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The Neuroscience Behind Retail Therapy

Kellie Burke

THE NEUROSCIENCE BEHIND RETAIL THERAPY

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Kellie Burke

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TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

Imagine, it's Monday morning and you are slowly waking up; still groggy, but somehow feeling much more refreshed than usual. You roll over in your warm, cozy bed to check the time and your stomach drops—you're already fifteen minutes late to class. You fly out of bed and race out to your car, not even bothering to change out of your pajamas or take a shower. Upon arriving to class, you realize that the homework assignment that was due today is sitting on your desk in your bedroom, and your professor does not accept late work. You settle into your usual seat, and the stress-induced knot in your stomach tightens as you think about how the rest of your day could possibly get any worse.

On your drive home, you pass by a Target. Instead of going home and eating a carton of ice cream to ease your stress, as you had originally planned on doing, you decide to turn your car into the parking lot. You feel a little rush of unexplainable, yet familiar, excitement that greets at you along with the cool air that wafts from the air conditioning vents above the automatic sliding door, saving you from the heat of the warm sun outside. You point your steps in the direction of the shoe section, walking past numerous displays and promotions. The shoe section is full of multiple racks, each shelf cradling various types of shoes—high heels, sandals; you name it. Still thinking about the horrific morning you are still recovering from, you find yourself eyeing a pair of snow boots; they're on sale! Two tall, black fuzzy shoes rest, almost helplessly, in their cardboard shoebox, supplicating to be saved from the confining coffin, and longing to be worn. It's 75 degrees outside, and you debate whether or not you should spend the money now and purchase these tempting boots—but that

won't stop you from trying them on. Low and behold, they fit you perfectly and since they are on sale anyway, you decide to buy them. The knot in your stomach begins to loosen, and you find yourself smiling as you happily make your way toward the checkout counter, pleased with your cute new boots and far less stressed than you were before entering the store.

Retail therapy, according to the Oxford English Dictionary, is "the practice of shopping in order to make oneself feel more cheerful," or rather, shopping with the intended goal of improving one's mood. Studies have indicated that negative mood can have dramatic influences on spending habits (Lerner, Small, & Loewenstein, 2004; Garg & Lerner, 2013) and purchasing goods can in turn have a positive affect on one's mood (Mick & DeMoss, 1990; Rick, Pereira, and Burson, 2013; Atalay & Meloy, 2011; Somer & Ruvio, 2014; Quartz & Asp, 2015). Much like eating in times of stress (Adams & Epel, 2007), retail therapy is the practice of a naturally rewarding behavior as an anxiolytic in an attempt to improve mood (Rick, Pereira, & Burson, 2014; Atalay & Meloy, 2011). In the case of retail therapy, the naturally rewarding behavior is social interaction (Song, Borland, Larkin, O'Malley, & Albers, 2016).

Pope Francis has diagnosed our current society as one of "extreme consumerism;" a society in which people are unable to resist what the market places before them. In such a culture, a sense of community is eroded; democracy is damaged as its citizens turn into mere customers; and it causes a spiritually deadening materialism (Pope Francis, 2015). Especially in the United States of America, where excess consumption of material goods and experiences are inescapable, and a sense of fleeting happiness is shoved in our faces; through

television commercials, billboards, brands, etc. The United States economy seems to operate on a single principle stating when people spend money, the economy grows. Politicians and economists in the past have considered a high gross domestic product (GDP) to imply prosperity, as the United States has notably one of the highest GDP evaluations in the world (IMF, 2017). In 2015, consumer spending generated greater than two-thirds of U.S. GDP and has accounted for 1.5 percentage points of the 2.0 percentage-point average growth in GDP over the past five years (Scopelliti, 2016).

According to a theory presented by Sheth, Newman, and Gross (1991), there are five concrete values that influence consumer choice regarding their purchase decisions. These values include an object's functional value, conditional value, social value, emotional value, and epistemic value. These values influence our decisions independently to either buy, or not buy a particular object, type, or brand. The functional value relates to the object's physical functionality; conditional value implies the object's utility is situational; social value describes objects that are clearly visible (i.e. clothing) or that can be shared; emotional value relates to the object's ability to evoke emotion; and finally, the epistemic value of an object is the potential to elicit curiosity or provide novelty to the consumer. Each of these values, in turn, act as motivators for one of three proposed "consumer machines," or drives, that work in conjunction with one another within each individual consumer's neurodynamic mind (Quartz & Asp, 2015). First, is the survival drive toward consumerism; second, the habitual drive; and third, the pleasure-seeking drive. As this thesis is entitled *The Neuroscience Behind Retail Therapy*, I will be focusing specifically on the emotional and social motivators proposed by Sheth et al. (1991),

and the implications these values have on the pleasure seeking drive suggested by Quartz & Asp (2015). I will also mainly be focusing on the impact these values and drive have on an individual's clothing choices.

