DEMOCRATIC AND POPULAR REPUBLIC OF ALGERIA

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

École Supérieure de Commerce

A Dissertation Submitted in Partial Fulfillment of the Requirements for Master's Degree in Commercial and Financial Sciences, Specialty: Marketing & Communication

THE INTERACTION BETWEEN AFFECT & COGNITION ON ONLINE CONSUMER DECISION-MAKING

Case: Goubba Solutions

Submitted by:
Zohra Nourhane CHEBAB

Supervised by:
Dr. Yahia BOUKERCH

Internship Place: EURL Goubba Solutions

Internship Period: 20/03/2022 – 20/04/2022

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DEDICATIONS

I would like to dedicate this thesis…

To my parents for their unlimited love, support, and encouragement. May Allah bless you with long life and good health,

To my dearest Doudouche, who was more than a sister to me, who's always been by my side listening to my complaints and offering the emotional support I needed, who has been encouraging me every step of the way,

To Amine, for his encouragement, support, and for every time he offered me a shoulder to lean on,

To my loving and caring friends, to all the laughter and fun we shared, Yacine, Ichrak, Anis & Souha,

To my dear Asma, & Yasmine,

To my brothers,

To my loving family,

Thank you…

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I'm always grateful to my supervisor, Dr. Yahia Boukerch, for his guidance and patience with me through this research journey, for his encouragement and great help,

I am very thankful to all each and every one from the Goubba team, who have helped me a lot, for their kindness, friendliness, and generosity,

I give my sincere thanks to the Jury members,

I would also like to thank all my teachers throughout the years.

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In highly competitive and growing markets, effective marketing became more and more challenging. Today, companies are searching for more innovative ways to gain attention from their customers and reach effectively a larger number of prospects.

Recently, online shopping has become a trend. Customers are spending more time shopping online than in traditional stores as it saves them time and effort. This change in customers' habits must be followed by a change in marketing efforts.

Consumer decision-making processes are a critical aspect for marketers to understand. Environmental stimuli presented in online and offline contexts are not the same, this results in a change in how these stimuli are processed, and thus, a change in consumers' behavior.

Research on consumer behavior has always been the center of interest for marketers. It has never stopped integrating new concepts, research methodologies, tools, and even other fields of study as researchers are conscious of the limitations of traditional marketing tools. Customers' unconsciousness is extremely important in every step of their journey but it cannot be measured using the traditional tools. And so are emotions and intuition which are deeply important to know to communicate effectively with customers.

Affect and cognition have long been known to be the main influencers of consumer behavior. Most research on consumer behavior has focused on the cognitive component and the role affect had was belittled. Researchers recently began to explore both components and measure the role of the interaction between affect and cognition on consumer behavior. They have concluded that this interaction differs from one context to another. Researchers have identified two separate decision-making models; one unconscious and affective and the other conscious and cognitive. It has been argued that affect and unconsciousness influence consumer behavior more than cognition which is why it is important to understand how consumers react to marketing stimuli on an emotional and unconscious level.

Cognition refers to the mental processes involved in knowledge and learning. It includes perception, attention, and memory. Affect, on the other hand, is a term that refers to the underlying experience of feelings and emotions opposite to "Cognition" which refers to thoughts and beliefs.

Researchers have studied this interaction using neuromarketing techniques. Neuromarketing has gained the interest of many researchers for two decades now. This new field lies at the intersection of three disciplines: Marketing, Neurosciences, and Psychology. It offers scientific explanations of consumers' preferences and behavior. Consumer Neuroscience aims to gain insight into consumers' motivations, preferences, decisions, and emotions to help create and adopt innovative and creative customer-oriented marketing actions.

Researchers, such as Damasio and Amada, have tried to reconcile cognitive and affective processes; viewing cognition under partial somatic-affective control and proposing the existence of two brain circuits; one in charge of cognitive processes and the second mediating feelings about cognitive processes. The Somatic Marker Hypothesis (SMH) shows how brain activity represents a potential choice's value relating to prior emotions and experiences.

Audience reactions to marketing efforts must be measured to determine what works and what doesn't so it can be improved. Once consumers' attention is caught, they begin evaluating the product or brand and thus the decision-making process begins.

Consumers are not driven by stimuli presented in the physical environment in an online shopping context. Marketers must understand the mechanisms behind online decision-making to compete in this digital era.

The cognitive approach to decision-making views the individual as an information processor. Analytical cognitive models of consumer behavior usually follow the classical five-step model; problem recognition, information search, alternative evaluation, choice, and outcome evaluation.

Combining Affective and Cognitive neuroscience results with findings from psychology, marketing, and decision theories helps to better understand the complexity of the human decision-making processes.

The use of consumer neuroscience in marketing, specifically in branding, has helped define the four essential components to forming brand preference, namely: representation & attention, predicted value, experienced value, and remembered value & learning.

1. Main Research Question

The following research aims at answering the following problem:

What drives online decision-making, Affect, or Cognition?

1.1. Sub-questions

The research problematic is divided into sub-questions:

- Does cognition influence online purchase decisions more than affect?
- What platform-related factors influence online buying experience?
- Is online buying experience influenced more by affect?

1.2. Hypotheses

To answer the previous questions, the flowing hypotheses were formed:

- **H1:** Online purchase decision is more influenced by cognition than by affect.
- **H2:** Online purchase experience is more influenced by affect than by cognition.
- **H3:** The overall platform design, ease of use, prices, and the variety of proposed products influence online purchase experience.

2. Reasons for Choosing the Topic

Consumers shifting their purchasing habits to online purchases has resulted in big changes in the field of consumer behavior. Previous studies have focused on in-store settings for research in this field to explain the impact of both affect and cognition in decision-making. It is high time for researchers to shift their focus to online consumer behavior.

Using both psychology and neuroscience tools and findings for marketing purposes will enrich it further. First by understanding key concepts, which are in this research affect and cognition, and the brain mechanisms behind them will prove extremely useful for marketers for more powerful marketing strategies which are more specific and efficient. Second, by finding pattern for the interaction between these key influencers of decision.

3. Importance of the Research

Consumers' preferences are constantly changing in a fast-growing and highly competitive market. Marketers ought to keep up with the trends and preferences of their customers to better direct their efforts toward these consumers. Preference for online shopping has changed many aspects of marketing efforts and re-shaped some of the knowledge marketers have about consumer behavior.

Understanding the underlying mechanisms of online purchases and online decision-making is highly necessary for marketers. Research has shown that, in an offline context, customers are more influenced by their affect than by their cognition.

Affective stimuli influencing customers can be as simple as the store's lighting, colors, and background music. They usually make their decisions impulsively and don't take too much time to think and decide which and what product to buy. But in an online context, these physical stimuli are inexistant, does that affect the affective ax of the consumer decision process? Answering this question will open another horizon for consumer research and bring new revolutionary findings to marketing.

4. Research Objective

The aim of this work is to uncover the affective and cognitive mechanisms related to decision-making, more precisely, online decision-making. Understanding the interaction between affect and cognition in online decision-making will help unlock new horizons for future marketing research especially on consumer behavior. Findings will help marketers orient their online marketing efforts to target the processes for online purchasing decisions with the adapted stimuli and ditch the ones who have no impact, or even who have the opposite impact of what's desired.

5. Previous Research

The following study was inspired by the work of various researchers who examined the interaction between affect and cognition such as LeDoux (1987, 1995, 1996), Leventhal (1984), Epstein (1993), Berkowitz (1993), and many others.

Berkowitz suggests that facing any stimulus, three processes may occur. The first is an automatic process that occurs quickly and that may give rise to lower-order affective responses. The second is subject to higher-order cognitive processing. The third is rather higher-order affective processing that is subject to more deliberate and slower.

Berkowitz's work is consistent with LeDoux's work which suggests that, when facing an external stimulus, three processes may occur: (1) "low-road" processes that occur rapidly, in the limbic system, and give rise to low-road affective reactions; (2) "high-road" cognitive processes that occur in the cortical systems of the brain and either strengthen or weaken "low-road" affective reactions; and (3) "high-road" affective reactions that result from "high-road" cognitive reactions.

Leventhal proposes that affective reactions can result from two routes: (1) an "innate route" that generates primitive affective reactions and (2) a "memory route" which involves conceptual processing.

Baba Shiv (1999) has examined, in his article "Heart and Mind in Conflict: The Interplay of Affect and Cognition in Consumer Decision-Making", the interaction between affect and cognition in decision-making using two experiments. Experiment 01 aimed at examining the effect of affective reactions on the subjects' decisions in high versus low availability of processing resources. The results were that subjects tend to choose the alternative that is higher on the affective dimension when processing resources are restrained, i.e. affect had a stronger impact on their decision. Experiment 02 aimed at testing the effect of subjects' impulsivity on their choice. Results show that impulsiveness is related to affect when processing resources were restrained. When resources were available, the choice was prudent.

Baba shiv's experiments results suggested that reducing processing resources in a shopping environment will increase consumers' impulsiveness, and thus they are more likely to buy. How products are presented also has a great impact on consumers' choices. In online shopping platforms, products are presented in a symbolic manner (pictures and descriptions)

which results in choices influenced more by cognition and less by affect. Marketers need to consider a better way to influence their cognition or find ways to target their affect so it has more impact on their choices.

6. Research Methodology

The empirical research of this work will be conducted through an online questionnaire in a non-probabilistic method of research due to the lack of time and budget to conduct a proper probabilistic survey. The questionnaire will be in three languages so that respondents can choose the language they're most comfortable using in an attempt to limit misunderstanding of the questions and to provide the most accurate answers possible.

The survey will aim at measuring the affect and cognition of the respondents and their influence on their online shopping decisions in addition to their shopping experience.

SPSS version 26 will be used for data treatment and analysis. One-sample t-test and multiple regression analysis will be used to test the research hypotheses to then confirm or refute them.

7. Research Structure

The present work will include two chapters. The first will aim at explaining the concepts of affect, cognition, and decision-making from a marketing, psychology, and neuroscience points of view. The second one aims at testing the hypotheses empirically.

The first chapter presents a theoretical framework explaining each concept of the research thoroughly from a marketing, psychological, and neuroscientific points of view. It will include three sections: the first section explains the concept of "Affect", its meaning in psychology, and the brain networks responsible for affective processes using findings from affective neuroscience, the section will also present its role in decision-making and its implications in marketing. In the second section, we will explain what is "Cognition", the evolution of cognitive neuroscience studies and some key concepts of cognition as well as the brain networks

involved in cognitive processes. Lastly, in the third section, we will go through the decision-making theories and processes, we will also look into consumer neuroscience.

The second chapter is where the empirical research takes part. Same as the first chapter, the second chapter will be divided into three sections. The first one will be a presentation of the host organism. The second chapter will provide information and explanation on the research methodology, sampling method, and research technique used for the study. Then, the last chapter will present and analyze the collected data and test out the research hypotheses to answer the research problem as well as the research sub-questions.

CHAPTER 01

—

AFFECT & COGNITION IN DECISION-MAKING

INTRODUCTION

To understand decision-making processes, it is necessary to go through some concepts and theories for a better understanding.

This study focuses on the interaction between affect and cognition in decision-making, more specifically in online decision-making. First, the concept of "Affect" will be explained from a psychological and neuroscientific angle, its implications in marketing, some affective components, and the underlying brain systems of these affective components. The next section aims at explaining the concept of "Cognition", its components, and the related brain mechanisms. Finally, we will go through some decision-making making theories where we will explain the concept of consumer behavior and the consumer decision process, in addition to consumer neuroscience and its implications in branding.

Decision-making is a fundamental process in every human's life. Decisions influence health, finances, and many other things. Researchers are becoming more and more interested in understanding why people make certain decisions especially when they don't seem rational or beneficial in the long run.

For many years, researchers in different fields from psychology, economics, and marketing to neuroscience have sought to understand human decision-making mechanisms. Decision-making is an integral part of human behavior; they make decisions on a daily basis and on different levels.

In the modern economy, it was known that decision-making was a rational process to maximize utility, with the assumption that humans had unlimited knowledge and information processing power. That is, "Utility" is conceived as the balance between pleasure and pain.

Economists then ignored the role of emotions in decision-making because of the disagreement on how to define them. "Emotion has no IQ". The question was "Could emotions, in fact, have a role in sound, rational decision-making?".

Cognitive neuroscience makes use of neuroscience tools in order to collect and measure data from brain activity related to specific functions and behaviors. This new data enriched research on consumer decision-making and behavior by combining various disciplines such as neuroscience, psychology, and marketing.

Affective Neuroscience is another field that emerged from the work of some researchers such as Panksepp (1990) and LeDoux (2000). It supports the idea that affective processes are supported by brain structures and run in parallel with cognitive processes.

Cognitive psychology studies behavior in an attempt to understand human cognition. Cognitive neuroscience aims also at understanding human cognition by observing behavior in addition to the brain using neuroscience tools and methods combined with psychological findings.

SECTION 01: AFFECT

The introduction of prospect theory suggesting the implication of other factors in decision-making generated interest in understanding the underlying mechanisms of preference, judgment, and choice (Kahneman & Tversky, 1979). Findings have great value for marketers helping them understand critical drivers of consumer behavior.

Researchers tried to reconcile cognitive and affective processes; viewing cognition under partial somatic-affective control (Damasio, 2005). The work of Almada et al. (2013) proposed the existence of two brain circuits; one in charge of cognitive processes and the second mediating feelings about cognitive processes.

Decision-making theories as of late started to argue that emotional processing apart from cognitive processing affects decision-making. The Somatic Marker Hypothesis (SMH) shows how brain activity represents a potential choice's value relating to prior emotions and experiences.

In the Somatic Marker Hypothesis, Antonio Damasio proposed that emotions play a role in decision-making. His studies were conducted on patients with damage in specific regions of the ventromedial prefrontal cortex, from where he concludes that this region is particularly responsible for emotions. Cognitive processes that accompany emotional processes may be conscious or unconscious.

1.1. The Role of Neuroscience Studies in Decision-Making

Over the past few decades, researchers have experimented with several hypothetical game scenarios to determine how people make their decisions. These experimentations confirmed even more that people violated the traditional economic decision-making model stating that people are rational economic agents aiming for utility maximization.

In Neuroeconomics, games are one way to control variables affecting decision-making. These studies look at either behavior, autonomic reactions, or brain activity while subjects are engaged in strategic games, thus revealing how the neural system processes fairness, reward, loss, trust, revenge, and choice (Almanda et al. 2013).

Specific brain regions such as the *amygdala, the ventromedial cortex, and the insula* were found to be involved in judgment, memory, emotions, decision-making, empathy…etc. Fiorillo (2003) has found that dopamine neurons of the *primate ventral midbrain* may act to predict reward. During gambling games, dopamine levels increase due to uncertainty. This may explain why gamblers feel a certain reward feeling even though losses outnumber gains. Later, it was found that dopamine signals the difference between predicted and experienced rewards, thus, reinforcing risk-taking behavior (Clark et al. 2014).

Emotional connections in marketing are no longer a secret weapon in strategy; they can be a real advantage. Marketers need to know the underlying emotional and affective responses in both online and offline contexts so they can adapt their strategies accordingly.

1.2. The Importance of Understanding Affect

Understanding customers' thoughts and feelings is a critical point for marketers. In a market-oriented mindset, marketers need to identify the emotional and thinking mechanisms of their customers and how they respond to various stimuli. The American Marketing Association defines consumer behavior as "The dynamic interaction of affect and cognition, behavior, and the environment by which human beings conduct the exchange aspects of their lives" (Peter&Olson, 2005). This interaction is what drives consumers' decision-making and consequently, their behavior.

In the modern age of business and various marketing techniques, a company's marketing has to stand out. Effective marketing has to catch consumers' attention and make them cognitively and emotionally engaged. Audience reactions must be measured in order to determine what works and what doesn't so it can be improved. Once their attention is caught, customers begin evaluating the product or service and thus the decision-making process begins.

Affect and cognition have long been known to be the main influencers of buying behavior of individuals. Researchers have identified two separate decision-making models; one unconscious and affective and the other conscious and cognitive. It has been argued that affect and unconsciousness influence consumer behavior more than cognition which is why it is important to understand how consumers react to marketing stimuli on an emotional and unconscious level.

In an online context, consumers are no longer driven by stimuli presented in the physical environment. Marketers must understand the mechanisms behind consumers' online decision-making to compete in this rapidly growing market.

Affective responses can be assessed through qualitative interviews; consumers express emotions they experience when they face the marketing stimulus. Although this approach requires cognitive efforts and it is hard to form a reliable recollection of emotional state from memory during exposure to a marketing action. Consumers are also influenced by the hindsight bias or the "I knew-it-all-along" phenomenon (Pieters, 1993); people believe they knew the outcome of an event even before it ended. If affect influences consumer behavior more than cognition, it is only safe to use more reliable methods to measure their affective responses.

Marketing efforts measuring consumers' affect are sometimes ineffective, and when they are, in fact, effective, marketers don't know why. Qualitative interview-based measuring methods rely on consumers' consciousness about their emotions which, most of the time, are unconscious. Marketers also use A/B testing methods to find out which campaign customers respond to better. The challenge here is to truly identify the stimuli that work better for customers in both affective and cognitive dimensions.

Neuroscientific methods stay the only reliable way to record affective consumer responses without the need to rely on reflection and cognition. Tversky and Kahneman (2011) linked heuristics to cognitive biases that influence market research done today. Hindsight bias and Confirmation bias are two of many examples of mental biases.

Using functional magnetic resonance imaging **(fMRI)** to assess how consumers make decisions, results show that they rely more on their emotions (feelings and experiences) rather than information (attributes, functions, features). Many great products have failed because their marketing strategy did not engage their customers' emotions.

"People will forget what you said, people will forget what you did, but people will never forget how you made them feel" Maya Angelou, an American poet.

The Institute of Neuroscience and Psychology at the University of Glasgow suggests that people have four basic emotions: happiness, sadness, fear/surprise, and disgust/anger. Determining which emotion to target helps determine the tone with which the marketing campaign will be conceived.

Emotions, according to various studies (Allen et al. 1992), serve as primary predictors of behavior. Research has always shown that affect can influence judgments and decisions; negative emotions trigger pessimistic assessments whereas positive emotions trigger more optimistic assessments, even when the emotions have no relation to the object of judgment.

It has been argued whether consumers' affective processing for decision-making occurs dependently or independently from the cognitive processing. Recent studies suggest that affect and cognition interact with each other for better decision-making.

Affect also plays a major role in customer satisfaction. Offering an enjoyable experience to customers will influence positively their post-purchase attitudes and judgments. Marketers must seek customer satisfaction through both utilitarian and hedonic (aesthetic and emotional aspects) dimensions of the product. Dissatisfaction with the product's features and utility will result in negative affect and vice versa.

When customer satisfaction is achieved, the brand impression is formed and customers, in the future, will have a positive attitude towards the brand even if they forget the utilitarian dimension.

1.3. Affect & Emotions: Definitions

Affect, in psychology, is the visible expression of feelings and emotions; facial expressions, voice expressions, or gestures. It is what people use to understand the way the other person feels about something.

Core affect is a state of pleasure/displeasure with some degree of arousal. It is "a neurophysiological state that is consciously accessible as a simple, non-reflective feeling that is an integral blend of hedonic (pleasure/displeasure) and arousal (sleepy/activated) values" (Russell, 2003).

An emotion is a body reaction to an event called an "emotionally-competent stimulus". The body's response to this stimulus involves a physiological modification that may be visible (facial expression, posture, specific behavior…) or not visible (heart rate, endocrine release…).

1.4. Understanding Emotions

Most research on affect deals with moods. Lately, researchers have shown an interest in studying specific emotions. Moods are usually described as low-intensity diffusing affective states that one cannot necessarily explain. Internal stimuli such as a change in the physiological or chemical activity of the body or external stimuli such as weather and music can cause an individual to experience a sense of feeling good or bad without him knowing why. Moods can guide relatively automatic self-regulatory responses as well as more conscious decisions.

Smith and Ellsworth's (1985) work suggested that 15 emotions could be defined by 06 core dimensions: pleasantness, certainty, perceived controllability, attentional activity, anticipated effort, and agency. Each emotion is uniquely defined respecting each of the six dimensions. Two emotions can share some common appraisals but they are distinct for they differ in the other dimensions. Emotions provide more attitude-specific information. Feeling anger, for example, will often lead to target and context-specific responses rather than more general displays of unhappiness (Bushman et al. 1999).

Note that emotions can, in fact, produce mood-like states where one's emotional response transfers to an unrelated behavior often without his realization. Recent studies show that the degree of transfer will be a function of two factors: (1) The salience of the source of the

emotional state—transfer is more likely when the actual source of the affect is not salient; and (2) The domain similarity between the actual source of the affective state and the objectively unrelated behavior (Raghunathan et al. 2006).

