weights-AMOS

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arousal &lt;--- Scent-No Scent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arousal</td>
<td>0.112</td>
<td>0.153</td>
<td>0.733</td>
<td>0.464</td>
</tr>
<tr>
<td>Arousal &lt;--- Pleasure</td>
<td>0.417</td>
<td>0.091</td>
<td>4.605</td>
<td>***</td>
</tr>
<tr>
<td>Pleasure &lt;--- Scent-No Scent</td>
<td>0.297</td>
<td>0.134</td>
<td>2.213</td>
<td>0.027</td>
</tr>
<tr>
<td>Environment_ &lt;--- Pleasure</td>
<td>0.635</td>
<td>0.119</td>
<td>5.337</td>
<td>***</td>
</tr>
<tr>
<td>Environment_ &lt;--- Arousal</td>
<td>0.120</td>
<td>0.092</td>
<td>1.297</td>
<td>0.195</td>
</tr>
<tr>
<td>Un-Happy-Happy &lt;--- Pleasure</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annoyed-Pleased &lt;--- Pleasure</td>
<td>1.409</td>
<td>0.172</td>
<td>8.199</td>
<td>***</td>
</tr>
<tr>
<td>Dissatisfied-Satisfied</td>
<td>1.233</td>
<td>0.149</td>
<td>8.268</td>
<td>***</td>
</tr>
<tr>
<td>Melancholic-Contented</td>
<td>0.951</td>
<td>0.144</td>
<td>6.587</td>
<td>***</td>
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<tr>
<td>Despairing-Hopeful &lt;--- Pleasure</td>
<td>0.738</td>
<td>0.134</td>
<td>5.522</td>
<td>***</td>
</tr>
<tr>
<td>Un-Aroused-Aroused &lt;--- Arousal</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dull-Jittery &lt;--- Arousal</td>
<td>1.113</td>
<td>0.129</td>
<td>8.649</td>
<td>***</td>
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<tr>
<td>Sluggish-Frenzied &lt;--- Arousal</td>
<td>1.010</td>
<td>0.119</td>
<td>8.507</td>
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<tr>
<td>Relax-Stimulated &lt;--- Arousal</td>
<td>0.429</td>
<td>0.130</td>
<td>3.306</td>
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</tr>
<tr>
<td>Buying &lt;--- Pleasure</td>
<td>0.325</td>
<td>0.168</td>
<td>1.931</td>
<td>0.054</td>
</tr>
<tr>
<td>Buying &lt;--- Arousal</td>
<td>0.145</td>
<td>0.157</td>
<td>0.929</td>
<td>0.353</td>
</tr>
<tr>
<td>Un-Attractive-Attractive &lt;--- Environment_</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tense-Relax &lt;--- Environment_</td>
<td>0.817</td>
<td>0.087</td>
<td>9.419</td>
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</tr>
<tr>
<td>Un-Comfortable-Comfortable &lt;--- Environment_</td>
<td>0.882</td>
<td>0.082</td>
<td>10.787</td>
<td>***</td>
</tr>
</tbody>
</table>
After analyzing the results with different tools and analysis, it is necessary to indicate clearly which of the research hypothesis was accepted and which one of them was rejected on the lights of results.