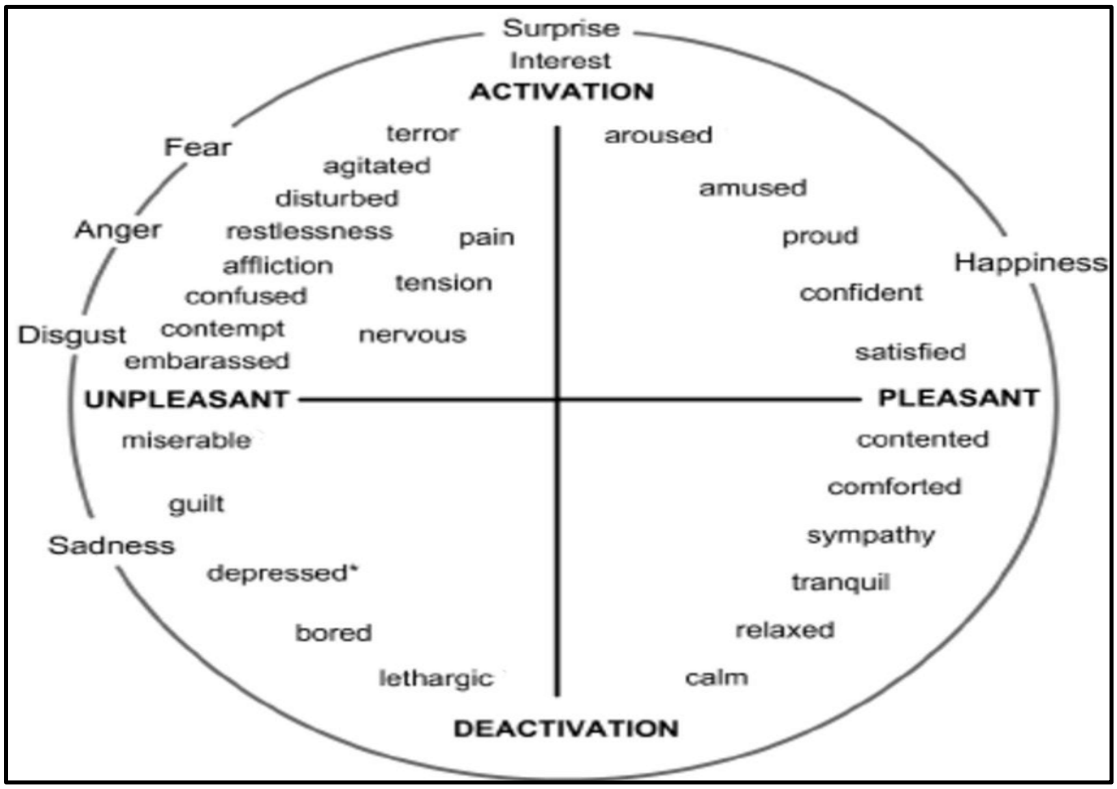
1.5. The affective circumplex

Affective circumplex is a model of how individuals process emotions. It is a circle and a set of axes that portrays the similarity between objects based on people's psychological reactions. The horizontal axis, representing valence, ranges from pleasant to unpleasant state. The vertical axis, arousal, ranges from high activity and attention at one end to low activity at the other. Both dimensions (axes) are highly independent of one another.

According to the model, each emotion can be explained by combining the two dimensions: a variation of the degree of valence and arousal. For example, happiness is an emotional state, a product of strong activation in the neural systems associated with positive valence (pleasantness) with moderate activation in the neural systems associated with arousal (Posner et al. 2005). Neurological evidence suggests that core affect provides a source of attention to the human brain. It influences sensory processing via several direct and indirect routes. The amygdala and the lateral orbitofrontal cortex project directly to all sensory cortices and so, directly influence sensory processing.

The circumplex model of affect proposes that all affective states arise from cognitive interpretations of core neural interpretations of neural sensations that are the product of two independent neurophysiological systems (Posner et al. 2005). Affective states refer to psychological and physiological responses of arousal and valence. Cognitive interpretations relate to how the brain processes stimuli in relation to memory, judgment, perception, and reasoning meaning all sensations that have to do with the stimuli that travel through neural pathways to inform the brain of what's happening in its environment.

Figure 1.1.: The circumplex model**.**



Source: "The structure of currect affect: Controversies and emerging consensus," by L. Feldman Barrett and J. A. Russell, 1999, Current Directions in Psychological Sciences, 8, 11. Copyright 1999 by the American Psychological.

Is it possible for a person to feel a combination of oppositely valenced emotions at the same time? Russell and Carroll (1999) argue that the bipolarity of emotional experience implies that when you are happy, you are not sad, just as when you are hot, you are not cold. Strictly speaking, that claim is very strong since being at one point on the abscissa of an affect distribution precludes being at any other point (Cohen et al. 2018). Some researchers have demonstrated that mixed feelings are more likely to occur when individuals place themselves within a protective frame.

1.6. Understanding Affective Responses

While emotional underpinnings may be somatic, and in that sense have significant evolutionary value in predisposing the body toward approach/appetitive or avoidance/inhibitory action, modern theories point to relatively few hardwired connections to discrete emotional states (Cohen et al. 2018).

Work by Leventhal (1980), Hoffman (1986), and Areni (1991) introduced a three-phase model in which the exposure to a stimulus produces a largely unconscious and rapid affective response at a sensory level. These responses may be innate or learned through evolutionary processes. These are phase-one emotional responses that interrupt other cognitive processes and orient attention to the stimulus. In phase two, affective responses become more differentiated; the cognitive system attaches a greater meaning to the stimulus by automatically extracting easy-to-process information and associating it with experienced pleasantness and arousal. In the third phase, the affective experience results from cognitive elaboration taking into account context and previous experiences.

Research has always shown that incidental affect can influence judgments and decisions; negative emotions trigger pessimistic assessments whereas positive emotions trigger more optimistic assessments, even when the emotions have no relation to the object of judgment.

It has been also proved that the arousal intensity of an affective experience increases the long-term memory. However, the emotional intensity is no guarantee of memory accuracy. Cognitive appraisal biases and the desire to see things differently change people's memory.

Richins (1997) conducted a comprehensive analysis of emotion measures used in consumer research. These emotions satisfied criteria developed by Ortony, Clore, and Collins (1988) to screen out non-emotion terms focusing on bodily states such as "sleepy," subjective evaluations such as "feeling confident," behaviors and action tendencies such as "crying" and "hesitant," and cognitive states such as "interested" (Cohen et al. 2018). She added to this list self-reports of positive and negative feelings such as "happiness," "relief," "excitement," "worry," "sadness," and "guilt".

1.7. Affective Neuroscience

Shiv and colleagues (2005) conducted a study comparing investment decisions of patients with damaged brain areas responsible for emotions to normal subjects. It was conducted under the hypothesis that these patients will make better decisions since they would be able to make decisions without the interference of emotions that could lead to poor choices. The study found that lesion patients made more advantageous decisions and made more money.

Affective processes usually happen in brain areas that are considered to be emotional such as the amygdala and ventral striatum. The amygdala does not encode fear, threat, or negative stimuli per se. its role is to direct sources of attention toward the object of sensation when its predictive value is uncertain. Dopamine, for instance, is fired by the dopamine neurons in the ventral striatum. Its firing rate only increases when an individual faces an unexpected event.

Some parts of the orbitofrontal cortex, a cortex that has been considered "cognitive" until recently, are responsible for some affective responses.

LeDoux established the notions of the Low and the High roads in order to show that emotional responses can occur without the involvement of cognitive processing systems. According to him, when facing an external stimulus, three (03) events may occur:

(1) "Low road" processes, centered in the limbic system of the brain, occur rapidly and may result in "low road" affective reactions.
(2) "High road" cognitive processes, involve the cortical systems of the brain, systems involved in thinking, reasoning, and consciousness, they strengthen/weaken low road affective reactions.
(3) "High road" affective reactions, arising from high road cognitive processes, occur relatively slower than low road affective reactions. (Shiv et al. 1999).

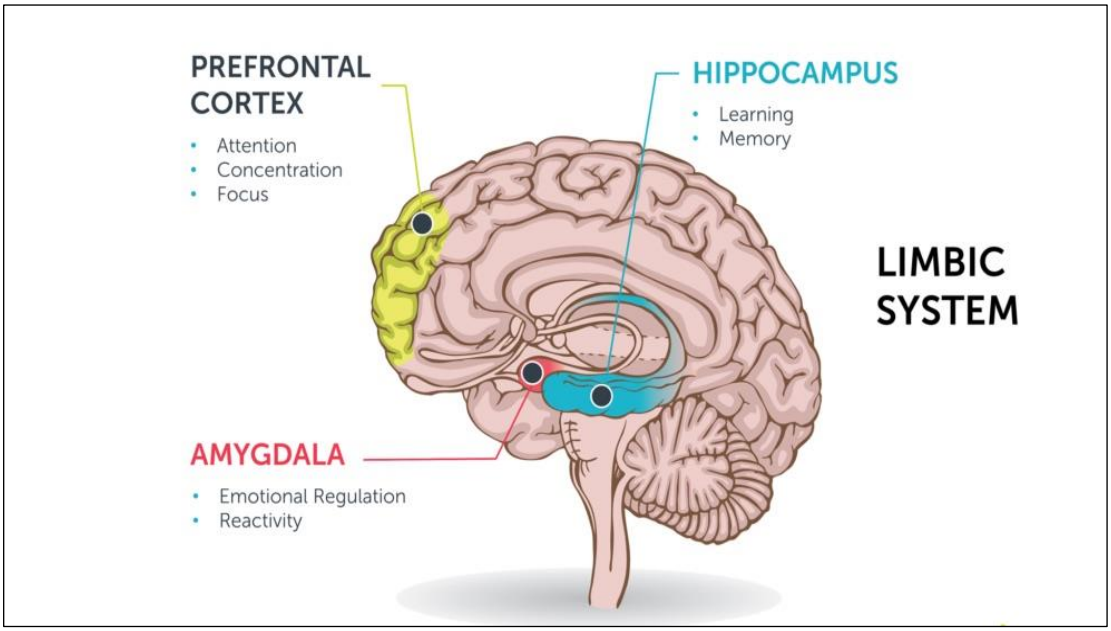
Research has shown that the amygdala plays a major role in the modulation of fear responses, anxiety, and negative affectivity. Aversion to risk is linked to the amygdala and is driven by an ancient fear response (Camerer et al. 2004). In risk choice tasks, the subject must choose between risky gambles forcing affect and cognition to interact. Bechara, Damasio, and colleagues conducted a study measuring performance in gambling tasks, patients with damaged Ventromedial Cortex (VM) suffered from decision-making deficit and continued to make disadvantageous decisions even after they knew about the correct strategy.

Results of the studies on the decision-making of patients with bilateral damage in the VM frontal cortex compared to subjects with no abnormalities have led to the **Somatic Marker Hypothesis** (Damasio, 1991, 1994). Patients with bilateral damage in the VM frontal cortex often decide against their best interest, they develop severe impairment in personal and social decision-making. They repeat the same actions that lead to negative consequences repeatedly, thus they're unable to learn from previous mistakes. On the other hand, though, these patients have normal problem-solving abilities and have normal intellect. Observations on how these

patients have normal intellect, they express abnormalities to express feelings and emotions and in decision-making led to this hypothesis.

The Somatic Marker Hypothesis attributes the inability of making advantageous decisions to damage in the emotional mechanism that rapidly signals the consequences of an action, thus assisting in selecting the advantageous one. Deprived of this emotional signal, these patients rely on a reasoned cost-benefit analysis of numerous and often conflicting options involving both immediate and future consequences (Bechara, Damasio. 2005).

Figure 1.2.: Brain structures involved in emotional regulation and fear response.



Source: https://turnaroundusa.org/wp-content/uploads/2020/03/Stress-and-the-Brain_Turnaround-for-Children-032420.pdf

Using fMRI, scientists could define brain regions responsible for emotional processing. These regions work together to process emotions as an "emotion processing network". The amygdala, the prefrontal cortex, the hippocampus, and the basal ganglia.

Researchers assume that affect and cognition are two distinct systems that interact with one another to become more functional and adaptive. Their interaction involves several limbic and cortical areas of the brain. Studies using fMRI revealed that the induction of emotional states generates a response in the lateral prefrontal cortex (Braver et al. 2002) and the role of the orbitofrontal cortex in emotion and emotion-related learning (O'Doherty et al., 2001). O'Doherty's research validates the idea that the lateral orbitofrontal cortex is associated with an aversive outcome, while the medial orbitofrontal cortex is associated with reward. Beer et al

(2006) defend the idea that the orbitofrontal cortex has a significant role in the interaction between affect and cognition.

Studies suggest that the prefrontal cortex is involved in the memory of time (Funahashi, 2017). Authors suggest that time can take several different forms:

• Temporal order: refers to the sequential occurrence of events;

• Time duration: refers to the memory of intervals between events;

• Time perspective: involves the memory for anticipating future events.

Time can be represented in the form of "how many steps" one needs to take and "in which order" for him to reach his goal.

1.7.1. The Amygdala

The amygdala is believed to be a critical component of the neural substrates of emotional experience. It has a central role in the mediation of fear, anxiety, and negative affectivity. It is situated in the medial temporal lobe, anterior to the hippocampal structure, and it is connected to the visual cortex, visual thalamus, and dorsolateral prefrontal cortex as well as to subcortical structures. Patients with damaged amygdala fail to show physiological responses to fear and have deficits in long-term memory. However, these patients are still aware of the stimulus and its valence. They can verbally account for the potential danger of the stimulus (Bechara et al. 1995).

It should be noted that the amygdala per se is not responsible for the expression of fear as it basically possesses no neurons able to process the meaning of stimuli (LeDoux, 1996). Instead, information from cortical sensory areas directly affects the sensory thalamus, from where the input reaches the amygdala (Damasio, 1994). Therefore, the activation of the amygdala triggers physiological responses via connective pathways from the central nucleus of the amygdala toward the brainstem where they activate the sympathetic nervous system (Kapp and Cain, 2001).

The amygdala contributes to the selection of relevant events worth encoding in the long-term memory. In a situation of reduced attentional resources, the emotional valence of the stimuli increases its chances of being remembered and consequently improves our faculty to learn from past events.

1.7.2. The Ventromedial Prefrontal Cortex

The Ventromedial prefrontal cortex is implicated in functions ranging from emotions to emotion regulation by encoding emotional stimuli and by regulating fear, anxiety, and stress.

The VM prefrontal cortex plays an important role in the integration of cognitive and affective processes (Pessoa, 2010). Studies suggest that this cortex is important in the control of impulsive reactions. Tranel's (2002) work found evidence that patients with damaged VM prefrontal cortex show disabilities in social and emotional decision-making. This conclusion is further confirmed by the work of Bechara (2007) with the Gambling Task. It has an extensive connection with the amygdala.

1.8. The Somatic Marker Hypothesis

The Somatic Marker Hypothesis proposes a solid ground for understanding emotional processing in relation to behavior and decision-making. The word **somatic** refers to the body-related responses that indicate emotion. Damasio tested his hypothesis using the Iowa Gambling Task which is a simulator for real-life decision-making.

According to Damasio, somatic states can be induced by primary or secondary inducers. Primary inducers are innate or learned stimuli, that cause pleasurable or aversive states. They automatically elicit a somatic response. The Amygdala is a critical substrate to trigger somatic states from primary inducers; it can be processed subliminally via the thalamus (Le Doux, 1996; Morris et al., 1999) or explicitly via early sensor and high-order association cortices. Secondary inducers, on the other hand, are generated by the recall of a personal event; a thought of a primary inducer that elicits a somatic response when brought to the working memory. The Ventromedial (**VM**) prefrontal cortex is a critical substrate to trigger somatic states from secondary inducers.

In a normal brain, primary and secondary inducers can be generated by the same stimulus. The exposure may elicit a quick emotional response and a thought at the same time. The normal development of normal secondary inducers is tied to the normal development of primary inducers. Once secondary inducers have been acquired normally, they become less dependent on primary inducers.

The mental representation of a future event triggers a somatic state, which can be perceived consciously or unconsciously as good or bad, this is called the "as-if body loop". When somatic states can't be detected as changes in the physiological parameters, they can still be detected as changes in the activity of different neurotransmitter systems. There are many direct and indirect connections between the amygdala and the VM cortex and the neurotransmitters nuclei within the brain stem (Blessing, 1997). The neural system responsible for the activation of the different somatic states involves several neural regions such as the VM cortex, the amygdala, and somatosensory cortices (insular/SII, SI).

The somatic states that are triggered by the **amygdala** are short-lived & habituate very quickly, i.e. emotions happen without much thought or effort, and before one can figure out what just happened.

"Low-order" emotions, i.e. automatic responses triggered by the amygdala are generally beneficial and serve an adaptive role in life. Normal acquirement of secondary inducers is highly tied to the integrity of the amygdala and somatosensory neural system.

The somatic states triggered via the secondary inducers may be conscious or unconscious. **VM cortex** triggers "High-order" emotional situations emerging from higher-order processes (thinking, reasoning, consciousness).

Ventromedial responses are deliberate, slow, and last for a longer time than amygdala responses.

1.9. Affective Responses and Decision-Making

Work by Gray et al. (2001) indicates that there some emotions may influence cognitive mechanisms that support goal-oriented behavior. Many aspects of human mental life, including empathy, beliefs, attitudes, altruism, creativity, and decision-making, are believed to reflect a "true marriage of cognitive and affective abilities".

In line with the presence of two pathways both connecting the amygdala to the thalamus and higher processing areas, emotional responses do not require perceptual consciousness (LeDoux, 1996). Information from the thalamus is also sent to cortical areas where the stimulus can be assessed leading to an eventual generation of an intentional response. At this stage, conceptual knowledge will emerge and determine whether the physiological arousal has to be maintained (the stimulus is recognized as a threat), or the organism may relax (the stimulus is harmless).

Researchers have distinguished between three types of affect: Integral Affect, Incidental Affect, and Task-related Affect. Integral affect refers to affective responses directly related to the exposure of the stimulus itself or the representation of the stimulus. These affective responses are "integral" in that they are elicited by the object's features, whether they're real, perceived, or imagined.

Incidental affect is the type of affect that is not related to the stimulus. It is mostly linked to mood which is typically unrelated to the judgment. In addition to mood, incidental affect may also be a cause of the individual's emotional dispositions (anxiety, depression), temperament (optimism vs. pessimism), or any contextual stimuli (music, pleasant/unpleasant sent…).

Task-related affect lies somewhere in between incidental affect and integral affect. It refers to the affective responses elicited by the process of decision-making and the integral responses to the object's features at the same time.

1.9.1. Integral Affect

Usually, objects that elicit pleasant feelings are evaluated more favorably than those that elicit unpleasant feelings. Three possible explanations for why integral feelings have a direct influence on behavior. The first is that integral feelings are evaluated automatically through simple evaluative conditioning (the transfer of evaluative meaning across stimuli that are presented simultaneously). The second assumption is that affective experiences are associated automatically with specific action tendencies such as approach, avoidance, withdrawal, or confrontation. The third mechanism is that integral feelings are seen as a source of information during stimulus evaluation. People often seek to consciously evaluate their emotions, namely "the how do I feel about it?" heuristic. Consumers tend to construct mental pictures of the alternatives and assess they would feel about each alternative. In this third mechanism, people reflect on what their feelings mean and do not rely on them automatically.

Decisions based on integral feelings are reached more rapidly and are based on descriptive input, this is due to: first, integral affect often arises rapidly (LeDoux, 1996). Second, integral affective responses are evaluated through simple associations. Finally, these responses have to be interpreted and their interpretation is usually very clear.

Also, Epstein (1990) assumes that integral affective decisions require less processing resources. In a decision-making task, individuals whose cognitive resources are constrained tend to choose the alternative that is more affectively attractive. This is explained in the work of Shiv et al. (1999) where two groups of individuals had to choose between a fruit salad (cognitively attractive option) and a chocolate cake (affectively attractive option). Findings suggested that when the processing resources are limited, individuals evoked spontaneous affective reactions and had a greater impact on choice. As opposed to when the processing resources are high, cognitions related to the consequences of choosing one alternative or another have a bigger impact on the final choice. The result of the experiment was that the consumer is more likely to choose the alternative that is inferior on the affective dimension but superior on the cognitive dimension.

Consumers rely on integral affect in the following situations: (1) their motivation to process information is low; (2) they are distracted, cognitively constrained, or under time pressure; (3) other bases of evaluation are ambiguous; (4) they lack expertise in the target domain.

1.9.2. Incidental Affect

Studies have shown that mood states and other incidental affect forms have an influence on an individual's evaluations, decisions, and behavior. Objects are evaluated more favorably in a positive context and when the evaluator is in a good mood as opposed to when he's in a bad mood and in a context of unpleasant stimuli. Some researchers propose that positive moods enhanced favorable evaluations by making positive thoughts more accessible in memory. However, others studies showed that decisions are not always influenced by mood affective states. People do not interpret their feelings as "good" vs. "bad", instead, they interpret the valence of their emotions with consideration to judging criteria. When the consumer's affective state matches with the valence of the information presented by the stimulus, that information feels right and therefore is more favorably evaluated.

According to the cognitive-complexity hypothesis (Paulhus & Lim, 1994), representations of target objects become simpler under high arousal. Because evaluative responses tend to be dominant, high arousal induces more polarized judgment and behavior. Gorn et al. (2001) suggest that this theory is more valid under strong arousal contexts where people's attention tends to be narrower. Whereas, under milder arousal conditions, there may be a misattribution explanation to incidental affective responses.

Incidental affect has been shown to have an impact on consumers' choices and decisions. Its influence is mainly directed by the intensity of the emotional state, its valence, and the appraisal content of the emotional state.

Interestingly, intense emotional states paired with both high and low arousal have an impact on people's judgments and decisions. Both high and low arousal interfere with people's reasoning ability to make decisions.

Research has always shown that incidental affect can influence judgments and decisions; negative emotions trigger pessimistic assessments whereas positive emotions trigger more optimistic assessments, even when the emotions have no relation to the object of judgment.

Positive moods have mixed effects on consumers' judgments and decisions. On one hand, they allow them to be more creative and flexible. On the other hand, they're less data-driven and rely more on general knowledge rather than deeply processing the presented information.

It is to note that negative moods don't necessarily increase task efforts while positive moods always decrease them.

1.9.3. Task-Related Affect

Task-related affect refers to the emotions and feelings that arise from the process of making judgments and decisions. In a situation where an individual has to trade-off important attributes that are negatively correlated induces an avoidant response from the individual. There's also the unpleasantness of having to choose between two attractive options. It was proved that when consumers are more deliberative about their choice, the more they experience emotional discomfort once they choose an alternative.

Conclusion

To conclude, “Affect” is a term that refers to the underlying experience of feelings and emotions opposite to “Cognition” which refers to thoughts and beliefs. According to the circumplex model, affect can be of opposite valences, positive or negative.

Affect has a direct impact on behavior. It can be observed as an unconscious response such as a specific facial expression or it can be conscious like purchasing a product for example.

Affect also makes the distinction between “emotions” and “moods”. Emotions are intense and uncontrollable feelings that result in a body reaction, either visible or not, after one’s encounter with a specific stimulus. Moods are less intense than emotions and tend to last long periods of time. Moods are not always related to a specific stimulus.

Bodily reactions resulting from emotions and without any cognitive processing are referred to as “low-order” affective reactions that are mainly processed by the limbic system. “High-order” affective responses, on the other hand, occur when emotions are processed by the cognitive system, usually processed by the VM prefrontal cortex.

Researchers have differentiated between primary and secondary emotions. Primary emotions are automatic and can be easily distinguished on people’s faces such as happy or sad facial expressions. Plutchik, an American psychologist, has demonstrated eight primary emotions: anger, fear, sadness, disgust, surprise, anticipation, trust, and joy.

Marketing has a lot to take from research on affect especially with neuromarketing. It’s the neuroscience findings that help boost marketing efforts and differentiate the brand from its competitors. Targeting affect is highly effective in advertising and in-store settings to incite customers to buy the product.

By influencing emotions, the brand not only gains new customers but also gains a sustainable competitive advantage. This is called emotional marketing. Using its methods and techniques makes great first impressions and makes the brand stand out from its competitors. It also makes it more memorable by having a better chance to make it into people’s long-term memory, we will talk more about memory in the next section. The best practices of emotional marketing are, without a doubt: story-telling, branding with colors, projecting an ideal image, challenging the impossible, and creating a brand’s community.

SECTION 02: COGNITION

Newer research on consumer decision-making considers a wider range of factors influencing consumer choices from affective factors to cognitive ones such as searching for information, evaluating alternatives, building purchase intention, and finally, purchasing and final evaluation.

The cognitive approach to decision-making views the individual as an information processor. Analytical cognitive models of consumer behavior usually follow the classical five-step model; problem recognition, information search, alternative evaluation, choice, and outcome evaluation.

Developed by Howard & Sheth in 1969, the analytical model became the "Theory of Buyer Behavior", it provides "a sophisticated integration of various social, psychological and marketing influences on consumer choice into a coherence sequence of information processing" (Foxall, 1990. P.10). Research found that marketing stimuli have a significant effect on cognitive learning.

Consumer decision processes are influenced by the consumer's psychological factors (Kotler & Keller, 2007): learning. Learning mechanisms differ in online and offline contexts. In an offline context, learning covers three domains: Cognitive learning, Affective learning, and Psychomotor learning. In an online context, psychomotor learning is absent as there's no physical form to the object, so understanding the online purchasing theory goes to studying cognitive and affective learning. Affective learning is the ability to prioritize feelings and emotions that are different from reasoning as explained in the previous section.

In this section, we will focus on the cognitive processes of consumer choice. Cognitive learning processes involve cognitive aspects of knowledge, reasoning, and thoughts. We will look at and review findings from cognitive psychology and cognitive neuroscience.

2.1. Evolution of Neurocognitive studies

Cognitive psychology was the starting point to understanding human cognition. Cognitive neuroscience emerged years later as an interdisciplinary research area between psychology and neuroscience to find and understand the biological processes and aspects that underlie cognition.

In the 1960s, Cognitive Psychology developed empirical methods for analyzing behavioral-cognitive relationships. Combining neurobiological research with the field of cognitive psychology became the basis for the newer field "Cognitive Neuroscience". It is a field of study that connects cognitive-behavioral outcomes with underlying neural systems.

Cognitive neuroscience researchers conducted studies on people with brain damage to understand the brain mechanisms associated with cognitive processes. The modularity assumption of Coltheart, a lead cognitive neuropsychologist, has played a central role in this discipline. The modularity concept means that the cognitive system consists of various processors operating separately from one another; each specialized for a given type of processing.

2.2. Cognition & Cognitive Neuroscience

Cognition refers to the mental processes involved in gaining knowledge and comprehension. Cognitive processes include thinking, reasoning, remembering, judging, and problem-solving. "Cognition can be defined as the processes of knowing, including attending, remembering, and reasoning. It can also be defined as the content of these processes, such as concepts and memories." (The American Psychological Association (APA))

Cognitive Neuroscience is a sub-research field of neurosciences studying the underlying brain networks responsible for complex behaviors. Cognitive neuroscientists want to understand the brain activity that enables people to perform complicated tasks. The field lies at the intersection of neuroscience and psychology, making it very rich in information to explain behavior. Cognitive neuroscience makes use of three types of techniques to answer its questions: (1) **Experimental psychology**: which emphasizes measuring behavior; (2)

Neuropsychology: which studies brain damage, trauma, and illness and their impact on the nervous system and thus behavior; and (3) **Brain imaging**: which uses neuroscience tools such as EEG, fMRI, and MEG.

2.3. The Contribution of Cognitive Neuroscience in Marketing

For the past 50 years, studies have shown that different pieces of information were initially processed by different modules of the brain each dedicated to one piece of information at the low order processing. These modules are some cortices and subcortical areas of the brain; Ventromedial Cortex, Prefrontal VM…etc.

At higher-order processing, the brain is highly interconnected. It involves the frontal and parietal lobes of the brain and it is extremely powerful. Attention and Emotion work together, one influences the other. By using both selective attention & emotion, the brain quickly assesses if the external stimulus is important and relevant or not. The stimulus judged relevant gains priority over others for mental processes that come later.

How does the brain decide what it should do next? For complex cognition, researchers suggest that it is the result of competition among brain circuits. Different information assessed by different mental networks compete against each other to access a specialized brain network called the "*mental workspace*" (Page et al. 2006). This "workspace" enables information to do five main things: (1) The workspace circuitry allows us to become conscious of any information that enters it; (2) It allows pieces of information to be integrated with other pieces of information so that relationships and connections can be formed. It is here that coherent representation of discrete objects, places, people, events, and even brands can be formed; (3) It allows information to be stored properly in the long-term memory; (4) It allows information to control actions including language; (5) It allows us to weight possible outcomes and consider options for behavior (Page et al. 2006). Numerous studies in cognitive neuroscience have led to conclude that the brain deals with information in a competitive way. Conscious experience is highly organized. Each piece of information is organized and stored in the brain as "representations" that are coherent and descriptive of various objects.

2.4. Bottom-Up & Top-Down Processing

Bottom-up processing focuses on interpreting sensory information in real-time (Gibson, 1966). It occurs when an individual receives new information from the sensory receptors. Bottom-up processing does not require any prior knowledge or experience. It is a data-driven process emphasizing the importance of the stimulus and the raw data of the direct experience. Therefore, the bottom-up process involves information intake from the senses, traveling from the stimuli up to the brain, which then constructs a perception based on the signals that were received.

The theory of bottom-up processing was first introduced by the psychologist Gibson who argued that sensation and perception are the same things. He suggests that the bottom-up processing works as follows: (1) the individual experiences sensory information about the world around; (2) these signals are brought to the retina. Transduction transforms these signals into electrical impulses that can then be transmitted; (3) electrical impulses travel along visual pathways to the brain, where they enter the visual cortex and are processed to form the visual experience.

The influence of bottom-up factors is especially strong online as consumers spend little time browsing a page and fastly surf that page and move to a new one. Manipulating low-level visual features on web pages guides consumers' attention to

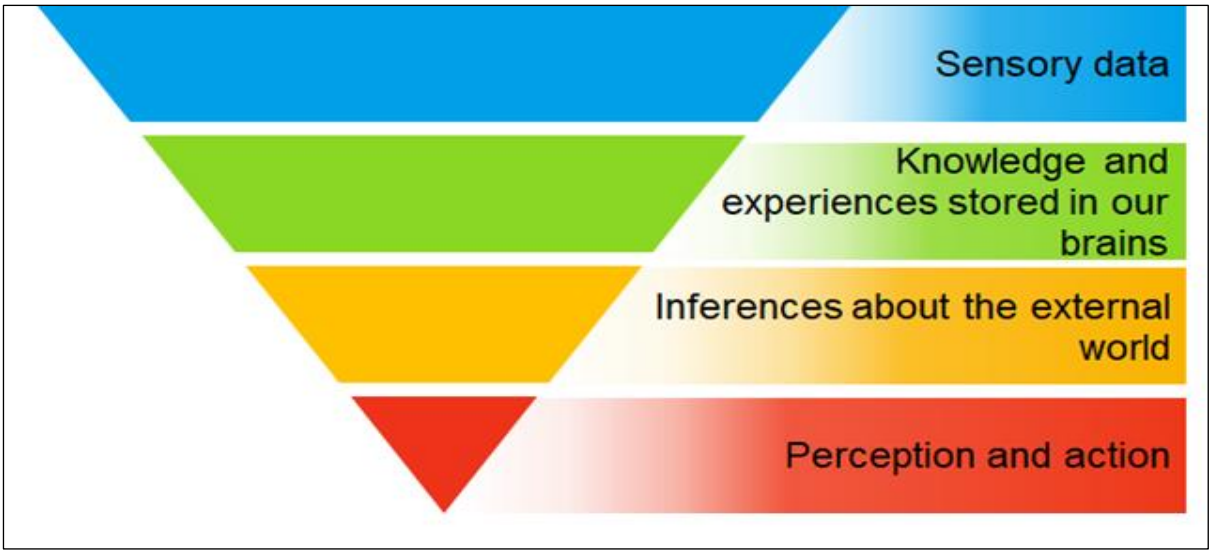
Top-down processing, on the other hand, is the perception driven by cognition. It is a goal-oriented process that relies heavily on previous knowledge and experiences. In top-down processing, the brain applies what it knows and what it expects to perceive to fill in the blanks and anticipate what's next.

Theories on top-down processing are hypotheses-driven and stress the importance of higher mental processes such as beliefs, expectations, and values… to interpret information and form perceptions later on.

It can be overwhelming in everyday life to equally focus and perceive each and every sensory information presented to us as we're experiencing an infinite number of stimuli at any given time. Top-down processing simplifies our understanding of the external world by quickly making sense of all information our sensory system captures, working downward from initial impressions down to particular details.

Gregory (1970) argues that the use of our senses to perceive new information is not enough and the use of prior knowledge and experiences is necessary in order to hypothesize the meanings of the new information. He proposed that the perception process depends on top-down processing to interpret information.

Figure 1.3.: Top-down Processing.



Source: https://www.simplypsychology.org/top-down-processing.html

Different factors can influence top-down processing according to Gregory: expectations, emotion, motivation, and culture. The context in which an individual perceives a piece of information has an impact on future expectations regarding a piece of similar information. This means that the experience we have regarding that stimulus may change drastically our perception in the future. Brains are shaped by the external world and through context and experience perception is also shaped by the external world.

Recent researchers such as Engel and colleagues (2001) distinguish 04 “flavors” of top-down: (1) an anatomical one, equating top-down processes with functional activity along descending connections between the levels of the hierarchy; (2) a cognitivist one, where top-down means hypothesis-driven processing; (03) a gestaltist one, viewing top-down processes in terms of contextual modulations of bottom-up processing; (04) a dynamicist one, describing top-down processes in terms of entrainment of local neuronal populations by widespread oscillatory activity in distant and distributed brain regions marketers and commercials need to identify

2.5. Attention

Attention is a cognitive process that helps individuals position themselves toward a stimulus judged relevant to eventually respond to it. It is the ability to actively focus on specific information while ignoring other information in the environment.

William James (1918) wrote: “Everyone knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what may seem several simultaneously possible objects or trains of thought…It implies withdrawal from some things in order to deal effectively with others”. It is the interface between the vast amount of stimulation provided by the complex environment and the more limited set of information of which ones are aware of. In this sense, attention is a selection mechanism that serves to choose a particular source of stimulation, internal train of thoughts, or a specific course of action for priority processing, and is closely connected to consciousness.

Attention is also defined as the flexible control of limited computational resources (Lindsay, 2020). Studies on this concept began in psychology where observations of behavior gave insight into attention tendencies. Cognitive psychology and recently cognitive neuroscience aim at turning these observations into mental processing models. Most everyday activities engage all three aspects of attention: Activation, Selection, and Control.

In its most basic form, attention can be defined as the alertness and ability to engage with surroundings. Experiments conducted on patients under sedatives suggest that attention is limited when the reward regarding the sustained attention task is low.

Visual attention is the most studied form of sensory attention. Some studies suggest that individuals may be biased by the visual domain even when the signal from another domain is equally valid (Spence, 2009).

Combining sensory inputs with past knowledge to coordinate multiple systems for the job of efficient task selection and execution is the role of executive control, and this control is usually associated with the prefrontal cortex (Miller and Buschman, 2014).

Attention has an important role in memory encoding. In a study, individuals were asked to memorize a list of words while being distracted on a secondary task their ability to recall these words was decreased although the ability to recognize these words was not affected (Gardiner and Parkin, 1990).

Studies identified two separate brain networks involved in selective attention. When focusing attention voluntarily in a goal-oriented manner (top-down), neuroimaging techniques show activation of the bilateral dorsal-frontoparietal network. When a relevant stimulus reorients attention according to task demand, the activation occurs in the right-lateralized network of ventral frontoparietal structures.

Scientists believe that the prefrontal cortex selects what information to focus on and that the thalamus filters out irrelevant sensory inputs. “Our latest research findings support a newly emerging model of how the brain focuses attention on a particular task, using neurons in the thalamic reticular nucleus as a switchboard to control the amount of information the brain receives, limiting and filtering out sensory information that we don’t want to pay attention to,” - Halassa (Wimmer et al. 2015).

Research has found that the prefrontal cortex is responsible for attention and filtering of relevant information from the visual cortex which receives sensory input. The prefrontal cortex is in charge of willful concentration whereas the parietal cortex is activated by automatic processes.

Marketers are faced with the challenge of how to capture people’s attention toward their brand or product in an endless flow of information and how to be selected by the brain’s selective attention. Bottom-up attention is triggered by the emotional relevance of the stimulus, moving objects, and unexpected events. Using attractive images and attractive people in advertisements along with catchy phrases triggers bottom-up processing and increases the chances of making it to the brain’s selective attention.

Based on research findings, the best way to capture people’s attention is to target their emotions. Attention is associated with brain areas that are also responsible for emotional processing, so focusing on emotionally relevant stimuli will not only capture people’s attention but will help form emotional connections as well.

2.6. Perception

Perception is defined as the process through which information from the external environment is received, organized, and interpreted to make sense of it. According to Joseph Reitz, "Perception includes all those processes by which an individual receives information about his environment—seeing, hearing, feeling, tasting and smelling. The study of these perpetual processes shows that their functioning is affected by three classes of variables—the objects or events being perceived, the environment in which perception occurs, and the individual doing the perceiving."

"*Perception is reality*". Understanding perception is very important to understanding human behavior; different perceptions from different individuals result in different behaviors. Also, perception is influenced by people's needs and so it gives valuable insight into their needs.

Perception is a cognitive process that helps individuals understand their surroundings. It's possible to train and improve perception with cognitive stimulation. Perception requires the use of bottom-up and top-down processes, i.e. not only people are directed by the received stimuli, but at the same time, they anticipate certain stimuli that control perception.

Research has suggested three stages of the perception process: sensory stimulation & selection, organization, and interpretation.

2.6.1. Sensory Stimulation & Selection

The environment presents countless stimuli at any given moment, and brain receptors receive all these stimuli data at the same time, but it would be crushing to the mind if the brain had to assess and interpret all these stimuli simultaneously. To counter this problem, the brain engages in a process where it selects which stimulus/stimuli it pays attention to through *sensory selection*.

Sensory selection is the process with which the brain determines which stimulus gets its attention and which to ignore. In a tsunami of stimuli, four factors influence what the brain pays attention to (1) **Needs**: individuals tend to pay more attention to what they're needing in order to fulfill their requirements; (2) **Interests**: people are more attentive to the things they enjoy. Interest helps individuals to perceive more details in things they experience; (3) **Expectations**:

when one believes he will experience something, he'll be more likely to focus on the stimuli that fulfill that expectation and ignore any contrary stimuli input. (4) **Physiological Limitations**: this refers to one of the sensory systems being limited in function. Limitations in one sense may sharpen another sense.

2.6.2. Organization

This is the step where the brain takes the processed stimuli and organizes them into some recognizable pattern. Rock & Palmer (1990) state that how we process stimuli is a complex process blending external stimuli with internal processes. Four variables come into play in the process of stimuli organization: (1) **Patterns**: with each experience, a new pattern for a stimulus is made; (2) **Proximity**: one's interpretation of the object changes in relation to what is around it; (3) **Simplicity**: the brain's drive for simplicity is so powerful, people tend to lower uncertainty at any cost to make sense of the world around; (4) **Closure**: looking at the stimulus in a complete image is much more comfortable than having partial images of it.

2.6.3. Interpretation

Interpretation is the last step consisting of making sense of the stimulus. There isn't one process impacting how to interpret stimuli: (1) **Implicit Personality Theories**: Psychologists suggest that we do not see one personality trait at a time. Rather, the presence of one trait has led to assume the presence of other traits (McLeod, 2008). The **Halo effect**, one theory of the implicit personality theories, is one's belief that having one trait naturally leads to having some other traits as well. **Stereotyping** is another form of the IPT; it links some personality traits to external labels such as gender, race, color…etc. just like assuming blond females are dumb. (2) **Assumed Similarity/Assumed Dissimilarity**: It is linked to the impression one makes about his similarity/dissimilarity with the person he encounters; (3) **Self-fulfilling Prophecies**: It starts by predicting something or some outcome; The person then starts "unconsciously" acting according to that prediction in a way to make it true so it confirms the initial prediction; (4) **Perceptual Defense**: is the strong desire to keep an already formed interpretation and avoid the complexity and the discomfort of having to change it; (5) **Social Pressure**: Solomon Asch

(1950) found that in many instances, individuals will conform to perceptions different than their own, at least temporarily, to avoid threats to their sense of acceptance (McLeod, 2008).

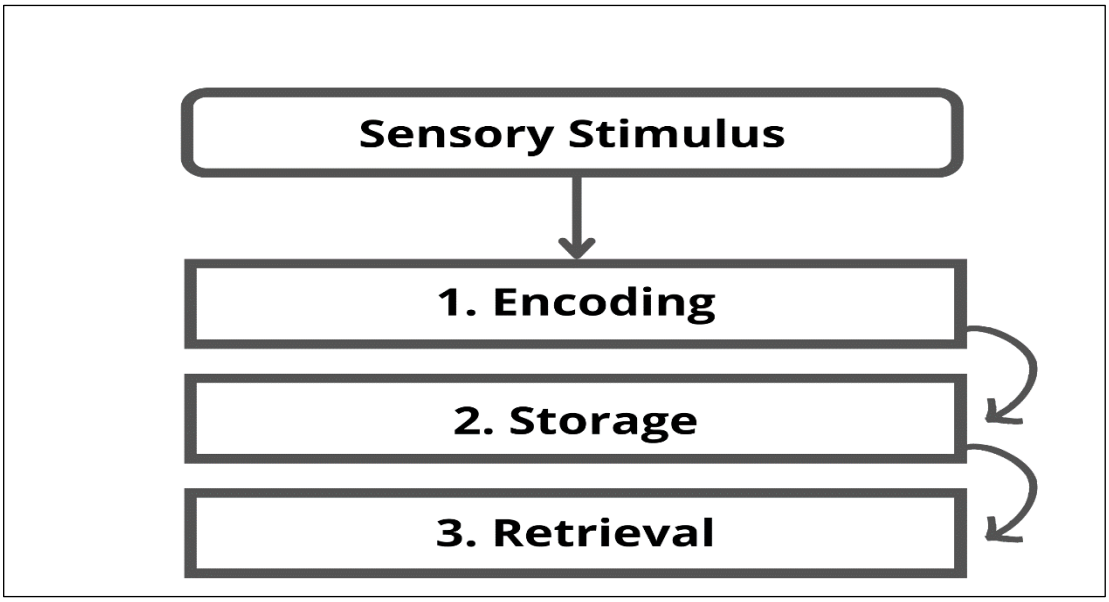
Research on perception in marketing has concluded that consumers don't act based on the objective reality but on their perceptions. Marketers need to understand their consumers' perceptions regarding a concept, brand, or product to determine what factors influence their decisions. Marketers then need to adapt their marketing actions to the stimuli that are judged relevant and favorable to consumers'. Targeting the senses in the first place is key here. Aligning the brand value with customers' value and building a shared brand image to show that the brand validates and respects who these consumers are.

To influence perceptions, marketers need to communicate their brand value. The value proposition is the promised benefits to the target consumers. Its definition requires a great understanding of the needs and wants as well as the expectations consumers have of the brand/product. A study of the competitions and what areas or needs they did not fulfill can be extremely beneficial to defining a void in the market and targeting it afterward.

2.7. Memory

Memory is how people draw on past experiences in order to use this information in the present (Sternberg, 1999). Memory refers to the process involved in encoding, storing, and retrieval of information; together they constitute the memory process (Melton, 1963). **Encoding** refers to the initial process of receiving the information. It allows external information to reach the sensory system. **Storage** is the process of maintaining information over some time. **Retrieval** refers to the process of recalling stored information and accessing it when needed. Memory issues can occur at any stage of the memory process. It can be hard to define precisely at which stage the problem occurred as the three stages are connected.