### Table 11. Regression Weights, AMOS

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Type of Analysis</th>
<th>Accepted</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong> Presence of a pleasant ambient scent increases the pleasure level of people in an Airport security screening area</td>
<td>One-Way ANOVA and AMOS Regression</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>H2</strong> Presence of a pleasant ambient scent has an influence on arousal level of people in an airport security screening area</td>
<td>One-Way ANOVA</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>H2a</strong> Arousal has also an influence on pleasure level of people</td>
<td>AMOS Regression</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>H3</strong> Presence of pleasant ambient scent congruent with the airport generates higher pleasure level than in-congruent ambient scent</td>
<td>One-Way ANOVA</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>H4</strong> Presence of pleasant ambient scent in-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothesis</td>
<td>Description</td>
<td>Methodology</td>
<td>Result</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>H5</td>
<td>Presence of pleasant ambient scent congruent with the environment generates lower arousal level than incongruent ambient scent</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
<tr>
<td>H6</td>
<td>Presence of pleasant ambient scent incongruent with the environment generates higher arousal level than when ambient scent is not present</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
<tr>
<td>H7a</td>
<td>Pleasure produces positive evaluations of overall airport security screening environment</td>
<td>AMOS Regression Analysis</td>
<td>X</td>
</tr>
<tr>
<td>H7b</td>
<td>Arousal produces positive evaluations of overall airport security screening environment.</td>
<td>AMOS Regression Analysis</td>
<td>X</td>
</tr>
<tr>
<td>H7c</td>
<td>Pleasant congruent scent produces better evaluations of overall airport security screening than in-congruent scent</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
<tr>
<td>H7d</td>
<td>Pleasant in-Congruent scent produces better evaluations of overall airport security screening than no scent</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
<tr>
<td>H8a</td>
<td>The Level of Pleasure has a positive effect on passenger’s likeliness of buying</td>
<td>AMOS Regression Analysis</td>
<td>X</td>
</tr>
<tr>
<td>H8b</td>
<td>The Level of Arousal has a positive effect on passenger’s likeliness of buying</td>
<td>AMOS Regression Analysis</td>
<td>X</td>
</tr>
<tr>
<td>H8c</td>
<td>Passenger’s likeliness of buying improves in presence of pleasant ambient scent</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
<tr>
<td>H8d</td>
<td>Passenger’s likeliness of buying improves in presence of pleasant ambient scent congruent with the environment</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
<tr>
<td>H9a</td>
<td>Perceived service quality of passangers improves in presence of pleasant ambient scent</td>
<td>One-Way ANOVA</td>
<td>X</td>
</tr>
</tbody>
</table>
H9b  Perceived service quality of passengers improves more in presence of pleasant ambient scent congruent with the airport than in-congruent ambient scent.  
One-Way ANOVA  
X

H10a  Passenger’s perception of time spent during security screening area decreases in presence of pleasant ambient scent.  
One-Way ANOVA  
X*

H10b  Passenger’s perceptions of time duration on the security screening area decreases more in presence of pleasant ambient scent congruent with the airport than in-congruent ambient scent.  
One-Way ANOVA  
X*

Table 12. Hypothesis Overview (Accepted-Rejected)

Notes: *: the researcher accepted the hypothesis even though it is statistically insignificant.
6. DISCUSSION

“You can close your eyes, cover your ears, refrain from touch, and reject taste but smell is part of the air we breathe. It’s the one sense you can’t turn off.”

Martin Lindstrom, *Brand Sense*, 2005

In this section of the research, the findings from the study will be discussed with previous relative literature and conclusions drawn. The order of discussion will follow the order of the research by shortly discussing the selection of model, setting, pretest, hypothesis, and lastly the empirical findings.

The aim of the research was decided as to reveal the effects of congruent pleasant ambient on emotions and evaluations. In order to verify the research questions, one of the widely used model, which is Mehrabian-Russell S-O-R Model (1974), was utilized. As a setting, Budapest Airport security screening was selected and commercial ambient scents, which were obtained from commercial scent company Aromamedia Kft applied to the selected setting to answer the main research question. Before the main research, a pretest was also done in order to select two different scents, one of which should be considered as pleasant-congruent and the other the pleasant in-congruent scent.

The findings from the pretest showed that ‘Airy’ scent was the one with the highest score for pleasant congruent scent and ‘Red Apple’ the most suitable scent for the in-congruent ambient scent. Despite this, it is beneficial to note that ‘Red Apple’ scent was the most suitable for in-congruent scent among the other four scents (Rain Shower, Airy, Soothing Vanilla, and Fresh Clean) provided by Aromamedia Kft. Thus, the findings were more relative as opposed to actual. That’s to say, the respondents in the pretest, might also score ‘Red Apple’ as highly congruent with airport security screening if they would score it independently from the other four scents or in different settings.

The findings of the research shows that the respondents answered more positively the questions regarding the ‘environment’, ‘service quality’, ‘likeliness of buying’, and also their perception of time was positively influenced. In that context, this study arrived at similar results as previous studies regarding ambient scent effects on people.
The first hypothesis of the research, which stated that the ‘presence of a pleasant ambient scent increases the pleasure level of people in an Airport security screening area’ was approved and generated compatible results with previous research literature such as the one of the earliest example considered by Donovan et.al (1982) where they measured emotions during the shopping experience and found out that pleasure and arousal level of respondents have changed by a minor alteration in the environment. The optimal arousal theory, which states that minor changes in the environment should result with increases in the environment’s perceived novelty and pleasantness, were also well-matched with the results. Such minor change was adding a pleasant ambient scent into the environment in this research (McClelland, Atkinson, Clark & Lowell, 1953; Berlyne, 1971).