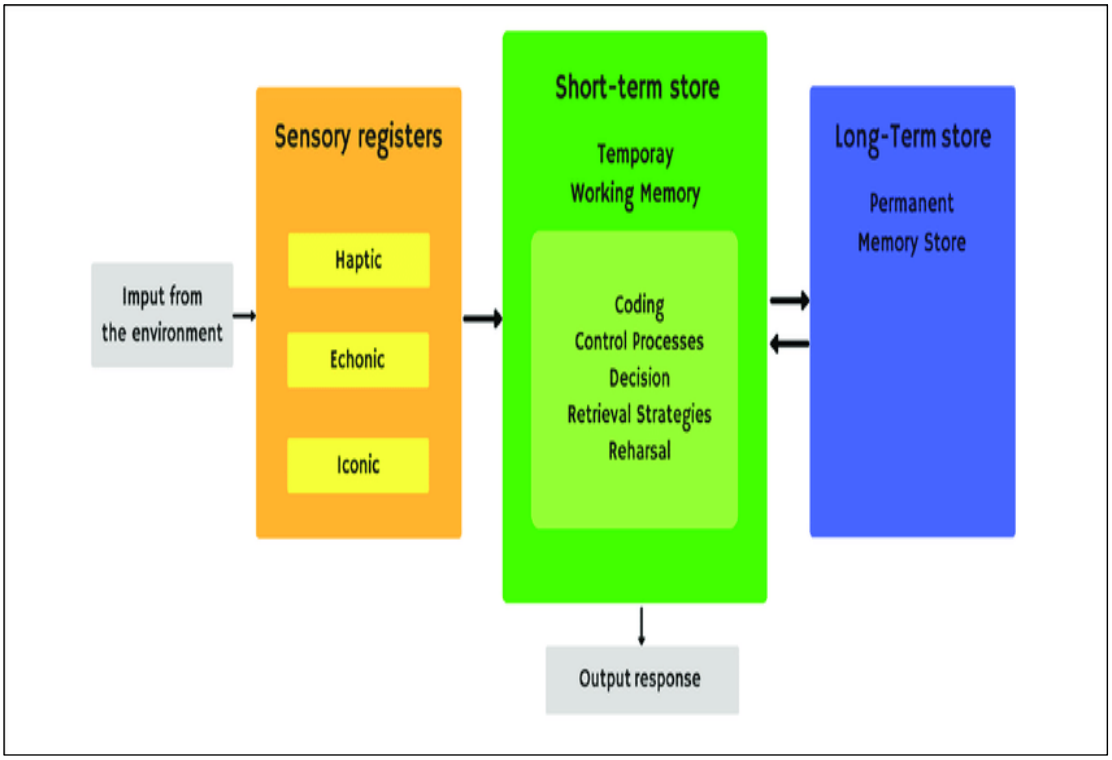
Figure 1.4.: Memory Stages.



Source: Melton, A. W. (1963). Implications of short-term memory for a general theory of memory. Journal of verbal Learning and verbal Behavior, 2(1), 1-21.

Research has classified memory according to different mechanisms: Sensory memory, Short-term memory, and Long-term memory.

Figure 1.5.: Atkinson and Shiffrin's modal model.



Source: Camina, E., & Güell, F. (2017). The neuroanatomical, neurophysiological and psychological basis of memory: Current models and their origins. Frontiers in pharmacology, 8, 438.

Sensory memory is the earliest stage of memory, it allows the retention of sensory information after the original stimulus has ceased. It refers to the brief storage of sensory information, if it's not assessed and passed for more processing, it will be easily forgotten. Sensory memory allows individuals to see the world by giving the brain some time to process incoming sensory information. According to Siegler & Alibali (2005) "Sensory memory is the capacity for briefly retaining large amounts of information that people encounter daily".

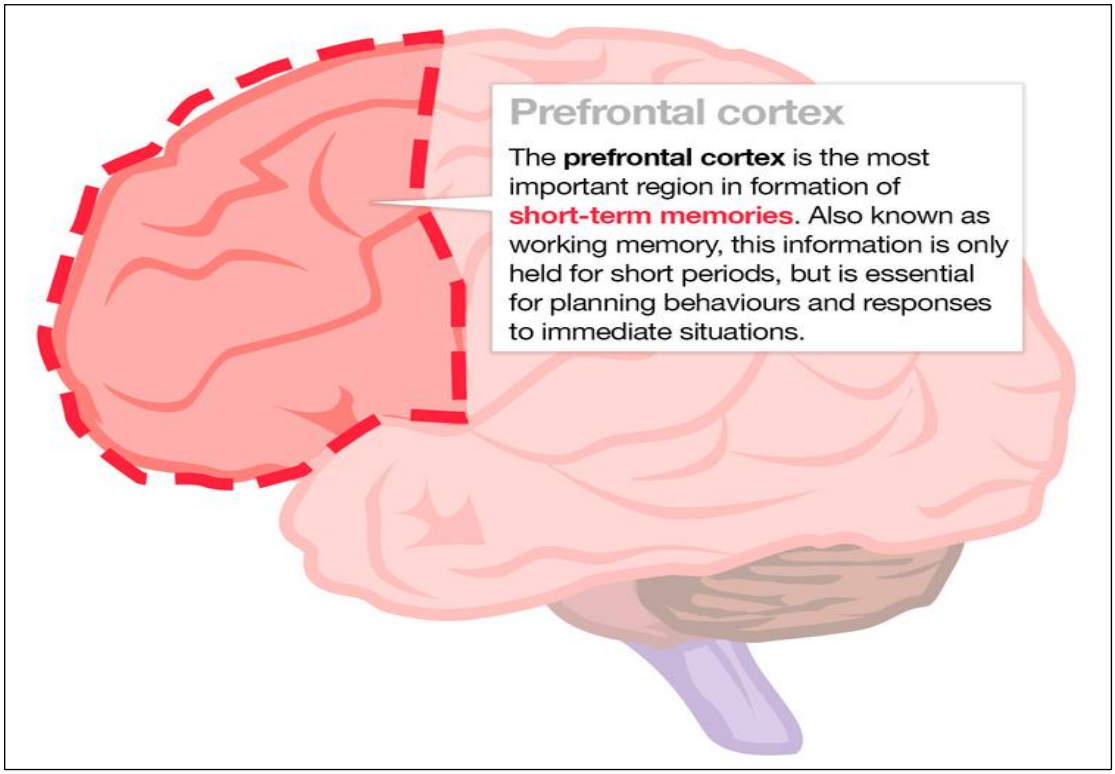
Sensory memory can be divided into three subsystems: iconic memory (through visual stimuli), echoic memory (through auditory stimuli), and haptic memory (through touch). Research has mainly focused on **iconic memory** that is also known as the "*Visual memory*". It stores visual images of the stimulus after it has ceased.

Sperling's work (1960) has suggested that the human visual system is capable of retaining information even if it's exposed very shortly. Research using fMRI has found that the parietofrontal is responsible for iconic memory although further research on brain networks responsible for iconic memory is needed to understand how it precisely works.

Short-term memory or **Working memory** is "the place where small amounts of information can be temporarily kept for more than a few seconds but usually for less than one minute" (Baddeley, Vallar, & Shallice, 1990). It refers to the cognitive process of storing memory for a short period of time, usually more than 20 seconds and less than 1 minute. In his revolutionary experiment, George Miller (1956) suggests that people can store seven items – plus or minus two, in their short-term memory. The working memory is important for reasoning and decision-making.

From a neuroscience viewpoint, it has been found that working memory activates frontoparietal brain regions of the brain including prefrontal, cingulate, and parietal cortices. Age, emotions, caffeine, and hormones appear to affect working memory performances at the neurobiological level (D'Esposito et al. 2015, Chai et al. 2018).

Figure 1.6.: The Prefrontal Cortex.



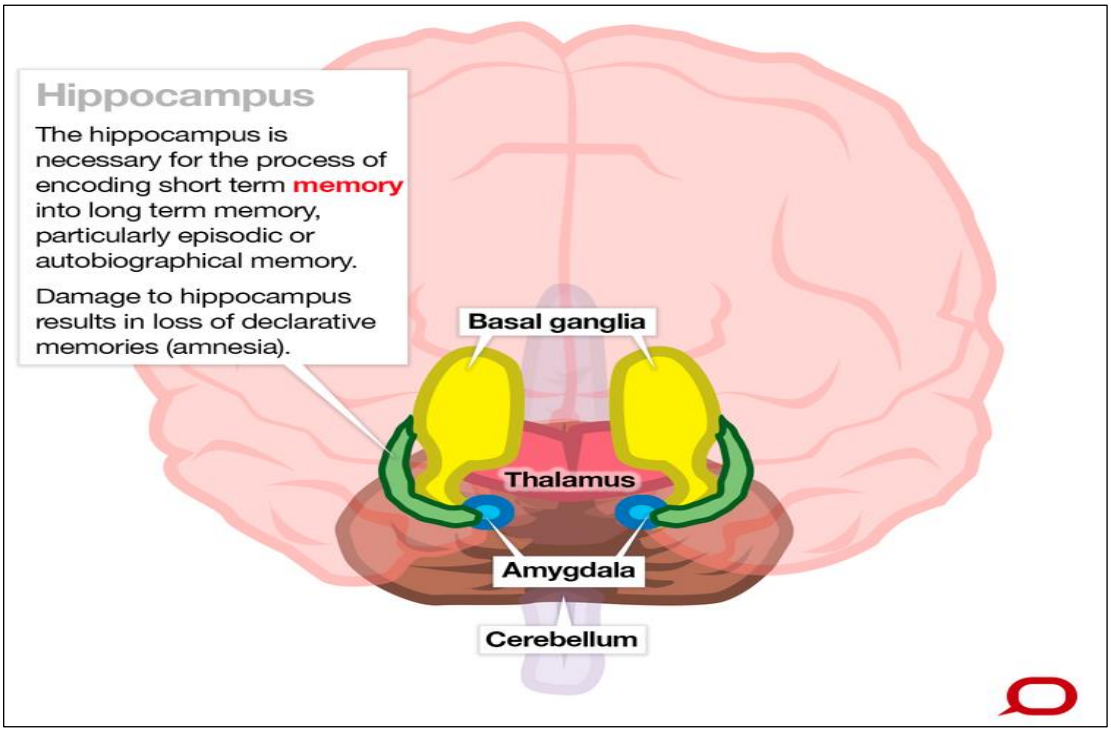
Source: https://www.science.org.au/curious/people-medicine/all-our-different-types-memories

Long-term memory is the final stage of the multi-store memory model (Atkinson & Shiffrin, 1968). It is the memory storage that can hold information for long periods of time. It has a vast storage capacity holding an immense number of information that can last days, months, years, or even a lifetime (Wang, Liu, & Wang, 2003). Long-term memory is divided into two types: implicit non-declarative memory and explicit declarative memory.

Explicit memory is the conscious recollection of information and is divided into two types: Episodic memory and Semantic memory. *Episodic memory* is long-term memories from specific events or experiences and *Semantic memory* consists of memories of facts and other general knowledge. Explicit memory is the result of interconnections between the prefrontal cortex, the amygdala, and the hippocampus (Dew & Cabeza, 2011). The P*refrontal Cortex* is essential for remembering contextual details of an event and is more involved with episodic memory than semantic memory. The A*mygdala* is responsible for encoding and attaching emotional significance to memories. Research has also shown that the amygdala specifically plays a role in forming memories related to fear. The *Hippocampus* is an important structure for the formation and indexation of information for later access. Eichenbaum, et al. (2001) developed the Three-Stage Model that proposes that the hippocampus does three things with

episodic memory: (1) Mediates the recording of episodic memories; (2) Identifies common features between episodes; and (3) Links these common episodes in memory space.

Figure 1.7.: The Hippocampus, the Amygdala, and the Basal Ganglia in the brain.



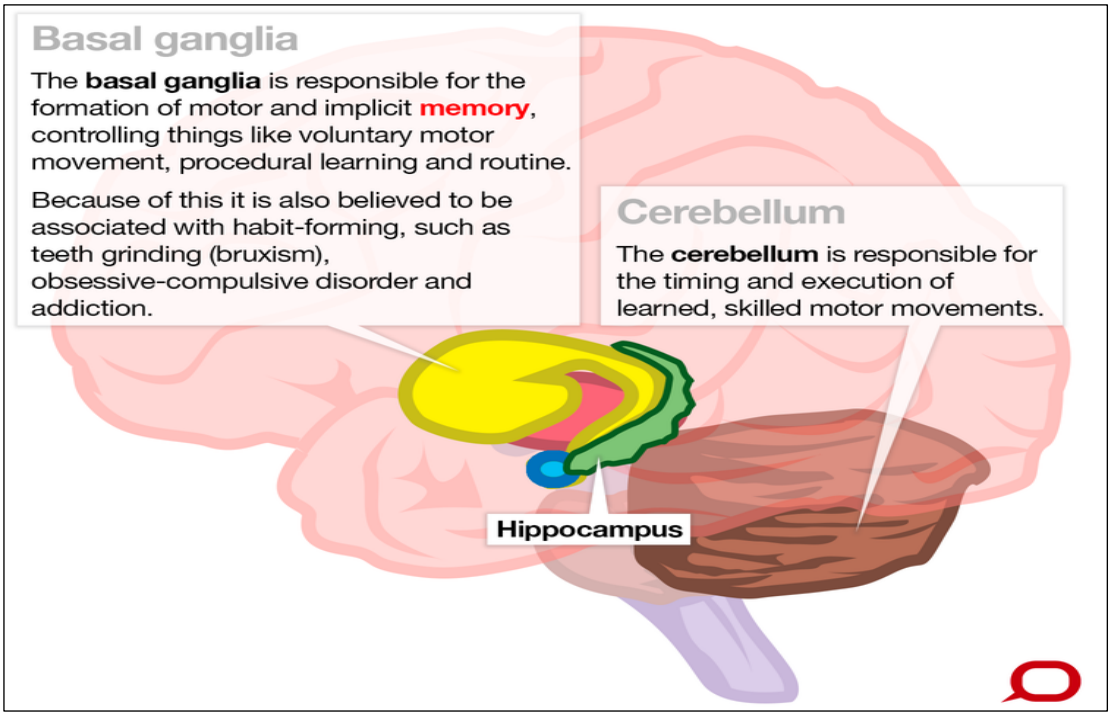
Source: https://www.science.org.au/curious/people-medicine/all-our-different-types-memories

Implicit memory, on the other hand, is an unconscious type of memory that occurs automatically. "Implicit memory, often referred to as non-declarative memory, does not require the conscious or explicit recollection of past events or information, and the individual is unaware that remembering has occurred. Implicit memory is usually thought of in terms of procedural memory, but also involves the process of priming" (Fillit et al. 2017). *Procedural priming* refers to the knowledge of how to perform a particular task or action. Procedural memories are automatically recalled for the execution of procedures involved in both cognitive and motor skills.

Priming is involved with the perceptual identification of words and objects. Targeting implicit memories can be used to manipulate individual behavior. Research has shown that implicit memory involves the **cerebellum** and the **basal ganglia** (Dew & Cabeza, 2011), with the cerebellum responsible for procedural memories. The *cerebellum* receives signals from the spinal cord, the brain, and sensory systems to carry out motor movements (Dew & Cabeza, 2011). It is the part of the brain that is also responsible for skill development and other cognitive functions such as attention and language. The basal ganglia are particularly involved in

coordinating sequences of motor activity, as would be needed when playing a musical instrument, dancing, or playing basketball. Its constitution explains why implicit memory involves subconsciously driven sensorimotor behavior which we typically remain unaware of.

Figure 1.8.: The Cerebellum, the Basal Ganglia, and the Hippocampus in the brain.



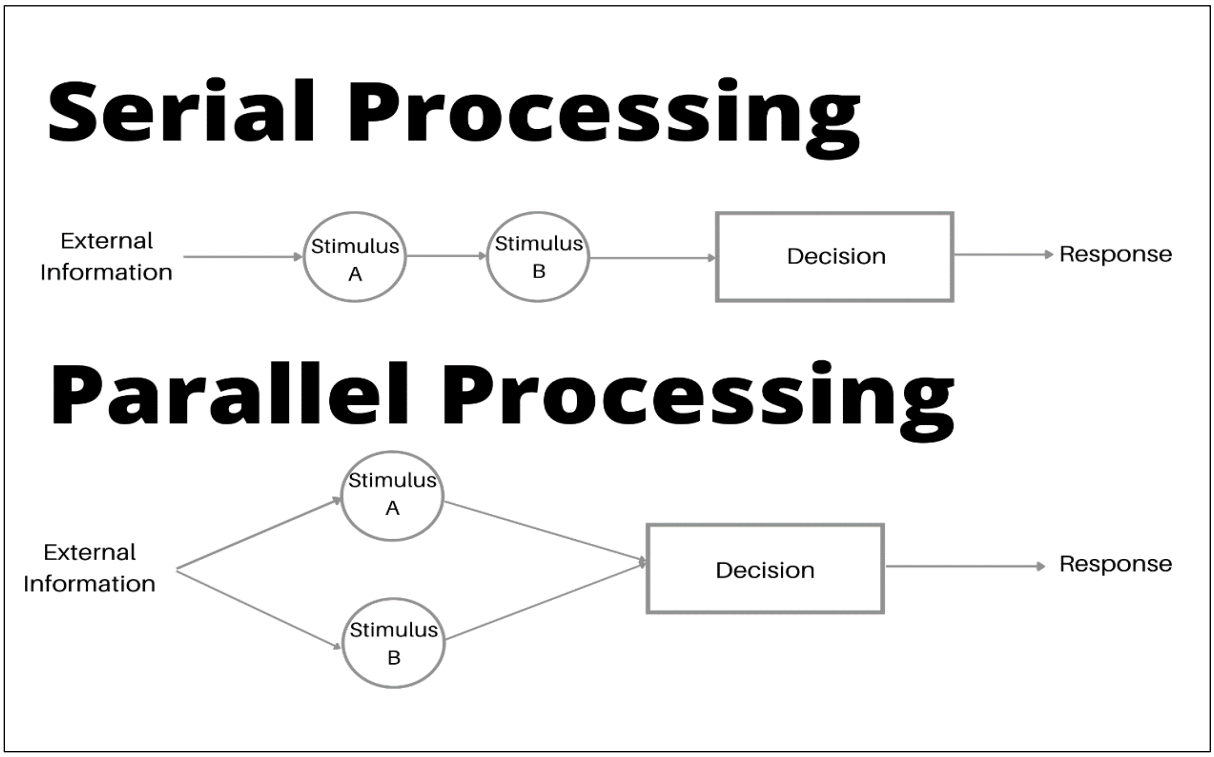
Source: https://www.science.org.au/curious/people-medicine/all-our-different-types-memories

2.8. Serial Processing VS Parallel processing

Individuals are constantly receiving new information and processing it in a way to produce an output: behavior. Processing systems including attention, perception, and short-term memory process information from the external environment and alter it systematically. Researchers have long questioned how the brain processes the infinite number of information it receives, are they processed one at a time? Or simultaneously?

Serial processing means that one process cannot begin if the previous is not completed yet; meaning the brain processes one stimulus at a time. This happens through a series of stages: (1) the stimulus is encoded; then (2) it is processed by the brain; and finally (3) the individual generates a response to the stimulus. This idea has received many critiques as it means that the brain processes information too slowly and wouldn't be able to attend to all the relevant stimuli present in the environment.

Figure 1.9: Serial VS Parallel Processing.



Source: Lentz et al. 2014. A new perspective on binaural integration using response time methodology.

Parallel processing assumes that multiple cognitive processes can happen at the same time, meaning that the brain processes different stimuli at the same time. When an individual sees an object that has shape, color, depth… etc. it would be too slow to assess each of these stimuli once at a time with serial processing to determine what is that object and act accordingly. Parallel processing enables individuals to recognize the object they see and decide how to respond to it quickly.

Parallel processing relies heavily on top-down processing and bottom-up processing to understand stimuli as they were explained above. Using parallel processes in everyday life makes them more or less automatic. Automaticity enables people to perform loads of impressive parallel processes. As many advantages as it may have, parallel processing is also limited in how much information it can process simultaneously.

Research has also shown that individuals only pay attention to salient information because attending to all information presented in the external environment can be very overwhelming.

Conclusion

To sum up, “Cognition” refers to the mental processes involved in knowledge and learning. It includes perception, attention, and memory. Cognition involves conscious and unconscious processes by which one acquires knowledge and comprehension such as judgment, reasoning, problem-solving, and perceiving.

Research in different fields such as psychology, neuroscience, and marketing has aimed at understanding and uncovering the processes underlying cognition. The field of marketing has taken advantage of the intersection of these disciplines, especially with the emergence of Cognitive Neuroscience.

Cognitive Neuroscience is the use of neuroscientific tools along with psychology in an attempt to explain the neural networks of different psychological aspects. It has differentiated between low order processing which involves the Ventromedial and Prefrontal cortices of the brain, and high order processing which involves the frontal and parietal lobes of the brain making it extremely interconnected and powerful.

Cognitive Neuroscience findings have also suggested that brain circuits compete against each other so that the “winner” gains priority to cognition that later results in behavior.

Attention, a highly important cognitive process that reflects the brain’s ability to focus on specific relevant stimuli in the environment and ignore the rest. Research has focused mostly on the visual type of attention. attention is what contributes most to memory formation. The prefrontal cortex combines sensory input and combines various systems for efficient task selection. Brain imaging has shown two other brain networks involved with attention. The bilateral dorsal-frontoparietal network is associated with focused attention in a goal-oriented manner. The right-lateralized network of ventral frontoparietal structures is activated by selecting a stimulus as relevant.