On the contrary, to the previous literature, our second hypothesis which stated that ‘presence of a pleasant ambient scent increases the pleasure level of people in an Airport security screening area’ did not generate any significant result both in ANOVA and regression analysis of AMOS. This might be due to a couple of reasons regarding the environment setting of the research or the scale that was used to measure arousal. Firstly, there was a considerable distance around 10 meters between the exits of security screening and survey desk. Considering the fact that passengers also spent a couple of minutes to collect their items from x-ray machine and also had to wait for their family or friends standing between survey desk and end of security screening, arousal effect of scent might have disappeared.

Moreover, in this section of the airport, where passengers tend to spend couple of minutes, locates exactly between the duty free area and security screening. There is a strong air circulation occurring between two areas. Combining small time delays between survey desk and security screening and also strong air circulation might influence the respondent’s arousal level. The other argument can be the possible relief or relaxation, which comes after the security screening process. Passengers usually get in to the security screening process with a relatively high arousal level than normal conditions. Thus, minor changes in an environment might be eradicated or lost with the relief that comes after the process.

The third hypothesis which stated that ‘arousal has an influence on pleasure level of people’ was approved through AMOS path diagram (see: figure 24) and regression
results (see: table 10 on Regression weights). The results indicated that there is a significant positive influence of arousal on pleasure. According to the previous literature of optimal arousal theory, there is a u-shaped relationship between two construct. Until a certain point, arousal increases the pleasure level. Below this point, the stimulation may be desired -that is, it is ‘pleasant’ above it, the same kind of stimulation produces avoidance and if avoidance is unsuccessful, behavioral disturbance occur (Hebb, 1949). Positive relationship between arousal and pleasure in this research shows a degree of freedom to increase the intensity level of the ambient scent. Thus, increase in arousal level of each individual in this research by increasing the intensity level of ambient scent might result in increase in the pleasure level.

The fourth hypothesis of the research which stated that the ‘presence of pleasant ambient scent congruent with the airport generates higher pleasure level than in-congruent ambient scent’ was also accepted by conducting one-way ANOVA with Tukey post hoc test between ‘Red Apple’ and ‘Airy’. The results indicated that with airy scent (pleasant-congruent), respondent’s pleasure level was significantly higher. That result is compatible with the pretest result of two scents where the respondents in pretest evaluated ‘airy’ as more pleasant and congruent scent (see: Figure 5. Scent Preference). Previous literature also indicated that while pleasant congruent scent generates better evaluations and feelings (Bone & Ellen, 1999), incongruent environmental scent usually results in lower customer perceptions of the environment (Bell, Holbrook, & Solomon, 1991).

The fifth hypothesis of the research which assumed that the ‘presence of pleasant ambient scent congruent with the environment generates lower arousal level than in-congruent ambient scent’ did not produce any significant difference with one-way ANOVA test. On the other hand, there was an in-significant difference between two conditions which were also compatible with the pretest results of ‘arousal’ (see: figure 6. Arousal scores of each scent). Result of the pretest previously indicated that ‘red apple’ (pleasant in-congruent scent) had the highest score of arousal and ‘airy’ (pleasant-congruent) the lowest arousal result. In connection with the fifth hypothesis, the sixth hypothesis of the research stating that the ‘presence of pleasant ambient scent in-congruent with the environment generates higher arousal level than when ambient scent is not present’ did not also produce any significant difference and was thus
rejected as well. Discussion about the possible reasons behind the absence of arousal feelings was previously discussed.

Previous literature regarding the effects of ambient scent on environmental evaluation has already showed that pleasant ambient scent has a positive effect on consumer store or physical environment evaluation compared to a non-scented environment (Spangenberg, Crowley, & Henderson, 1996). The atmosphere of physical place is perceived to be nicer and favorable. Spangenberg et al. (2005) also found out that a combination of different atmospherics cues like Christmas background music and an ambient Christmas scent can generate a positive effect on the consumer’s perception of the store environment. Hypothesis 7a which stated that ‘pleasure produces positive evaluations of overall airport security screening environment’ was tested in this context. The result of the AMOS regression analysis indicated that pleasure has a statistically significant positive influence on the evaluation of environment. In the previous chapter, significant effect of pleasant ambient scent on pleasure was observed. Thus it leads us to conclude that pleasant ambient scent generates higher pleasure level which significantly influence the ratings of passengers for the security screening environment in Budapest airport.

Moreover, the study also tested whether there was an effect of congruency of scents on passenger’s evaluations of environment with hypothesis 7c which stated that the ‘pleasant congruent scent produces better evaluations of overall airport security screening than in-congruent scent.’ After conducting one-way ANOVA and Tukey post hoc test for the evaluations of respondents in three different settings (Pleasant congruent scent, pleasant in-congruent scent and no scent) there was surprisingly no significant difference between the pleasant congruent scent (airy) and pleasant in-congruent scent. This led to rejecting the hypothesis 7c. More surprisingly, even though it was not statistically significant, pleasant in-congruent scent (red apple) generated slightly better results for respondent’s evaluation of environment than pleasant congruent ambient scent (airy). This led to hypothesis 7d which stated that ‘pleasant in-Congruent scent produces better evaluations of overall airport security screening than no scent’ being accepted. The research theoretically assumed that the pleasant congruent ambient scent (airy) would likely generate more positive effect on environmental evaluation. Nonetheless, Tukey post hoc test between the scents showed that respondents who were under the diffusion of red apple scent (pleasant in-congruent scent) rated the
environment more favorably. That would raise the question of how well the selection of the in-congruent ambient scent was performed. As also discussed in previous paragraph, selection of pleasant in-congruent scent was conducted among other four commercial different scents. Thus, the result of pretest is depending on a relative measure. Instead of rejecting previous literature, the study showed that the ‘red apple’ scent which assumed to be ‘in-congruent’ can also be considered as a congruent scent with the security screening environment.

Hirsch (1995) showed in his research that the usage of pleasant odor in a casino located in Las Vegas result in a significant increase on the money gambled on the slot machines. Parsons (2009) also found out that by diffusing an appropriate pleasant scent in the lingerie store, it could increase the shopping behavior while an inappropriate scent would generate opposite results. In this context, hypothesis H8a which stated that ‘the Level of Pleasure has a positive effect on passenger’s likeliness of buying’ and in addition to that hypothesis H8b which states that ‘the level of Arousal has a positive effect on passenger’s likeliness of buying’ was tested in this research by using AMOS. The results of the regression clearly indicate that ‘pleasure’ has a direct positive impact on ‘buying’ (see: table 10. Regression weights and figure 24. AMOS diagram of the proposed research model). On the other hand, there was no significant relationship between ‘arousal’ and ‘buying’ behavior. Considering high significant influence of arousal on pleasure, it can be also be concluded that arousal has a considerable in-direct effect on buying behavior of passengers.

The relationship between the presence of pleasant ambient scent and ‘buying’ was also tested with hypothesis 8c which stated that ‘passenger’s likeliness of buying improves in presence of pleasant ambient scent’. Despite there was no significant difference between presence of the pleasant ambient scent and no scent. Thus, Mehrabian and Russell model (1974) which assumes relationship between stimuli (ambient scent) and behavior (buying) occur through organism (pleasure-arousal) was again validated with this research.

Effect of congruency of scent on buying was also tested with the hypothesis 8d which stated that ‘passenger’s likeliness of buying improves in presence of pleasant ambient scent congruent with the environment’. Despite, one-way ANOVA and Post Hoc test did not provide any significant difference between the pleasant ambient scent (Airy) and
the pleasant in-congruent ambient scent (Red Apple). On contrary to the theory, selected incongruent scent (Red Apple) generated slightly better result than the congruent ambient scent (Airy) but the result was not statistically significant. Thus, the same issue with selecting pleasant in-congruent ambient scent repeated itself again and it leads us to conclude that positive results of environmental ‘evaluations’ and ‘buying’ for Red Apple (assumed as in-congruent scent in this research) clearly showed that ‘Red Apple’ scent can be also considered as pleasant congruent scent.

Depending on the request of Budapest Airport management, additional hypothesis regarding ‘service quality’ of the Airport were also added. Service quality was measured independently from the main model thus it was not included in AMOS model. In order to analyze effect of pleasant scent on perception of service quality, one-way ANOVA was utilized. Despite there was no significant difference between ‘service quality’ and presence of the pleasant ambient scent. Following Tukey post-hoc test was utilized in order to understand whether congruency of scents have an positive influence on perceived service quality but it did not also generate any significant results. Hypothesis 9a and 9b were rejected due to the insignificant results.

Apart from proposed model, the effect of the pleasant ambient scent on time perception was also analyzed. One of the main reasons that time perception was detached from the main model is that the sample size was not equal to the other constructs because of technical issues regarding the barcode information. Another reason was that time perception analyzed independently from the model was the complexity of measurement and scale of the questions regarding passenger’s estimated time and real time information. On figure 22, it is clearly visible that when there is a pleasant ambient scent on security screening area, estimation time was shorter than actual time. On the other hand, when there is no scent on the environment, estimated time was more than real time spent during security screening process. In conclusion, it can be said that the presence of pleasant ambient scent positively effects on perception of time spent during security screening. It should be also be noted that this difference was not statistically significant. In spite of, considering small sample size and difference between the pleasant ambient scent and no scent conditions, it leads hypothesis 10a and 10b to be partly accepted.
6.1. Managerial Implications

This study provides evidence suggesting that improving ambient conditions can actually enhance people’s evaluations of environment and behaviors in shopping. Manipulating environmental factors such as arousing and pleasure qualities of the place by adding pleasant ambient scent (congruent with environment) can help gain a competitive advantage over your competitors.