Perception, another core cognitive system, consists of the process of receiving, organizing, and interpreting external stimuli. It is the process of understanding and making sense of the world. Perception occurs as a succession of three processes: sensory stimulation & selection, organization, and interpretation.

Another important aspect of cognition is memory. It is the process of recalling past information to use in a present situation consisting of encoding, storing, and retrieving information. Memory is classified into three categories: sensory memory, short-term memory, and long-term memory. Sensory memory, being the earliest stage of memory, is the brief storage of information right after the stimulus has made it through selective attention. It allows people to see the world by processing environmental sensory information. Short-term memory, also known as the working memory, stores information for a short period, usually less than one minute. It is important for reasoning and decision-making. Working memory activates frontoparietal brain regions of the brain and is affected by age, hormones, and emotions. Finally, long-term memory is where information is stored for long periods: days, months, and sometimes even a lifetime. Neuroscience has demonstrated that the hippocampus, the amygdala, the cerebellum, and the basal ganglia are responsible for long-term memory.

Understanding these cognitive concepts and how they work and are processed by the brain, gives marketers an advantage to differentiate their marketing strategies. Using cognition is one of the keys to better appealing to potential consumers and making existing ones even more loyal to the brand.

Cognitive marketing is also useful to determine which factors influence consumers' decision-making to later adapt marketing efforts by using stimuli that target the cognitive functions of these consumers.

Marketing has yet a lot to take from this growing field that revolutionizes all marketing efforts.

SECTION 03: DECISION-MAKING

Decisions, in general, are influenced by many factors such as marketing actions, culture, demographics, society, emotions, personality traits, motives, perceptions, learning…etc. Understanding how each factor influences decisions is key to many horizons in different fields and may answer human and consumer mysteries.

Researchers used and integrated different tools trying to elaborate models to explain decision-making processes like mathematics, statistics, economic models, management, psychology, and even philosophy.

The most traditional of the models was the Utility Maximization model (Walras, 1977) which assumed that decision-makers were irrational economic agents having complete knowledge of their surroundings, making decisions that have the maximum utility. Later, with prospect theories, economists agreed on the important role of emotions in decision-making processes.

Cognitive psychology, a sub-field of psychology, has emerged in an attempt to explain the cognitive mechanisms of decision-making. It seeks to understand the “black box” of the human mind (Camerer et al. 2003). Affective psychology, also a sub-field of psychology, has tried to examine how affective components shape and guide the decision-making process in various contexts and situations.

In the most recent years, researchers have integrated neuroscientific tools to improve their understanding of decision-making. From cognitive psychology and affective psychology emerged cognitive neuroscience and affective neuroscience providing researchers with tools that help them measure and gather data from brain activity and link it to specific functions and behavior.

Combining Affective and Cognitive neuroscience results with findings from psychology, marketing, and decision theories helps to better understand the complexity of the human decision-making processes.

3.1. Consumer Behavior

Consumer Behavior is the study of how individual people, groups, and organizations select, buy, use, and dispose of ideas, goods, and services to satisfy their needs and wants. "Consumer behavior is the study of what people buy, what they buy, when they buy, and why they buy" Kotler (1994). Schiffman (2007) defines consumer behavior as "the behavior that consumers display in searching for, purchasing, using, evaluating, and disposing of products and services that they expect will satisfy their needs".

The field of Consumer Behavior is a complex, dynamic field that researchers have been working on for numerous decades combining various tools and techniques, and even disciplines in an attempt to deepen their understanding of the field. It is critical for marketers to know their consumers in terms of personality, choice, motivation factors...etc. in order to adapt their marketing actions to each segment of consumer groups.

Consumer behavior is influenced by various factors from psychological & personal factors to social, cultural, and situational factors. It is always changing and evolving as the market is always growing and consumers' needs changing. What makes the study of consumer behavior even more challenging is the fact that it varies from consumer to consumer, region to region, and country to country, so it is quite impossible to make a general rule for consumer choice.

3.2. Decision-Making Theories

Literature on decision-making (Edwards, 1954; Neumann, 1947; Savage, 1972) has classified decision theories into four categories: (1) Normative decision theory; (2) Descriptive decision theory, (3) Behavioral decision theory; and (4) Naturalistic decision theory.

3.2.1. Normative Decision Theory

According to Edwards (1954), people were "intuitive statisticians". Early studies on decision-making used gambling tasks and viewed individuals as "economic" men striving to maximize their profit. Normative theories define "good" decisions as ones that are most likely to provide the decision-maker with desired outcomes (Edwards, 1954; Yates, 1990).

The normative decision theory aims at identifying the optimal decisions while considering the decision-maker as a fully rational and ideal individual with perfect accuracy. "Normative" refers to the behavior decision-makers should adopt in order to maximize their profits.

For example, the *Expected Utility Theory* (Neumann & Morgenstern, 1947) is used to analyze situations without knowing the outcome of that decision, i.e. decision-making under uncertainty. Decision-makers choose the alternative that has the highest expected utility and it also depends on the decision-maker's level of risk aversion.

Savage (1954) introduced the *Subjective Utility Theory* as an extension of the Expected Utility Theory. He said, "One idea now held by me that I think Von Neumann and Morgenstern do not explicitly support, and that so far as I know they might not wish to have attributed to them, is the normative interpretation of the theory" (Savage 1972, p. 97).

The two normative theories are similar in that: (1) Both represent a linear additive model and the implied decision model is compensatory involving compromise between gains and losses; (2) Both theories involve normative constructs: Utilities & Probabilities; and (3) Both theories assume that decision-makers know their own preferences with certainty (Fischer et al. 2000, p. 89).

Fischhoff, Goitein, and Shapira (1983) described the normative decision rule as: "[the] *List all feasible courses of action. For each action, enumerate all possible consequences. For each consequence, assess the attractiveness or evasiveness of its occurrence, as well as the probability that it will be incurred should the action be taken. Compute the expected worth of each consequence by multiplying its worth by its probability of occurrence. The expected worth of an action is the sum of the expected worth of all possible consequences. Once the calculations are completed, choose the action with the greatest expected worth*" (p. 183).

The Expected Utility Theory and the Subjective Utility Theory are based on a set of assumptions: (1) Decisions are based upon unlimited information; (2) Decision-makers can efficiently utilize all of the available information; (3) Decision-makers know all of the options available to them and the rewards or consequences of purchasing one or another of these options; (4) Preferences are invariant; preferences between options are independent of the presence or absence of other options; and (5) The optimal course of action is obtained by applying the appropriate calculations of expected utilities.

The Normative theory of decision has been subject to many critiques over time for that studies on consumer decision-making often violate the normative theory's assumptions.

3.2.2. Descriptive Decision Theory

Descriptive theories of decision-making have tried to explain paradoxes and decision problems. They are more about "what will" occur in a given situation rather than "what should" occur. The theories take into consideration external factors that might influence the decision-making process towards less optimal & less rational ends.

Decision-making activities include, at various stages, some forms of comparison: comparisons between alternatives, comparisons between decision situations, and comparisons between the attributes of different alternatives (Dillon, 1998). Situation comparisons include comparisons between situations and comparisons between situations and alternatives. Non-situation comparisons include comparisons between alternatives, comparisons between alternatives and a standard, and comparisons between attributes of different alternatives.

Simon (1955) had doubted the correctness of the Expected Utility Model and Subjective Utility Model stating that people can calculate optimal choices. He was convinced that decision-makers cannot consider and evaluate all alternatives and the information presented. Simon proposed his *Satisficing* model as an alternative to the optimization models. His model implied that people think of options, one by one, and choose the first course of action that meets or surpasses some minimum criterion that will satisfy them. Simon also believed that the satisficing process leads more often than not to the optimal decision.

3.2.3. Behavioral Decision Theory

After Simon (1955) challenged the Normative Decision Theory with both concepts of "Bounded Rationality" and "Satisficing", research on decision-making took a new turn. Behavioral Decision Theory recognizes that individuals make their decisions on the spot using the information available and different processing strategies defined by the decision task size, information presentation, negative attribute correlation, and time pressure.

According to Payne and colleagues (1992), the failure of the concept of "preference invariance" is due to two main reasons: (1) Decision-makers are not certain about the weight of the decision, especially in situations when there's a conflict between the desired attributes; (2) Decision-makers are uncertain assigning values to different outcomes. Decision-makers developed "a repertoire of methods for identifying their preferences and developing their beliefs" (Payne et al., 1992, p. 89). These 'methods' are the 'decision strategies' in the literature.

Tellis and Gaeth's (1990) work found that consumers tend to be price seeking when information on quality was low but the quality was important, but tend to be price averse when the importance of quality decreased. This showed that consumer preference could reverse. Also, Nowlis and Simonson (1997) found that consumers emphasize more on easy to compare attributes such as price when they're directly comparing between brands, but tend to focus more on "enriched" attributes that are a bit more difficult to compare, like brand names for example, when evaluating brands individually.

Other research has found that consumers can be both risk-taking and risk-aversive depending on the situation and the gain or losses at hand. Simple phrasing in a positive or negative sentence may change the perception of the outcome positively or negatively. To utilize the framing effect, marketers may specify one or more reference points to influence consumer behavior to become more risk-taking or risk-averse in favor of their own product or brand.

Consumer choice is dependent on the context of the decision task. When two alternatives are considered equally attractive, the entry of a third alternative that is dominated by one alternative and not the other will increase the attractiveness of the dominant alternative, i.e. adding an irrelevant alternative to an existing set of alternatives increases the proportion of individuals choosing one of the original alternatives.

In marketing, this phenomenon is usually known as the *Decoy Effect* where consumers' preference changes between two options when a third one is presented to them. One example that illustrates well the Decoy effect is The Economist Magazine Subscription. The magazine initially offered two subscription offers: (1) One-year of online access to all The Economist articles – priced at $59 and (2) One-year subscription to the Economist print edition along with yearlong online access to all The Economist articles – priced at $125. The results were that more subscribers favored the first option over the second one. The magazine later added a third option (3) One-year subscription to the print edition of The Economist – priced at $125. Adding

this option in the middle of the choice set may look useless at first but is actually an important pricing strategy. Why would subscribers opt for a print-only subscription when they can get online access and print deal at the same price? After adding the third option more subscribers chose the print and online access option over the first option, making the magazine arrive at its initial goal.

Consumers' preferences can indeed be changed according to the environment and the context, but it should be noted that consumers have a firm and stable preference for the products they frequently purchase (Beach & Mitchell, 1998, p. 188). This stability suggests that marketers should maintain a certain competitive position by reinforcing their brand image and reputation to maintain a strong loyal customer base.

3.2.4. Naturalistic Decision Theory

The Naturalistic Decision Theory focuses on the cognitive functions such as decision-making and situational awareness, which emerge in a natural environment and cannot be replicated in a research laboratory. This theory's central goal is to identify cues that experts use to make complex decisions.

The researcher Gary Klein and his colleagues realized that laboratory settings may not precisely represent how decisions are made in people's everyday life. Naturalistic Decision Theory focuses on a sequence of activities involved in a decision-making process where alternatives are generated internally as opposed to the Normative and Behavioral Decision Theories where the focus was on decision events and externally generated alternatives.

Various models have been set under the Naturalistic Decision theory, namely: Recognition Primed Decision model (Klein, 2017), Situation Assessment model (Noble, 1989), Model of Explanation-Based Decisions (Pennington & Hastie, 1986, 1988, 1992, 1993), and many other models.

The Recognition-Primed Decision (Klein, 2017) model is one of the most popular models of the Naturalistic Decision Theory. It aims at explaining why people can make good decisions without comparing all options but just based on pattern recognition. The model is about a quick and effective decision-making process in complex situations. The Recognition-Primed Decision model is a mental model, meaning when individuals use this model to make decisions

it's usually quickly and automatically. As people gain experience, their ability to recognize pattern improves, and thus, their decisions become better and more effective.

The Dominance Search model and Image Theory model are two models of the Naturalistic Decision Theory that assume that alternatives are generated externally.

The Dominance Search Model (Dahlstrand & Montgomery, 1984), proposes that when making a decision, the individual goes through four stages searching for the best – dominant - alternative, using a different decision strategy at each stage: (1) **Pre-editing**: at which the individual screens out the unacceptable alternatives on important attributes; (2) **Finding a promising alternative**: the decision-maker finds the alternative that has a better chance to be the final choice; (3) **Dominance testing**: here, the decision-maker tests out the promising alternative to determine if it is the dominant one; finally (4) **Dominance structuring**: the decision-maker reconstructs given information in a way that the promising alternative becomes the dominant alternative if was not dominating.

The Image Theory model assumes that decisions use three different schematic knowledge structures - called images - to make decisions: (1) the Value Image which is composed of the decision-maker principles; (2) the Trajectory Image composed of previously adopted goals; and finally (3) the Strategic Image composed of the various plans that have been adopted for achieving the goals on the trajectory image.

The last two theories have been widely relevant to consumer decision-making and have been used to examine consumer behavior in various contexts. The Dominance Search model and Image Theory model meet on a couple of points: (1) Both of them relate to knowledge-based decision behavior; (2) Both emphasize the decision maker's values and goals in determining behavior; (3) Both propose a preliminary process of eliminating unacceptable alternatives and a subsequent process of choosing among the remaining alternatives; and (4) Both of them assume that decision alternatives are generated externally.

3.3. Decision-Making Process

The consumer decision-making process refers to the process that consumers go through to identify their needs, gather information, evaluate alternatives, and finally make their buying decision.

Marketers ought to understand consumers' buying behavior like the impact of lowering or raising the price on their perception of the product or how to direct their marketing efforts based on comments and reviews on social media.

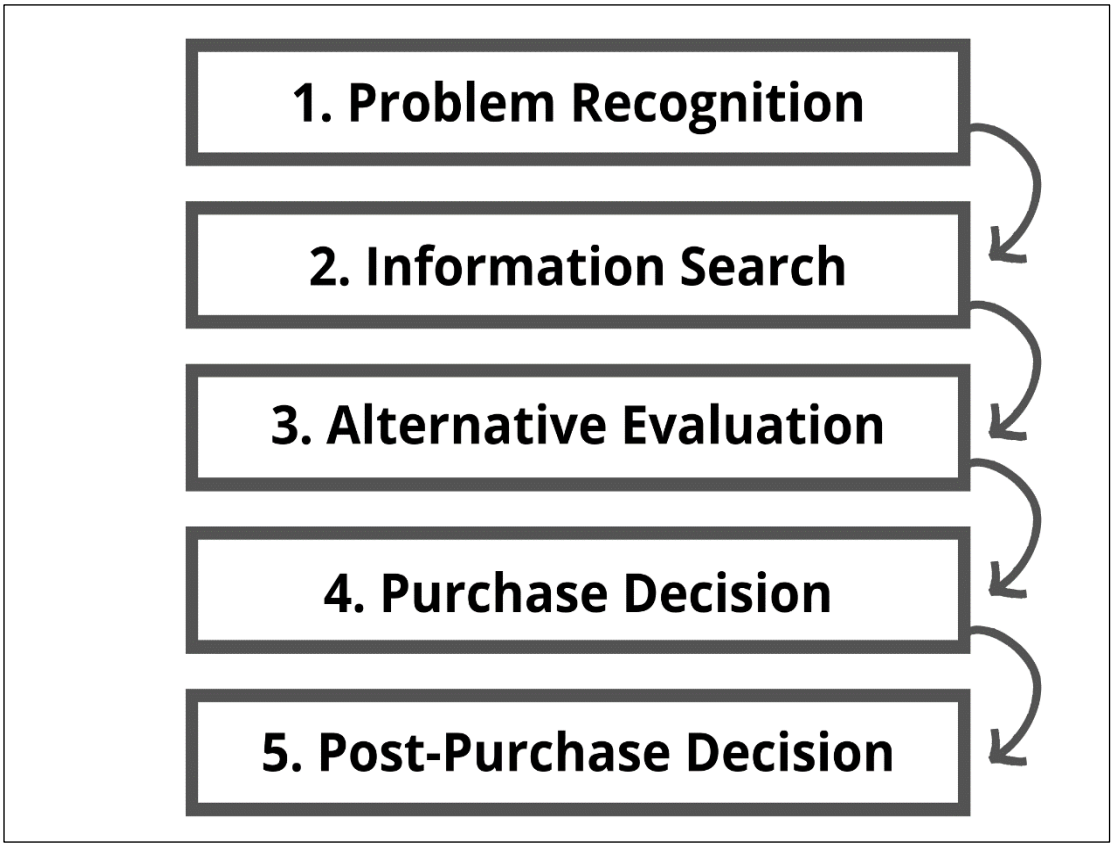
Consumer decision-making is a complex process that involves very early cognitive stages like need recognition which can have no relation to the marketer's brand or product. Needless to say that different consumers have different needs and wants, leading them to make different decisions.

The five-step consumer decision-making model is a method used by marketers to trace consumers' buying behavior from the start to the end. The whole process starts when a consumer recognizes a need that can be satisfied by a product. He then proceeds to gather information and then evaluate the available alternatives. Once he selects the best alternative, he then proceeds to purchase the product. Once the consumer uses the product, he decides on its quality and whether he would buy the product another time or not.

3.3.1. Problem recognition

The consumer becomes aware of being in need. The need can be triggered by an internal or an external stimulus. Whether the need is internal or external, the result is the same: wanting to satisfy the need. An internally triggered need is usually when one of the consumer's basic needs is unsatisfied. According to Maslow (1943), there are five basic human needs: physiological needs, safety needs, belonging needs, esteem, and self-actualization. External stimulus is an outside influence such as advertising or word-of-mouth. Marketers need to determine at the early stages what the needs of their target customers are to start developing products and strategies that target those needs. Marketers can get involved in the stage of "Problem recognition" in three ways.

Figure 1.10.: Consumer Decision-Making Process.



Source: John Dewey, 1910.

First, they need to know the problems their consumers are facing so they can then develop the marketing mix to satisfy those needs. Second, marketers sometimes need to trigger problem recognition themselves. Lastly, marketers can shape problem definition. Developing a comprehensive brand campaign to build brand awareness and brand trust, but the most important thing is to make them feel like they have a problem only that specific brand can solve.

3.3.2. Information search

After the consumer recognizes a need, he will then seek information about products that can work to satisfy that need. Information can be obtained through communicational sources such as commercials, public sources like newspapers and radio, and experiential sources i.e. from previous experiences. Information can also be obtained from other people's recommendations.

Marketers at this stage need to offer a promotional mix aiming at providing information to assist consumers in their problem-solving process. Brands need to present themselves as a trustworthy source of information. An important strategy that marketers should not pass by is "word-of-mouth"; customers trust other customers more than they trust the brand itself. Implementing testimonials and reviews of other customers should be considered by marketers.

3.3.3. Alternative evaluation

Consumers at this stage tend to have a list of criteria for what they're looking for in order to satisfy their needs. These criteria vary from consumer to consumer, just like their needs and information sources vary. Here, consumers tend to be highly influenced by their attitude and the degree of involvement they may have with the product.

Consumers start weighting their eventual choice against the other available alternatives on a scale of attributes to deliver the benefits they seek. If these alternatives are financially and psychologically adequate, they make it into the consumers' evaluation set.

An *Evaluation set* is a number of alternatives considered by the consumer during his evaluation of the available alternatives. For marketers to increase the likelihood of their brand being in the evaluation set of many consumers, they need to understand specifically the problem they're trying to solve and which product attributes weigh more in their decision.

3.3.4. Purchase decision

After the consumer has evaluated the product and identifying which product is more preferred to satisfy his needs from the evaluation set, he proceeds to the purchase. The purchase decision can be either a logical decision based on gathered facts and knowledge or an emotional decision based on an emotional connection or personal experience with the brand or product or it can be a combination of both.

The more marketers simplify the purchase of their product, the more it will become attractive to buyers. Simplification can be of any nature, maybe fewer clicks on an online checkout platform or maybe simplified payment options. In ads, marketers can also suggest different sizes of the product for different uses if the product comes in sizes.

To take marketing efforts a step further to make them even more effective, marketers need to have the answers to customers' related questions. For instance, how much effort the consumer is willing to put in order to acquire the product? What are the factors that may influence his purchasing decision? Also, providing free samples, coupons, and using personal selling techniques all help make marketing efforts more effective.

3.3.5. Post-purchase decision

The purchase of a product is always followed by a post-purchase evaluation that will determine their future decisions. After the consumer uses the product, he evaluates the product relatively to his expectations. Consumer feelings and evaluations after the sale are significant to marketers because they can influence repeated sales and influence what the customer tells others about the product or the brand. Three outcomes are to be expected: (1) Performance matches expectations: neutral feeling; (2) Performance exceeding expectations: positive feeling and satisfaction; and (3) Performance below expectations: negative feeling and dissatisfaction (Schiffman et al. 2012, 84).

Marketing is about making customers happy and satisfied. To keep the customers engaged after the purchase, marketers could send follow-up emails, discount coupons, and newsletters to incite these consumers to make future purchases.

Sometimes, some kind of anxiety follows the purchase action of consumers. For example, the consumer might keep asking himself whether he made the right purchase decision or not. This phenomenon is named *Cognitive Dissonance*. Cognitive Dissonance refers to a state of discomfort that results from holding two conflicting beliefs or attitudes. People usually seek consistency among their cognitions (knowledge, attitudes, beliefs, values). The state of discomfort acts as a motivator for people to engage in actions that will help them minimize discomfort feelings.

Marketers should take some actions to reduce post-purchase dissonance, advertising stressing the positive attributes of the product might be helpful. Offering a money-back guarantee is another helpful strategy to reduce post-purchase anxiety.

3.4. The Neuroscience of Decision-Making

Neuroscience adds value to decision-making research by helping researchers and marketers understand consumers better and thus better predict their future decisions. Understanding neural mechanisms underlying a certain decision may help: (1) Generalize that knowledge; (2) Understand contextual influences that may interact with different neural circuitry leading to different choices; and (3) Create interventions or influence those decisions more effectively (Yoon et al. 2012).

Using Cognitive Neuroscience along with Affective Neuroscience leads to **Consumer Neuroscience**. The use of neuroscience techniques in marketing unlocks new horizons for consumer and market research. Thanks to it, predicting consumer needs in real-time became more doable and better than using traditional methods such as questionnaires and interviews. Reasons to use neuroscience in marketing may include: (1) the existence of a gap between what consumers do and what they say; (2) possible data corruption due to unreal answers in questionnaires and interviews; (3) consumers may not want to disclose their real emotions so that affects the study, and (4) consumers might not be aware of their subconscious motivators.

Neuroscience can also help understand how the store's environment influences shoppers' decisions to buy products or not. This includes the store's color, smell, products' packaging, merchandizing…etc.

Attention, Emotion, and Memory are three important aspects of understanding consumer decision-making. Attention is essential to understanding which part of a given event captures attention. The memory aspect measures both short-term and long-term memory. Emotions are the most critical aspects of consumer research; they drive decision-making and are pretty hard to measure.

For successful marketing, marketers need to develop a strong emotional brand connection and brand memory and link it to their consumers' goals.

As developed in the Affection and Cognition sections, the amygdala, hippocampus, and the ventromedial prefrontal cortex are responsible for underlying mechanisms of emotion while the dorsal prefrontal cortex and orbitofrontal cortex in addition to the amygdala and hippocampus are responsible for reason, judgment, visual search, and decision.

3.5. Consumer Neuroscience and Branding

Neuroscientific methods have been widely used in marketing, especially for branding. Studies on this topic aim at understanding the processes underlying brand decisions. Plassmann and his colleagues have divided the stages required for brand preference into four basic components: (1) Representation & Attention; (2) Predicted Value; (3) Experienced Value; and (4) Remembered Value & Learning.

3.5.1. Representation & Attention

In the previous section, we have talked about how our brain is exposed to an enormous amount of information, and yet, our brain processing capacity is limited. *Representation* refers to the process of forming representations of the alternatives, i.e. brand identification. Most information selected to be processed is visual information. The visual system allows for quick brand identification. Milosavljevic and his colleagues (2011) have demonstrated that consumers can identify two food brands and make their choice about which they prefer in as little as 313 ms.

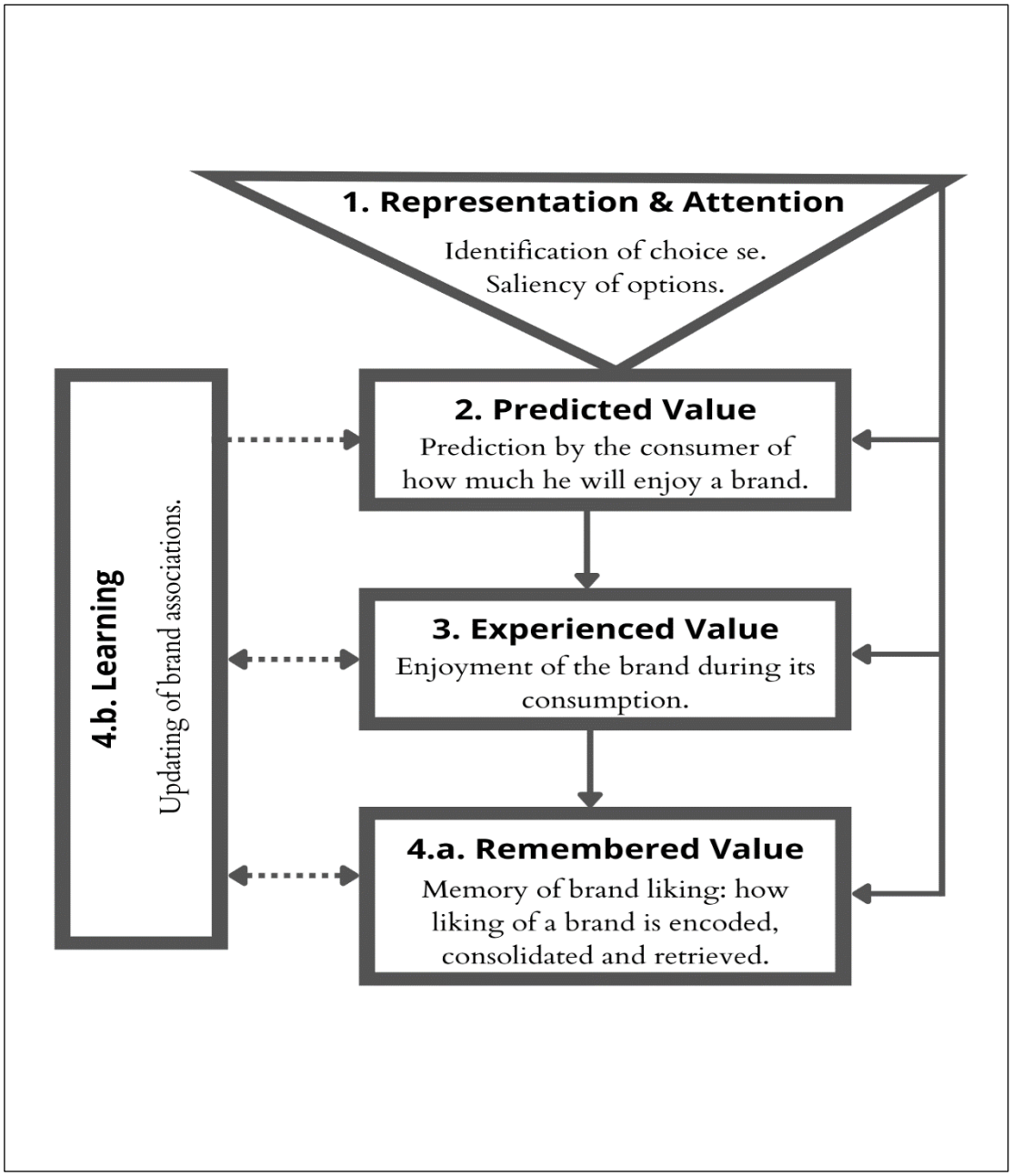
Attention is the process of selecting which information the brain attends to among all available information. Four components are fundamental to attention: (1) Bottom-up processing; (2) Top-down processing; (3) Competitive visual selection; and (4) Working memory. Research shows that consumers are 60% more likely to buy an item that is shown at the center of the screen than if it is shown in another location (Reutskaya et al. 2011). Expectation can modulate what consumers pay attention to via brain structures that include the dorsolateral cortex (Egidi, Nusbaum, & Cacioppo, 2008).

3.5.2. Predicted Value

Predicted Value refers to the expected value that the consumer will experience from the brand. Research has demonstrated that three parts of the brand are involved with consumers' evaluation of the brand: (1) the striatum; (2) the ventromedial prefrontal cortex; and (3) the dorsolateral prefrontal cortex.

A study by Esch and colleagues (2012) investigated how brand associations influence brain activity during decision-making. The study found that the part of the dorsolateral prefrontal cortex involved in predicted value encoding is more active when consumers are exposed to "strong" brands against "weak" brands. It also found that exposure to "weak" vs. "strong" brands leads to more activity in the insula, the brain area associated with intense and arousing emotional experiences.

Figure 1.11.: Value Signals Important for brand decision.



Source: Plassmann, H., Ramsøy, T. Z., & Milosavljevic, M. (2012). Branding the brain: A critical review and outlook. Journal of consumer psychology, 22(1), 18-36.

3.5.3. Experienced Value

Experienced Value is derived from the pleasure of consuming the brand. The experienced value consists of the valence and the valence and intensity of the brand experience. McClure (2004) investigated how brand associations alter the experienced value. He conducted an experiment where he investigated brain activity during the consumption of Coke and Pepsi in two conditions: (1) knowing which brand consumers are drinking and (2) not knowing the brand of the soda they're drinking. The study showed that the experience value depended on knowing or not knowing the brand they're drinking, i.e. brand associations.

3.5.4. Remembered Value & Learning

Remembered Value refers to the experienced value the consumer remembers from previous experience. Remembered Value also refers to how different brand associations are encoded, consolidated, and retrieved in the consumer's memory (Plassmann et al. 2012). Research suggests that these associations are usually on an unconscious level.

The remembered value consists of both explicit and implicit memory. Explicit memories are also known as *declarative memories*. They rely on specific brain regions such as the hippocampus and the dorsolateral prefrontal cortex. McClure et al. (2004) and other studies have reported a strong connection between declarative memory and preference.

Implicit memories, on the other hand, are what is triggered at an unconscious level. Research suggests that low-level computations such as sensory processing are driven by unconscious mechanisms, while high-level functions such as decision-making require consciousness. Other evidence suggests that some higher processing levels can also be engaged unconsciously (Plassman et al. 2012).

Learning refers to the process of updating brand associations. As memories are made of brands and associations are established, those associations become involved in learning mechanisms.

Conclusion

To end this section, consumer behavior is the study of the process people follow to buy a product. It is a much more complex field of study than it looks. It makes use of various disciplines from marketing and psychology to neuroscience. Marketers need to study consumer behavior to learn about their personality, motivations, choice…etc. and it is to note that consumer behavior is influenced by various factors and is constantly changing.

Literature has identified four decision-making theories: the normative decision theory, the descriptive decision theory, the behavioral decision theory, and the naturalistic decision theory.

First, the normative decision theory assumes that people were ideal rational individuals making decisions that are surely optimal. Expected Utility Theory and Subjective Utility Theory are the most known theories of the normative decision theory. Both are compensatory models (compromising gains and losses) assuming that decision-makers are certain about knowing their preferences. The normative theory is based on assuming the existence of unlimited information, that individuals are capable of fully analyzing the unlimited information and are fully aware of the options available and the consequences of each option, preferences are independent of the number of options available, and that calculations on the expected utility always lead to the optimal decision. Second, the descriptive theory takes into consideration the external factors that might influence decision-making. H. Simon (1955) proposed the "satisficing" model as an alternative to the optimization models. The model suggests that decision-makers evaluate the available options one by one, then choose the alternative that satisfies a bare minimum criterion they have set. Third, the behavioral decision theory challenged the normative decision theory. It assumes that individuals result in decisions after courses of any processing strategies paired with available information. The choice of the alternative is based on situational factors and context. This is further known as the *decoy effect* which changes the attractiveness of a set of alternatives by adding an irrelevant alternative to the choice set. Finally, the naturalistic decision theory focuses on the cognitive functions of the decision-maker. Researchers of this theory concluded that real-life settings cannot be replicated in laboratory settings. Klein's Recognition-Primed Decision model (2017) is one of the most famous models of the naturalistic decision theory. It explains how people make decisions based on pattern recognition.

CONCLUSION

"Affect" is a term that refers to the underlying experience of feelings and emotions opposite to "Cognition" which refers to the mental processes involved in knowledge and learning including perception, attention, and memory.

Affect has a direct impact on behavior, it can be observed as an unconscious response such as a facial expression or it can be conscious like purchasing an item.

Marketing has a lot to take from research on affect especially with neuromarketing. It's the neuroscience findings that help boost marketing efforts and differentiate the brand from its competitors. Targeting affect is highly effective in advertising and in-store settings to incite customers to buy the marketer's brand.

Cognitive Neuroscience is the use of neuroscientific tools along with psychology in an attempt to explain the neural networks of different psychological aspects. It has differentiated between low order processing which involves the Ventromedial and Prefrontal cortices of the brain, and high order processing which involves the frontal and parietal lobes of the brain making it extremely interconnected and powerful.

Cognitive marketing is extremely useful to determine which factors influence consumers' decision-making to later adapt marketing efforts by using stimuli that target the cognitive functions of these consumers.

Although theories have tried to explain the decision-making process as simple as it could be, the decision process stays very complex to be simplified like that. The five-step decision model is a decision-making process model that aims to explain the path consumers follow while making decisions. The path starts with the need or problem recognition which refers to the consumer's awareness of the need and that can be triggered either internally or externally. It is critical for marketers to be present at this early stage of the decision process if they want to make a strong impression and trigger a need in these consumers' minds, especially to give them the impression that only their brand can solve their problems. The second turn consumers take is the information search. Consumers seek information about the products that may satisfy their needs from various sources. Marketers at this stage need to provide all necessary information through ads, blogs, websites…etc. It is also important to be presented as a trustworthy and a reliable source of information. After all information has been collected, it's now time for the

alternative choice. Consumers start evaluating the brands and the products that they judged able to solve their problems the better. At this stage, consumers are highly influenced by their attitudes and their degree of involvement with the product. Once the alternatives are evaluated and the choice made, consumers proceed to purchase the product. Note that the purchase decision can either be based on affect or cognition. The more marketers simply the purchase process, the more likely consumers going to buy their product. The latest stage of the consumer decision process is the post-purchase decision. This stage consists of evaluating the product, whether it resolved the initial problem or not, and whether it lived to their expectations or not.

Consumer neuroscience unlocks new horizons for consumer research and consumer behavior. Its use has helped close the gap between what consumers say and what they do leading to minimizing human bias errors found in questionnaires and interviews.

The use of consumer neuroscience in marketing, specifically in branding, has helped define the four essential components to forming brand preference, namely: representation & attention, predicted value, experienced value, and remembered value & learning.

Marketers have yet a lot to discover from consumer neuroscience. This study direction will challenge all of the previous consumer decision and consumer behavior theories and findings obtained through traditional methods.

CHAPTER 02

–

EMPIRICAL RESEARCH

INTRODUCTION

After having gone through the various concepts and theoretical constructs to gain the necessary knowledge on affect and cognition, we will present the operational aspect of this study.

In this digital era, marketers need to know and understand the influencers of consumers' online behavior so they can better shape their marketing efforts accordingly. The study aims at exploring the interaction between affect and cognition in online purchase decision-making.

First, the host organism, Goubba Solutions, will be presented (Section 01). The following section will develop the research methodology used for this study. And finally, in section 03, the final study results will be presented and the study hypotheses will be tested.

SECTION 01: HOST ORGANISM PRESENTATION

1.1. Presentation of Goubba Solutions

Goubba is a fintech startup offering innovative solutions to make the Algerian community's life easier and help improve its purchasing power. Goubba was founded in 2020 by Yacine Ahmed BENMOSBAH and is one of the most promising startups in Algeria with a market share of 1.3%.

Goubba started as a discount and promo codes app. It then introduced, for the first time in the market, the concept of Cashback. The startup does not only benefit consumers from discounts and cashback enabling them to save lots of money on their online purchases, but it also offers a solution for businesses to increase their visibility and gain more customers. Goubba then improved its offers and introduced a system of points that users can gain through various methods (buying products through the app, completing daily tasks, rotating the wheel…etc.) to level up on their level system and win rewards. These rewards were in the form of Gift Cards. A concept that is being focused on and developed for the next updated app version.

Goubba's main mission is to offer the best deals and offers to the Algerian society and help them save more money on each of their purchases, of different categories.

In the near future, Goubba aims at improving people's purchasing power through easy transactions available for everyone. It believes that it can update its users' everyday life through easy, fast, and secure payment solutions.

Goubba App is the number #1 app 100% Algerian with more than 100.000 downloads on Play Store. Goubba counts a number of 80.000 active users monthly, each spending 17 minutes a month on average.

1.2. Good App Criteria

Goubba is a modern app that focuses on providing the user optimal experience; group all available promo codes and the best deals, from national and international platforms, in one place. It has all characteristics of a good app; it was designed according to UX Design guidelines taking into account the user experience in both the overall design and content to ensure its ease of use.

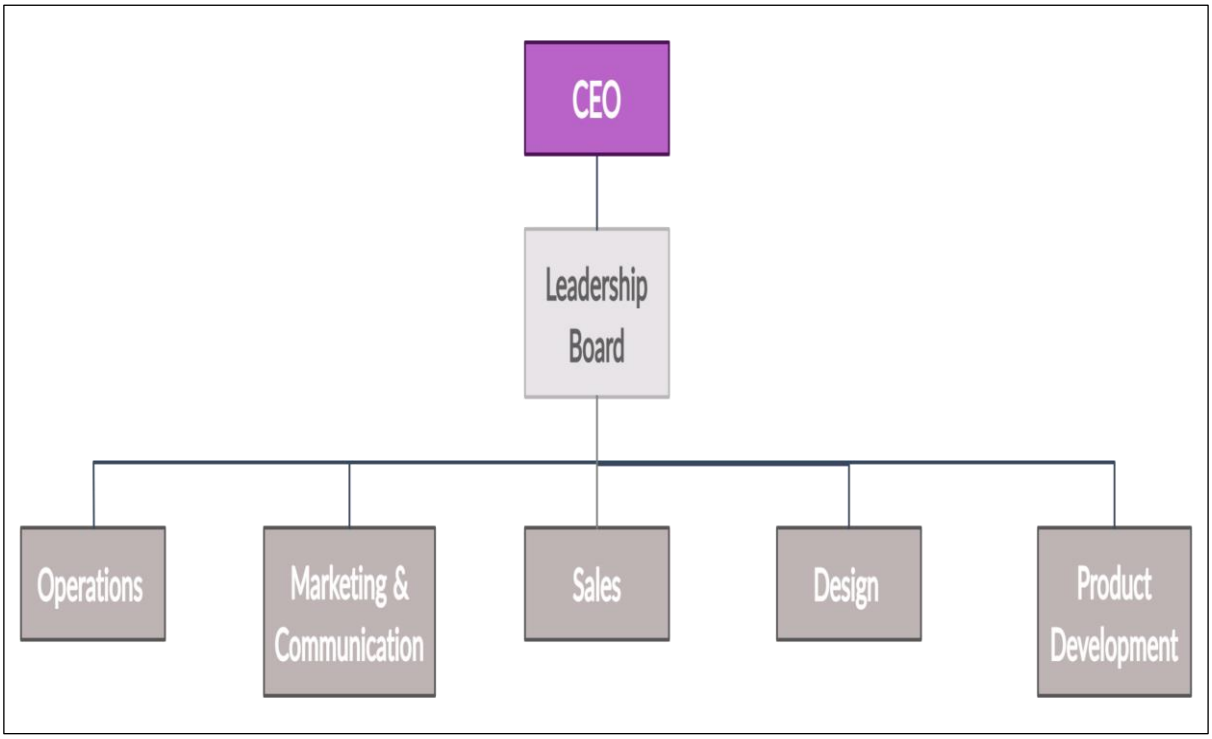
Statistics have shown that consumers spend more time interacting with a mobile app rather than a website. Some key considerations must be taken into account so the mobile app is judged favorably by users:

- Intelligent notifications;
- Interaction;
- App design;
- Ease of use;
- Contact and support sections;
- The adaptability of the app to different operating systems;
- Easy sign-up and sign-in.

1.3. The Organizational Structure

Goubba follows an **agile** and **horizontal** management model, consisting of the CEO, Leadership board, and then teams and departments: Operations, Marketing, Product, Design, and Sales.

Figure 2.1.: Goubba's Organizational Chart**.**



Source: Personal Efforts.

1.4. Measures of Performance

With a growth rate of 230%, Goubba keeps track of its performance and measures its progress daily to improve what needs to be improved, and find better ways to do things.

The startup measures its performance through **KPI** (**K**ey **P**erformance **I**ndicator) system and regular reporting. Goubba also holds weekly and monthly meetings to track the team's progress and performance.

Other important metrics include the number of active users, users' data points, and the company's revenue.

SECTION 02: RESEARCH METHODOLOGY

2.1. Objective

The empirical research aims at answering the following problematic thoroughly:

What drives online decision-making, Affect, or Cognition?

The problematic is divided into sub-questions representing its variables, which will be answered in this section.

2.1.1. Sub-questions

- Does cognition influence online purchase decisions more than affect?
- What platform-related factors influence online buying experience?
- Is online buying experience influenced more by affect?

2.1.2. Hypotheses

- **H1:** Online purchase decision is more influenced by cognition than by affect.
- **H2:** Online purchase experience is more influenced by affect than by cognition.
- **H3:** The overall platform design, ease of use, prices, and the variety of proposed products influence online purchase experience.

2.2. Research Method

In order to conduct the research and test out the hypotheses, an online questionnaire was directed and addressed to the research sample.

Online questionnaires have become the most used method for collecting information. They’re easy to make, easy to use, and easy to analyze.

2.2.1. Questionnaire

At the start of the questionnaire, an option to choose the language respondents were most comfortable with was presented: Arabic, French, and English.

Questions were structured according to the objective of our research; an eliminatory question, 7 questions measuring platform-related factors, 11 questions measuring affect and cognition, and 3 demographic questions.

The questionnaire includes various question forms:

- **Closed-ended questions:**
  - Single choice questions;
  - Seven-point Likert scale questions;
  - Yes/No questions.
  - Identification questions
- **Open-ended questions.**

2.2.2. Questionnaire Pilot-testing

Questionnaire pre-testing is an essential step to questionnaire elaboration. The goal of pre-testing is to test the validity and reliability of the questionnaire.

For this step, the questionnaire was first distributed to friends and relatives to test out the coherence and quality of the questions.

Online questionnaires have many advantages:

- Convenient;
- Fast;
- Low-cost;
- Quick to analyze;
- Flexible;
- Possibility of automation;
- Anonymity.