The originality of this research comes from the fact that the field research was held in an airport security screening area rather than a retail store. Airport environments have unique characteristics especially when it comes to shopping because they are filled with ‘excitement of air travel’, an ‘image of exclusivity’ and offering duty free prices and good discounts (Bohl, 2016). Therefore, shopping is one of the most common activities that travelers engage in. Retailing at airport has a vital role in airport operations too because it generates revenue (Crawford, 2003). Considering the fact that passengers in an airport have certain degree of anxiety and pressure due to the security screening process and nature of air travelling, it can be said that they are different than general shoppers in street or other retailing setting. Previous research indicated that almost 35% of airport travelers are converted to purchasers who evidently show the impact of the airport environment on purchasing behavior (Geuensa, Vantommeb, & Brengmanc, 2004). Thus, adding a pleasant ambient odor to environment will not only enhance positive emotions but also result in behavior in shopping.

Positive effects of pleasant ambient scent on time perception have also been indicated in this research. Thus, negative effect of security screening on passenger’s emotions can be reduced by using a pleasant odor. There are already some earlier research papers which point out that shoppers perceived time decrease in a store in presence of pleasant ambient scent as a result it motivates shoppers to stay longer and make additional buying (Spangenberg, Crowley & Henderson, 1996).
There are two important elements to be carefully considered before adding a pleasant ambient scent into the environment. First of all, scent should be congruent with the environment. The selection of scent can be a very challenging decision when it comes to congruency with the environment. Especially, places like airport which are constantly filled with people who have different demographic and social characteristics from each other. Therefore, selected scent should be considered pleasant by people who have different culture, nationality, and preferences. Second element is the intensity level of the scent which highly affects the pleasure level of scents. Location of diffuser, frequency of diffusing and circulation of air should be carefully planned because even the most congruent and the most pleasant scent can be disturbing in wrong intensity level.

In conclusion, marketing and retail managers should definitely exploit any opportunity to enhance consumer’s emotions which will result in positive behavior and evaluations. Ambient scent remains one of the elements in a retailing or service environment and one of the most important.

### 6.2. Limitations and Future Research

The first limitation involves the use of only five commercial scents which were provided by Aromedia Company. Selection of scents for the pretest depended on the intuition and experience of the company rather than any relevant scientific research. As a consequence it leads this research to have some different results than existing literature. For instance, Red Apple scent was selected as an in-congruent ambient scent, despite it generated more positive results than selected congruent scent in evaluation of environment.

Second limitation with this research was the nature of place where the field research was conducted. Since there is large number of people pass through security screening area every day, there is a strong air ventilation which can decrease the positive effects of pleasant ambient scent. Beside that, passengers can be distracted with countless other environmental factors. For instance, a procedural body search might negatively effects the emotions of people which will eventually influence on their responses. Accordingly,
complexity of the environment and diversity of people challenge researcher to truly understand the effect of a single stimuli on respondents. Third limitation was the lack of resources which only let me to collect 208 samples in the field research. In order to test effect of ambient scent on people in three different conditions (pleasant congruent ambient scent, pleasant incongruent ambient scent, and no scent), definitely a larger sample size should be collected. Future research can be repeating the same study to find a better model for airport setting with a larger sample size. Modifying the model of this research by adding additional relationship between ‘environment’ and ‘buying’ can generate better results. Because, in the model of this research, strong relationship was also observed between ‘environment’ and ‘buying behavior’. Last recommendation for a future research can be whether there is an effect of pleasant ambient scent on passenger’s perception of crowding and cueing in airport security screening.
7. BIBLIOGRAPHY


APPENDIX

1. Pictures of Experiment
1.1. Survey Desk

1.2. Plan of Field Research
1.3. Plan of the scent dispensers located in air vents
1.4. Small scent dispensing machine near to the desk
2. Figures

2.1. SPSS Tables & Figures

2.1.1. Main Research

One-Way ANOVA Analysis Each Item of Pleasure and Arousal Construct

Means Plots (Pleasure and Arousal Items)
### 2.1.2. Pretest Tables & Figures

#### Pleasantness of Each Scent Type

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### 2.2. AMOS Tables and Figures

#### 2.2.1. Fit Indexes

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### HOELTER

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