2.2.3. Final Questionnaire

The final questionnaire was adapted to the results of the pilot testing. Only one question was rephrased in French it's easier to understand.

After the eliminatory question of whether the respondent has already bought something online or not, the first seven (7) questions were related to shopping platforms:

- The first question asks which product the respondent purchased online. It aims at refreshing the respondent's memory and getting them thinking about a particular product.
- The second question aims at knowing which platform is mostly used by the respondent.
- The third question rates the overall purchase experience.
- The fourth to the seventh questions aim at rating the design, ease of use, prices, and the variety of products of the platform.

The next section includes eleven (11) questions, asking respondents to indicate to which extent they agree/disagree with each statement (question) on a seven-point Likert scale. These questions aim at measuring the affect and cognition of the respondents: four (4) questions measured Affect, and seven (7) measured Cognition.

The final section included three (3) demographic questions: age group, gender, and employment status.

2.2.4. Sampling

Non-probability sampling technique was used for this study. The technique was chosen due to its practicality, accessibility, low cost, effectiveness, and rapidity of data collection.

2.3. Preliminary Analysis

After the data was collected and treated, we analyzed it using the computer software **SPSS** version 26.

To test the first hypothesis, **H1**, Student Test was used to test whether the mean value is different from zero for both Affect and Cognition. And determine which variable influences online purchase decision more.

To test the second hypothesis, **H2**, Multiple Linear Regression was used:

- **Dependent Variable:** Online Purchase Experience.
- **Independent Variables:** there are two, namely: Affect and Cognition.

To test the third hypothesis, **H3**, Multiple Linear Regression was used:

- **Dependent Variable:** Online Purchase Experience.
- **Independent Variables:** Overall Platform Design. Ease of use. Prices. Product.

SECTION 03: DATA ANALYSIS

In this section, we shall present and analyze data collected through the online questionnaire using SPSS version 26.

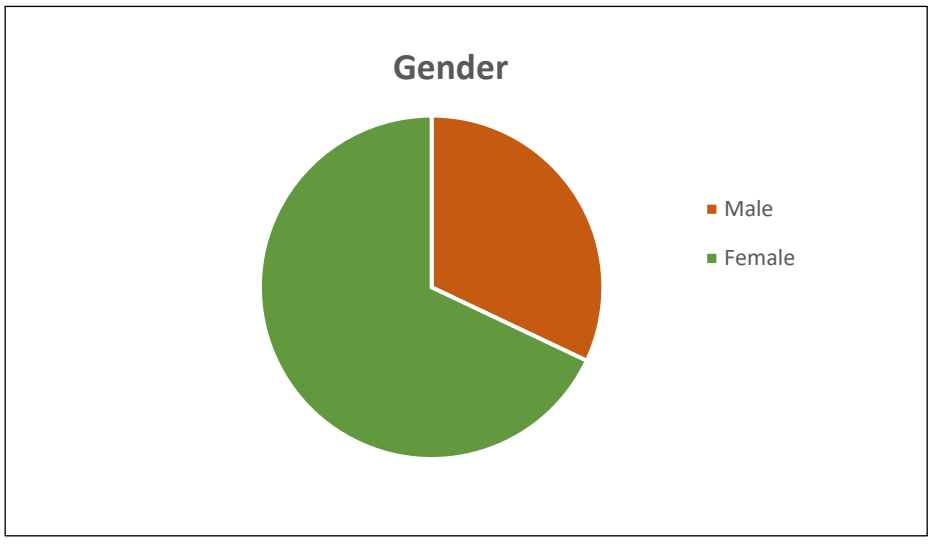
We have collected 310 answers from which we have accepted 200 answers for this research to answer the main question of whether affect or cognition drives online purchase decisions.

First, we will analyze the demographic characteristics of the respondents. Next, we will go through a deeper analysis of the collected data using One-Sample t-test firstly to test out if cognition influences online shopping decisions more than affect. Then, we will use Multiple Regression Analysis to investigate the impact of affect and cognition on online shopping experience first, then to investigate the influence of the overall platform design, ease of use, prices, and the variety of proposed products on online purchase experience.

3.1. Demographics

The questionnaire contains a set of questions to help identify the targeted population.

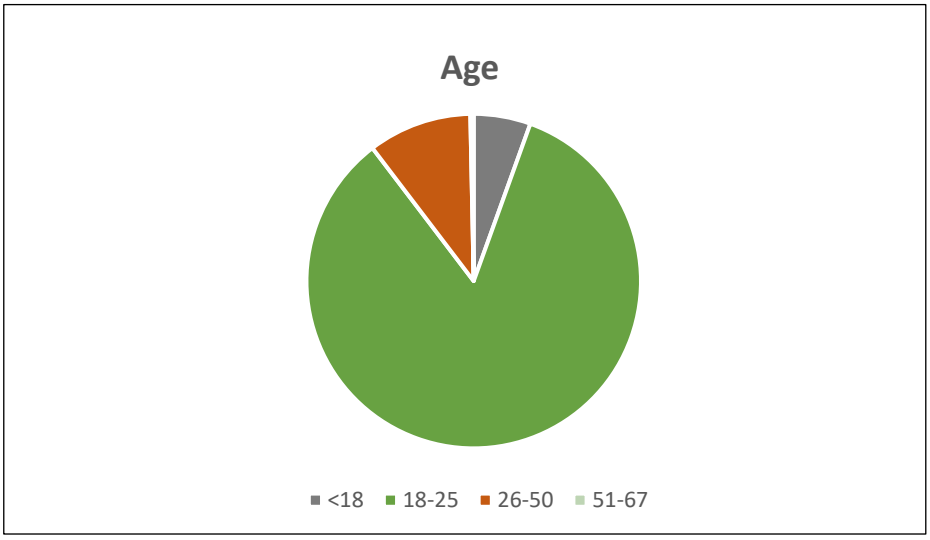
Figure 2.2.: Respondents' Gender.



Source: Personal Efforts.

The research sample includes 309 respondents, 99 are males (32% of the sample) and 210 females (68% of the sample).

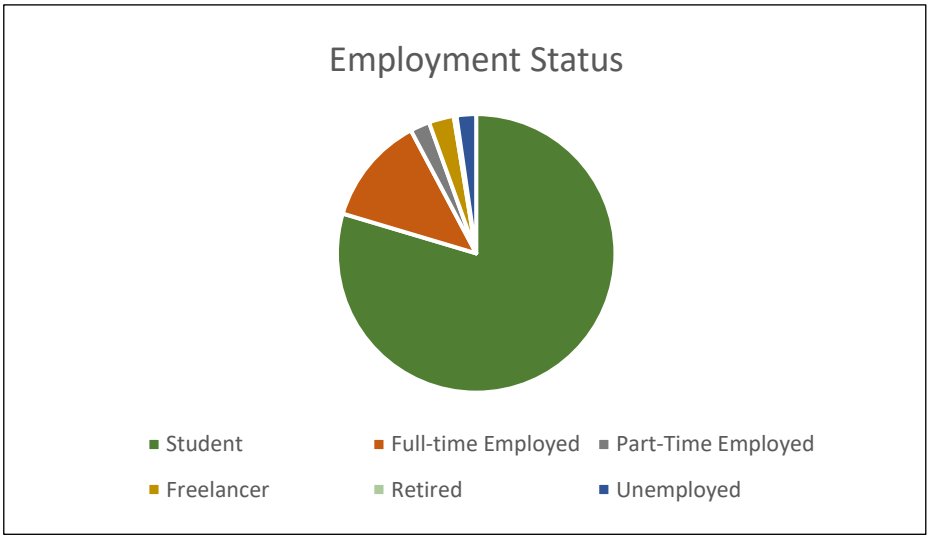
Figure 2.3: Respondents' Age.



Source: Personal Efforts.

84% of respondents are aged between 18 and 25, 10% are aged between 26 and 50, and 5.5% are less than 18 years old. Only one respondent was above 51 years old (0.3%).

Figure 2.4.: Respondents' Employment Status.



Source: Personal Efforts.

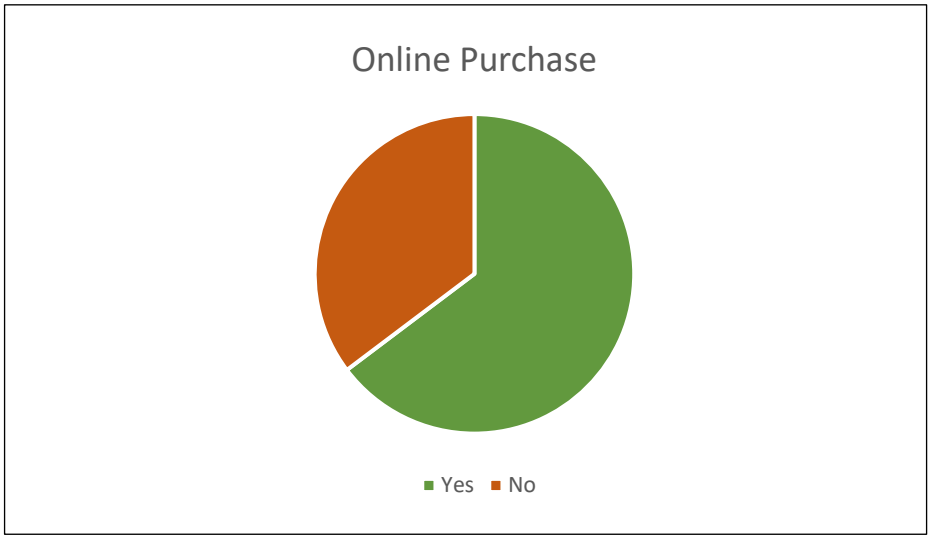
80% of the respondents were students (246 out of 309). 39 of them were Full-time employed (12%). The rest were either part-time employed (7%) or unemployed (7%) and only one of the respondents was retired.

3.2. Eliminatory Question

At the beginning of the questionnaire, the respondents were asked to indicate whether they have bought online before or not.

200 (65%) have purchased online before while 109 (35%) of the respondents have never purchased online before.

Figure 2.5.: Eliminatory Question.



Source: Personal Efforts.

3.3. Affective and Cognitive Statements Data Treatment

The research questionnaire included eleven (11) questions aiming at measuring the respondents' affect and cognition; four (4) of these questions were Affective statements measuring Affect, and seven (7) of them were Cognitive statements measuring Cognition.

Before any hypothesis testing begins, the mean of the affective statements (A1, A2, A3, A4) was calculated, making it the variable **"Affect"** in this study. The same was done to the cognitive statements (C1, C2, C3, C4, C5, C6, C7) becoming the variable **"Cognition"**.

3.4. Hypothesis H1 Testing

To test the first hypothesis which stipulates "Online purchase decision is more influenced by cognition than by affect", a one-sample t-test was conducted on both affect and cognition.

Table 2.1.: One Sample Test.

One Sample Test						
Test Value = 4						
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Affect	4.327	199	0.000	0.42375	0.2306	0.6169
Cognition	3.575	199	0.000	1.15150	0.9842	1.3188

Source: SPSS Version 26.

Both variables, "Affect" and "Cognition", are statistically significant given that the calculated t-statistic is **higher** than the critical t-value.

Table 2.2.: One Sample Statistics.

One-Sample Test				
	N	Mean	Std. Deviation	Std. Error Mean
Affect	200	4.4238	1.38486	0.09792
Cognition	200	5.1515	1.19957	0.08482

Source: SPSS Version 26.

The mean value for both variables is **superior** to 4 meaning both variables influence the purchase decision. The mean value for Cognition (5.1515) is **superior** to Affect's mean value (4.4238).

It can be concluded that Cognition influences online purchase decision more than Affect. **H1** is accepted.

3.5. Hypothesis H2 Testing

To test the second hypothesis stipulating "Online purchase experience is more influenced by Affect than by Cognition", Multiple Linear Regression will be conducted on the 200 respondents who have already purchased online, where the dependent variable is "purchase experience" and the independent variables are "affect" and "cognition".

3.5.1. Data Screening

First, regression assumptions must be verified:

3.5.1.1. Sample size

Since the equation includes two independent variables, the appropriate sample size should be at least $15 \times 2 = 30$.

This sample's size is 200>>>30. The assumption is verified; thus, the final equation is reliable.

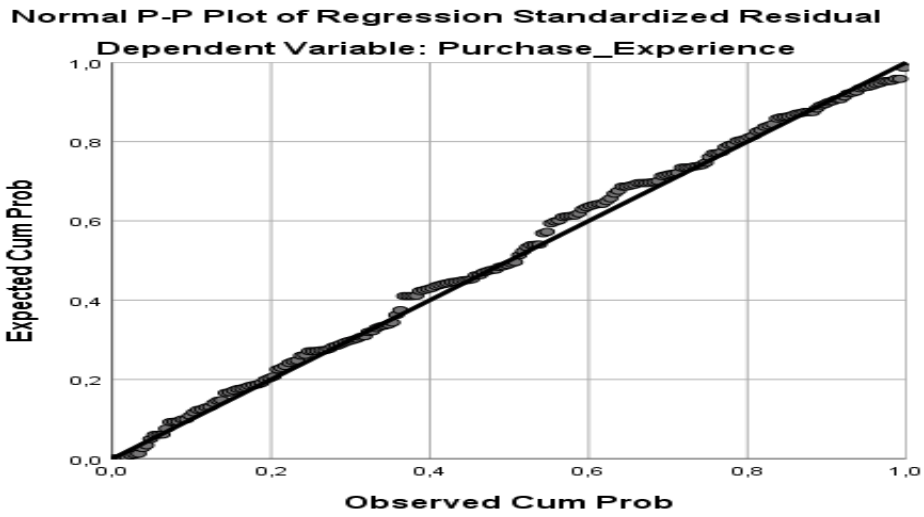
3.5.1.2. Outliers

To verify this assumption, MAH values must be compared to the chi-square value. All MAH values are **inferior** to the criterion value of chi-square of 13.82; outliers are inexistent in this data.

3.5.1.3. Normality of Residuals

All residuals are extremely close to the diagonal line, i.e. the residuals form a straight line. This indicates that the assumption of normality of residuals is checked.

Figure 2.6.: Residual Normality Test – H2.



Source: SPSS Version 26.

3.5.1.4. Autocorrelation

The calculated Durbin-Watson value is 1.920 which is **superior** to the Durbin-Watson upper criterion value of 1.789 and the Durbin-Watson lower criterion value of 1.748. Thus, the null hypothesis stipulating the existence of autocorrelation is rejected.

It can be concluded that respondents have answered the questionnaire independently from one another.

3.5.1.5. Multi-collinearity

Multi-collinearity refers to high correlations between independent variables.

The Tolerance statistic (tol = 0.998) is **superior** to 0.1 indicating the absence of multicollinearity. This phenomenon does not cause a problem in the study.

Table 2.3.: Coefficients, Tolerance – H2.

Model		Collinearity Statistics	
		Tolerance	VIF
1	(constant)	-	-
	Affect	0.998	1.002
	Cognition	0.998	1.002

Source: SPSS Version 26.

3.5.2 Interpretation of the Model

The overall model is significant given that the calculated Fisher value is 9.999 which is **superior** to the critical Fisher value of 3.04, which leads to rejecting the null hypothesis stipulating $r^2 = 0$.

Table 2.4.: ANOVA – H2.

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
1	32.678	2	16.339	9.999	0.000[b]
	321.917	197	1.634		
	354.595	199			
a. Dependent Variable: Purchase_Experience					
b. Predictors: (Constant), Cognition, Affect					

Source: SPSS Version 26.

3.5.3. Strength of the Association

The two independent variables, namely "Affect" and "Cognition" explain 8.3% of the variation of the dependent variable "Purchase Experience".

The adjusted r-square of this model is relatively low (8.3%).

Table 2.5.: Model Summary – H2.

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.304[a]	0.092	0.083	1.278	1.920
a. Predictors: (Constant), Cognition, Affect					
b. Dependent Variable: Purchase_Experience					

Source: SPSS Version 26.

3.5.4. Usefulness of the Model

For the model to be useful, the calculated Fisher value must be 4 to 5 times superior to the critical Fisher value.

$$\frac{\text{Calculated F}}{\text{Critical F}} = \frac{9{,}999}{3{,}09} = 3{,}289$$

Given that the calculated F is only 3.289 times bigger than the critical Fisher Value, this model is not useful.

3.5.5. Interpretation of the Parameters

Affect:

The associated t-test with this independent variable is significant; the calculated t value is 3.955 **higher** than the critical value. Therefore, "Affect" influences positively (β = 0.269) the dependent variable.

Cognition:

"Cognition" contributes to the explanation of the variation of the dependent variable. The parameter is statistically significant for the calculated t-statistic is 2.259, **higher** than the critical value. "Cognition" influences "Purchase Experience" positively (β = 0.154).

Table 2.6.: Coefficients – H2.

Coefficients[a]						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.179	0.504		6.310	0.000
	Affect	0.259	0.065	0.269	3.955	0.000
	Cognition	0.171	0.076	0.154	2.259	0.025
a. Dependent Variable: Purchase_Experience						

Source: SPSS Version 26.

3.5.6. Estimation Equation

Purchase Experience = 3.179 + 0.259 Affect + 0.171 Cognition

3.5.7 Hypothesis-testing Sum-Up

Although both variables contribute positively to the explanatory power of the model, “Affect” contributes more to the “Purchase Experience”.

Hence, the second hypothesis stipulating “Online purchase experience is more influenced by affect than by cognition” is accepted.

3.6. Hypothesis H3 Testing

To test out the third hypothesis stipulating “The overall platform design, ease of use, prices, and the variety of proposed products influence online purchase experience”, Multiple Linear Regression will be conducted on the 200 respondents who have already purchased online, where the dependent variable is “purchase experience” and the independent variables are the platform’s “design”, “ease of use”, “prices”, and “product variety”.

3.6.1. Data Screening

First, regression assumptions must be verified:

3.6.1.1. Sample size

Since the equation includes four independent variables, the appropriate sample size should be at least $15 \times 4 = 60$.

This sample’s size is 200>>>60. The assumption is verified; thus, the final equation is reliable.

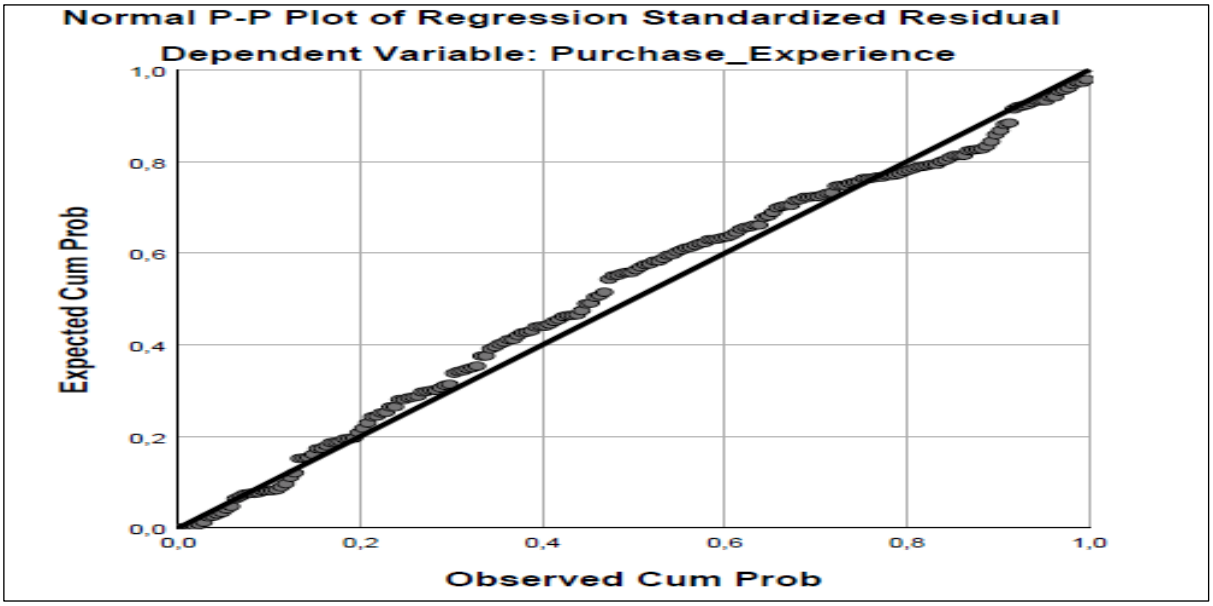
3.6.1.2. Outliers

To verify this assumption, MAH values must be compared to the chi-square value. All MAH values are inferior to the criterion value of chi-square of 18.47; outliers are inexistent in this data.

3.6.1.3. Normality of Residuals

The residuals form a straight line; all residuals are extremely close to the diagonal line. This indicates that the assumption of normality of residuals is checked.

Figure 2.7.: Residual Normality Test – H3.



Source: SPSS Version 26.

3.6.1.4. Autocorrelation

The calculated Durbin-Watson value is 1.988 which is superior to the Durbin-Watson upper criterion value of 1.809 and the Durbin-Watson lower criterion value of 1.728. Thus, the null hypothesis stipulating the existence of autocorrelation is rejected.

It can be concluded that respondents have answered the questionnaire independently from one another.

3.6.1.5. Multi-collinearity

Multi-collinearity refers to high correlations between independent variables.

The Tolerance statistics are superior to 0.1 indicating the absence of multicollinearity. This phenomenon does not cause a problem in the study.

Table 2.7.: Coefficients, Tolerance – H3.

Model		Collinearity Statistics	
		Tolerance	VIF
1	(constant)	-	-
	Design	0.723	1.382
	Ease	0.806	1.241
	Prices	0.998	1.002
	Variety	0.805	1.242

Source: SPSS Version 26.

3.6.2. Interpretation of the Model

The overall model is significant given that the calculated Fisher value is 11.877 which is superior to the critical Fisher value of 2.42, which leads to rejecting the null hypothesis stipulating $r^2 = 0$.

Table 2.8.: ANOVA – H3.

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
1	69.466	4	17.367	11.877	0.000[b]
	285.129	195	1.462		
	354.595	199			
a. Dependent Variable: Purchase_Experience					
b. Predictors: (Constant), Variety, Prices, Ease, Design					

Source: SPSS Version 26.

3.6.3. Strength of the Association

The four independent variables, namely “Design”, “Ease”, “Price”, and “Variety” explain 17.9% of the variation of the dependent variable “Purchase Experience”.

The adjusted r-square of this model is relatively low (17.9%).

Table 2.9.: Model Summary – H3.

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.443[a]	0.196	0.179	1.209	1.988
a. Predictors: (Constant), Variety, Prices, Ease, Design					
b. Dependent Variable: Purchase_Experience					

Source: SPSS Version 26.

3.6.4. Usefulness of the Model

For the model to be useful, the calculated Fisher value must be 4 to 5 times superior to the critical Fisher value.

$$\frac{\text{Calculated F}}{\text{Critical F}} = \frac{11.877}{2.42} = 4.91$$

Given that the calculated F is approximately 5 times bigger than the critical Fisher Value, this model is judged useful.

3.6.5. Interpretation of the Parameter

Design:

The associated t-test with this independent variable is significant; the calculated t value is 5.214 **higher** than the critical value. Therefore, "Design" influences positively ($\beta = 0.394$) the dependent variable.

Ease, Variety:

The independent variables "Ease" and "Variety" have a positive impact on the dependent variable ($\beta = 0.079$ and $\beta = 0.015$ respectively). But they are not significant at a 5% significance level. So, they basically do not have a significant impact on the dependent variable.

Prices:

"Prices" impacts negatively the "Purchase Experience" (β = -0.039). The associated t-test with this independent variable is not significant.

Table 2.10.: Coefficients – H3.

Coefficients[a]						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.794	0.559		4.995	0.000
	Design	0.388	0.079	0.394	5.214	0.000
	Ease	0.090	0.081	0.079	1.111	0.268
	Prices	-0.031	0.060	-0.034	-0.522	0.602
	Variety	0.013	0.062	0.015	0.213	0.832
a. Dependent Variable: Purchase_Experience						

Source: SPSS Version 26.

3.6.6. Estimation Equation

Purchase Experience = 2.794 + 0.388 Design + 0.090 Ease – 0.031 Price + 0.13 Variety

3.6.7. Hypothesis-testing Sum-up

It can be concluded that the platform's design impact the purchase experience. We do not have enough data to conclude whether the rest of the variables; ease of use, prices, and the variety of products impact the online purchase experience.

CONCLUSION

To conclude, the empirical research has enabled us to answer the research questions by testing out the hypotheses.

Using one-sample t-test and multiple linear regression to analyze the collected data has given us insight into consumers' online decision-making mechanisms as well as factors influencing purchase decisions and purchase behavior.

Online buying decisions are more influenced by the consumers' cognitive processes whereas their purchasing experience is more influenced by affect. The research data has also shown that purchase experience is influenced by the platform's design.

GENERAL CONCLUSION

The study of consumer decision-making and behavior has been the center of most marketing-related research. This dynamic field has combined, over the years, various techniques and methods to reach better findings every time. Research on consumer decision-making has combined the fields of marketing, psychology, and neuroscience.

Consumer behavior is the result of the interaction between affect and cognition. Many researchers have examined this interaction in an in-store context. Baba Shiv's work has led to the conclusion that limiting processing resources in a shopping environment leads to more impulsive actions, meaning that affect takes control over customers' behavior. In an online context, it is hard to restrain these processing resources in addition to the products being presented symbolically, diminishing thereby the possible emotional link with the product. Online shoppers are more likely to take time before making their purchase decision and they might look for different information about the product.

The present research has allowed us to understand the concepts of affect, cognition, and decision-making and the brain processes behind them. Research suggest that affective processes are usually the predictors of behavior and occur either dependently or independently from cognitive processes. The somatic marker hypothesis assessed the role of emotions in decision-making. using fMRI, it has been proved that the amygdala and the ventromedial prefrontal cortex are the main brain regions responsible for affective processes.

Cognition has been the main subject of study in decision-making, researchers have mainly focused on the cognitive component for decades. Bottom-up & Top-down processing are key concepts to understand cognition besides perception, memory, and attention in addition to serial and parallel processing. Neurocognitive studies suggest that the hippocampus, the basal ganglia, and the cerebellum are the regions of the brain responsible for cognitive processes.

Finally, the concept of decision-making was explained highlighting its most used theories, and how years of research have led to the current understanding of decision-making. the consumer decision-making process is composed of three steps namely: problem recognition, information search, alternative evaluation, purchase decision, and post purchase evaluation.

Online decision-making differs from offline decision-making in that this interaction is different from another; different affective and cognitive stimuli lead to different affective and cognitive responses, thus, leading to different decisions and behavior.

The empirical research aimed at testing the research hypotheses. The first hypothesis stipulates “Online purchase decision is more influenced by cognition than by affect”. One sample t-test was conducted to test the significance of the variables “Affect” and “Cognition”. Both contributed to online purchase decisions but “Cognition” had a more important impact on online decisions.

The second hypothesis stipulates that “Online purchase experience is more influenced by affect than by cognition”. The hypothesis was tested using multiple regression analysis where the independent variables were “Affect” and “Cognition” and “Purchase Experience” being the dependent variable. From the test it was concluded that both variables had an influence on the purchase experience, although affect had a bigger influence ($\beta = 0.269$). The second hypothesis was confirmed.

The last hypothesis stipulates “The overall platform design, ease of use, prices, and the variety of proposed products influence online purchase experience”. Multiple regression analysis was conducted to test out this hypothesis where the dependent variable was “purchase experience” and the independent variables were the platform’s “design”, “ease of use”, “prices”, and “product variety”. The overall model was judged significant and useful. Only the variable “Design” was significant at a 5% level of significance, the other three variables were NOT significant. It was concluded that the platform’s design impacted the purchase experience. Further research is needed to conclude whether the rest of the variables impact the online purchasing experience or not.

The research sub-questions were answered with the empirical research. The first sub-question (Does cognition influence online purchase decisions more than affect?) was answered by testing out the second hypothesis: cognition influences online purchase decisions more than affect.

The answer to the second research sub-question (What platform-related factors influence online buying experience?) was concluded from the third hypothesis: the platform’s design influences online buying experience. More research is needed to determine the influence of other factors.

The third research sub-question (Is online buying experience influenced more by affect?) was answered by testing the second hypothesis: the online buying experience is more influenced by affect than by cognition.

This study aimed at uncovering different affective and cognitive processes and their origins to better understand how consumers make their choices and then adapt marketing efforts accordingly.

From the empirical research, we can conclude that the online buying experience is more influenced by affect since it's mostly influenced by the platform's design. Whereas, online buying decision is more influenced by cognition.

The research objective, which was to determine the interaction between affect and cognition in online decision-making, was achieved.

We were also able to understand the concepts of "affect", "cognition", and "decision-making" and uncover the processes and the brain mechanisms underlying these processes.

Further research is needed to determine to which extinct the online shopping platform's ease of use, prices, and the variety of proposed products influence the online purchase experience.

To follow up on this research, neuromarketing tools can be used to eliminate biases and provide better and more precise data on online decision-making processes and its influencers. Techniques such as **EEG** (electroencephalogram) and **fMRI** (functional magnetic resonance imaging) can help identify which brain regions are more active during online shopping, which stimuli impact which regions and to which extent, then link these regions to affective and cognitive processes. Research can also focus on identifying the affective stimuli that can greatly influence online purchasing decisions and experiences, the same goes for cognitive stimuli.

From the collected data, it is recommended for online shopping platforms to try to increase affective aspects of the platform such as the design, its ease of use, colors...etc. to convey as much emotional value as possible. It is also recommended to make the platforms use as easy as it can possibly be by reducing purchasing and checkout steps and presenting all the information needed to make the purchase decision.

There are, therefore, some limitations to this research. First, the sample is not representative since the method used is a non-probability method due to time and budget limitations and also, most respondents are students. The second limitation consists in that the research relies on self-reported data which is subject to various biases. Also, decision-making is a subconscious process and the questionnaire measures conscious data which is usually different from the subconscious processes.

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Appendix 01: The Host Company's Logo

Appendix 02: The Questionnaire

Before we begin, please choose the language you're most comfortable with.

Avant de commencer, veuillez choisir la langue avec laquelle vous êtes le plus à l'aise.

قبل البدأ، يرجى اختيار اللغة التي تريحك الأكثر.

- English
- Français
- العربية

Appendix 02.1: The Questionnaire – English Version

Dear participants,

For the purpose of completing my Master's Thesis at the Higher School of Commerce, I'm inviting you to participate in this research by completing the following survey. Kindly respond frankly to the questions.

Please note that the survey is completely anonymous and no personal data will be collected nor shared.

Section 01:

1. Have you ever purchased something online?
   - Yes
   - No
2. What did you buy?.....
3. Which platform do you use the most for your online purchases?
   - Jumia
   - Neqdilek
   - Haylla
   - Goubba
   - Foorshop
   - Batolis
   - Algerie Store
   - Other:…….
4. Rate your overall experience of your online purchase.

Not Satisfied	1	2	3	4	5	6	7	Satisfied
	○	○	○	○	○	○	○	

5. Rate the overall design of the platform

Bad	1	2	3	4	5	6	7	Good
	○	○	○	○	○	○	○	

6. How easy was it to use the platform?

	1	2	3	4	5	6	7	
Not Easy	○	○	○	○	○	○	○	Easy

7. How would you rate the prices offered by the platform?

	1	2	3	4	5	6	7	
Cheap	○	○	○	○	○	○	○	Expensive

8. How would you rate the variety of the products available?

	1	2	3	4	5	6	7	
Non-Varied Products	○	○	○	○	○	○	○	Varied Products

Section 02:

Remember one of your online purchases, on a scale of 1 to 7, to which extent do you agree with the following statements?

1. I felt an impulse to buy it.

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

2. I have checked different platforms offering the same product before deciding from which to buy.

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

3. I bought the product out of necessity.

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

4. I bought the product for my pleasure.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

5. I took my time to search for information on the product (attributes, use, effectiveness...etc.).

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

6. I bought the product because it was attractive.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

7. I checked other people's evaluations of the product.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

8. I felt a certain emotional attachment to the product.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

9. I take time deciding before purchasing online.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

10. I carefully chose the product that I bought.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
	○	○	○	○	○	○	○	

11. I take more time deciding when buying online than buying in-store.

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

Section 03:

1. What is your gender?
   - Male
   - Female
2. What is your age group?
   - <18
   - 18 – 25
   - 26 – 50
   - 51 – 60
   - >60
3. What is your employment status?
   - A student
   - Unemployed
   - Full-time employed
   - Part-time employed
   - Freelancer
   - Other:……..

Appendix 02.2: The Questionnaire – French Version

Chers participants,

Dans le cadre de la réalisation de mon mémoire de fin d'étude à l'École Supérieure de Commerce (ESC), je vous invite à participer à ma recherche en répondant au sondage suivant.

Veuillez noter que cette enquête est totalement anonyme et qu'aucune donnée personnelle ne sera collectée ni partagée.

Section 01 :

1. Avez-vous déjà acheté quelque chose en ligne ?
   - Oui
   - Non
2. Qu'avez-vous acheté?.....
3. Quelle plateforme utilisez-vous le plus pour vos achats en ligne ?
   - Jumia
   - Neqdilek
   - Haylla
   - Goubba
   - Foorshop
   - Batolis
   - Algerie Store
   - Autre:…….
4. Évaluez votre expérience globale de votre achat en ligne.

Insatisfait	1	2	3	4	5	6	7	Satisfait
	○	○	○	○	○	○	○	

5. Évaluez le design global de la plateforme.

Mauvais	1	2	3	4	5	6	7	Bon
	○	○	○	○	○	○	○	

6. A quel point il a été facile d'utiliser la plateforme ?

	1	2	3	4	5	6	7	
Pas Facile	○	○	○	○	○	○	○	Facile

7. Comment évaluez-vous les prix proposés par la plateforme ?

	1	2	3	4	5	6	7	
Pas Chers	○	○	○	○	○	○	○	Chers

8. Comment évaluez-vous la variété des produits disponibles ?

	1	2	3	4	5	6	7	
Produits Non Variés	○	○	○	○	○	○	○	Produits Variés

Section 02 :

Rappelez-vous de l'un de vos achats en ligne, sur une échelle de 1 à 7, à quel degré êtes-vous d'accord avec les affirmations suivantes ?

1. J'ai acheté le produit sans trop réfléchir.

	1	2	3	4	5	6	7	
Pas du Tout D’accord	○	○	○	○	○	○	○	Tout à Fait D'accord

2. J'ai vérifié différentes plateformes proposant le même produit avant de décider sur laquelle acheter.

	1	2	3	4	5	6	7	
Pas du Tout D’accord	○	○	○	○	○	○	○	Tout à Fait D'accord

3. J'ai acheté le produit par nécessité.

	1	2	3	4	5	6	7	
Pas du Tout D’accord	○	○	○	○	○	○	○	Tout à Fait D'accord

4. J'ai acheté le produit pour me faire plaisir.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

5. J'ai pris mon temps pour rechercher des informations sur le produit (attributs, usage, efficacité...etc.).

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

6. J'ai acheté le produit parce qu'il était attrayant.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

7. J'ai vérifié les évaluations d'autres personnes sur le produit.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

8. J'ai ressenti un certain attachement émotionnel au produit.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

9. Je prends mon temps pour décider avant d'acheter en ligne.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

10. J'ai choisi avec soin le produit que j'ai acheté.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

11. Je prends plus de temps à décider avant d'acheter en ligne qu'à acheter en magasin.

	1	2	3	4	5	6	7	
Pas du Tout D'accord	○	○	○	○	○	○	○	Tout à Fait D'accord

Section 03 :

1. Êtes-vous un Homme ou une Femme ?
   - Homme
   - Femme
2. Quel âge avez-vous ?
   - <18
   - 18 – 25
   - 26 – 50
   - 51 – 60
   - >60
3. Quel est votre statut professionnel?
   - Etudiant
   - Sans emploi
   - Employé à temps plein
   - Employé à temps partiel
   - Freelancer / Indépendant
   - Autre :……

Appendix 02.3: The Questionnaire – Arabic Version

أعزائي المشاركون،

لغرض إكمال مذكرة الماستر الخاصة بي، في المدرسة العليا للتجارة، أدعوكم للمشاركة في هذا البحث من خلال استكمال الاستبيان التالي.

ملاحظة: إن الاستبيان مجهول الهوية تمامًا ولن يتم جمع أي بيانات شخصية أو مشاركتها.

1. هل سبق لك أن اشتريت منتجا عبر الإنترنت؟
   - نعم
   - لا
2. ماذا اشتريت؟.....
3. ما هي المنصة الذي تستخدمها على الأكثر لعمليات الشراء عبر الإنترنت؟
   - Jumia
   - Neqdilek
   - Haylla
   - Goubba
   - Foorshop
   - Batolis
   - Algerie Store
   - غير:.....
4. قيم تجربتك الإجمالية لعملية الشراء عبر الإنترنت.

	1	2	3	4	5	6	7	
غير راضي	○	○	○	○	○	○	○	راضي

5. قيم التصميم العام للمنصة.

	1	2	3	4	5	6	7	
سيء	○	○	○	○	○	○	○	جيد

6. ما مدى سهولة استخدام المنصة؟

	1	2	3	4	5	6	7	
غير سهل	○	○	○	○	○	○	○	سهل

7. كيف تقيم الأسعار التي تقدمها المنصة؟

	1	2	3	4	5	6	7	
سعر غالي	○	○	○	○	○	○	○	سعر رخيص

8. كيف تقيم تنوع المنتجات المتاحة؟

	1	2	3	4	5	6	7	
متنوعة	○	○	○	○	○	○	○	غير متنوعة

Section 02 :

1. شعرت برغبة دافعة لشرائه.

	1	2	3	4	5	6	7	
موافق	○	○	○	○	○	○	○	غير موافق

2. راجعت مختلف المنصات التي تقدم نفس المنتج قبل أن أقرر من أيها أشتري.

	1	2	3	4	5	6	7	
موافق	○	○	○	○	○	○	○	غير موافق

3. اشتريت المنتج بدافع الضرورة.

	1	2	3	4	5	6	7	
موافق	○	○	○	○	○	○	○	غير موافق

4. اشتريت المنتج من أجل متعتي.

	1	2	3	4	5	6	7	
موافق	○	○	○	○	○	○	○	غير موافق

5. أخذت وقتي في البحث عن معلومات عن المنتج (الصفات ، الاستخدامات ، الفعالية ... إلخ).

	1	2	3	4	5	6	7	
موافق	○	○	○	○	○	○	○	غير موافق

6. اشتريت المنتج لجاذبيته.

	1	2	3	4	5	6	7	
غير موافق	○	○	○	○	○	○	○	موافق

7. راجعت تقييمات الآخرين للمنتج.

	1	2	3	4	5	6	7	
غير موافق	○	○	○	○	○	○	○	موافق

8. شعرت ببعض الارتباط العاطفي بالمنتج.

	1	2	3	4	5	6	7	
غير موافق	○	○	○	○	○	○	○	موافق

9. أستغرق وقتًا في اتخاذ القرار قبل الشراء عبر الإنترنت.

	1	2	3	4	5	6	7	
غير موافق	○	○	○	○	○	○	○	موافق

10. اخترت بعناية المنتج الذي اشتريته.

	1	2	3	4	5	6	7	
غير موافق	○	○	○	○	○	○	○	موافق

11. أستغرق وقتًا أطول في اتخاذ القرار عند الشراء عبر الإنترنت مقارنة بالشراء في المتجر.

	1	2	3	4	5	6	7	
غير موافق	○	○	○	○	○	○	○	موافق

Section 03 :

1. هل أنت ...؟
   - ذكر
   - أنثى
2. ما هي فئتك العمرية؟
   - < 18
   - 25 – 18
   - 50 – 26
   - 60 – 51
   - 60<
3. ما هو الوضع الوظيفي الخاص بك؟
   - طالب
   - عاطل عن العمل
   - عامل - دوام كامل
   - عامل - دوام جزئي
   - مستقل / Freelancer
   - غير:.....

Abstract
This thesis aims at uncovering the mechanisms of the interaction between affect and cognition in consumers' online decision-making. Customers shifting their preferences toward online shopping has resulted in changes in their decision mechanisms, consequently, resulting in a change in their behavior. Research has demonstrated that affect plays a more important role in consumers' decisions due to the environmental stimuli in an offline context. Online, consumers are no longer driven by stimuli presented in the physical environment. Understanding the changes in affective and cognitive processes online is highly beneficial to marketers. Knowing how the brain processes information to translate it into behavior helps marketers achieve more knowledge in their consumer research. Marketing actions will then be built so that they target the mechanism more responsible for online decisions and help increase the impact of the other.

Keywords: affect, cognition, decision-making, neuromarketing, consumer behavior.

ملخص
تهدف هذه الأطروحة إلى الكشف عن آليات التفاعل بين المشاعر والإدراك في عملية اتخاذ القرار لدى المستهلكين، عبر الإنترنت. أدى تغير تفضيلات المستهلكين نحو التسوق عبر الإنترنت إلى تغييرات في آليات اتخاذ القرار، مما أدى إلى تغيير في سلوكياتهم. أظهرت الأبحاث أن المشاعر تلعب الدور الأكثر أهمية في قرارات المستهلكين بسبب المحفزات البيئية. عبر الإنترنت، لم يعد المستهلكون مدفوعين بالمحفزات المقدمة في البيئة المادية. فهم التغييرات في العمليات العاطفية والمعرفية عبر الإنترنت للمسوقين بالغ الأهمية. إن معرفة كيفية معالجة الدماغ للمعلومات لترجمتها إلى سلوك يساعد المسوقين على تحقيق المزيد من المعرفة في أبحاثهم في سلوك المستهلك. سيتم بعد ذلك بناء إجراءات التسويق بحيث تستهدف الآلية المسؤولة بشكل أكبر عن القرارات عبر الإنترنت وتساعد على زيادة تأثير المحفز الآخر.

الكلمات المفتاحية: المشاعر، الإدراك، اتخاذ القرار، التسويق العصبي، سلوك المستهلك.

Résumé
Ce mémoire vise à découvrir les mécanismes de l'interaction entre l'affect et la cognition dans la prise de décision en ligne des consommateurs. Le changement des préférences des consommateurs vers l'achat en ligne a entraîné un changement dans leurs mécanismes de prise de décision et leurs comportements par la suite. Les recherches ont démontré que l'affect joue un rôle plus important dans les décisions des consommateurs, dans un contexte réel, en raison des stimuli environnementaux. En ligne, les consommateurs ne sont plus guidés par les stimuli présentés dans l'environnement physique. Comprendre les changements dans les processus affectifs et cognitifs en ligne est très bénéfique pour les marketeurs. Savoir comment le cerveau traite l'information pour la traduire en comportement aide les spécialistes du marketing à acquérir plus de connaissances dans leurs recherches sur les consommateurs. Des actions marketing seront alors construites afin qu'elles ciblent le mécanisme le plus responsable des décisions en ligne et contribuent à augmenter l'impact de l'autre.

Mots clés : affect, cognition, prise de décision, neuromarketing, comportement du consommateur.