Research has shown that consumer behavior, much like all other human behavioral endeavors, is an unmistakable drive to achieve a specific goal (Wallance & Etkin, 2018; Fitoussi et al., 2018). In the case of retail therapy, the goal itself can be the positive affect one receives while shopping, or positive affect can be a consequence of resulting from the related goal of shopping; Baumgartner and Pieters (2008) consider the former *affect-as-goal,* and the latter, *affect-as-motivation.* Goals, in this context, can be considered internal representations of desirable states that people strive to attain, and undesirable states of which they try to avoid (Baumgartner & Pieters, 2008). Negative emotions have been observed to have dramatic effects on an individual's spending habits (Lerner et al., 2004; Garg & Lerner, 2013); the actual purchasing of material goods has also been observed as an attempt to improve mood (Yurchinsin, Yan, Watchravesringkan, & Chen, 2006; Mick & DeMoss, 1990; Rick, Pereira, and Burson, 2013; Atalay & Meloy, 2011; Somer & Ruvio, 2014; Quartz & Asp, 2015). Sheth et al. (1991) defines emotional value as "the perceived utility acquired from an alternative's capacity to arouse feelings of affective states." For example, if one were purchasing a new home, a sense of personal and familial security would be an emotional value that would elicit consumer behavior. The sense of security one receives while buying the house would either be an *affect-as-goal* scenario, or *affect-as-motivation* especially if the individual

were pressured by feelings of insecurity in relation to their current home; in either scenario, affect is intimately linked to consumer choice.

Consumption choices are also influenced by social value, as our clothing choices serve as rapid insight to onlookers and provide a general idea of who we are and how we behave to others (Howlett, Pine, Orakçıoğlu, & Fletcher, 2013). Sheth et al. (1991) maintain social value is acquired through associations with positively or negatively stereotyped demographic, socioeconomic, and cultural-ethic groups; social value is measured on a profile of choice imagery. In other words, the social gratification one is attempting to receive while shopping is belonging. Hyman (1960) suggests that individual behavior, as well as retail purchases that are clearly visible (Escalas & Bettman, 2005; Berger & Heath, 2007), are influenced by group membership and inclusion. Human beings are fundamentally motivated by a need to belong and frequently seek positive interactions within the context of building relationships (Baumeister & Leary, 1995), a function mediated by the hormone oxytocin. Oxytocin has also been observed to impact the mesocortical dopaminergic pathway, also known as the reward pathway (Love, 2014); oxytocin also seems to be an imperative reason as to why socially indulging behaviors (such as expressing oneself thorough clothing choices that are received well by peers) are so rewarding (Song, Borland, Larkin, O'Malley, & Albers, 2016). Activation of the reward pathway has also been linked to positive affect (Zhang, Chang, Guo, Zhang, & Wang, 2013; Corral-Frias, Nadel, Fellous, & Jacobs, 2016) implying why engaging in social behaviors may make us feel better after a stressful event in our lives.

The aim of this thesis is to explain the neurological structures and underlying circuitry motivating the consumption choices in an attempt to improve mood in times of stress or sadness. As retail therapy is not currently being researched in neuroscience and is not an established phenomenon in the literature of science yet, I will mainly be relying on the implications set forth by research on comfort eating in times of stress as well as art therapy and their relation to retail therapy. Since group belonging is such a strong, innate reward and social value is an intrinsic evaluator in terms of *what* we buy (i.e. clothing), affect is both the motivator of action (stress or sadness) as well as the desired goal (happiness) in the context of purchasing clothing as a form of retail therapy. I will attempt to elucidate the neurological underpinnings of retail therapy in such a way that convinces the reader that there is some truth to this concept through the plethora of research that currently exists in the realm of stress eating to explore the affect of stress on the reward pathway and vice versa. I will further be using current research related to using art to creatively express one's self and improve mood to ideally convince the reader and support the notion that creative expression of the self, through both art and socially-signaling clothing choices, are innately rewarding behaviors and thus may prove to have therapeutic benefits.

CHAPTER TWO: SOCIAL SIGNALING

Our Possessions

Our unique possessions, according to Belk (1998), serve to define and remind us who we are as an individual. Belk (1998) maintains that our possessions are our extended selves and if we define our possessions as "things" we call *"*ours*"*, we are implying that we are the sum of our possessions. To complicate this idea, research has also indicated that individuals tend to mimic others more so when they like another individual or group (Cheng & Chartrand, 2003; Chartrand & Bargh, 1999) or when they wish to be associated with another individual or group (Quartz & Asp, 2015; Yabar, Johnston, Miles & Peace, 2006). This behavior can also be observed in the clothing choices groups of individuals make in order to associate with one another. In this way, our possessions (ie our "go-to" clothing brand) serve not only as a reminder of who we are, but extend further to summarize our social identity as well.

In a study conducted by Chan, Berger, and van Boven (2012), researchers investigated the notion that brands often signal group identification and the hypothesis that affiliation motives drive preferences on consumer choice dimensions associated with desired social identities was explored. In the first portion of their experiment, Chan et al. (2012) took photos of what people from two distinct groups typically wore on a usual day and asked participants to address two key questions. First, they were asked to examine whether they could accurately guess which social group the individuals in the photos belonged; second, the researchers examined whether those same clothing choice identifiers also expressed uniqueness. Fifty-four

students were segregated into three groups, which are referred to as clubs: club A consisted of members that dressed in athletic or preppy attire, whereas club B members wore a more "hipster" or "alternative" style. Club C consisted of individuals that fell into neither group and was thus used as a control group. A second group of 63 students were recruited as 'observers' and were asked to identify members of either club A, B, or C based on the photographs presented. Chan et al. (2012) found not only were observers able to accurately categorize photographs into the correct club, but the differences in individual clothing choice also were viewed as a creative way to express uniqueness. In other words, clothing choices have the capacity to not only express which social grouping we belong to (i.e. preppy), but can also signal uniqueness in the sense that none of the clothing choices, however similar within a group, were identical.

Secondly, Chan et al. (2012) examined how various identity motives influenced different levels of consumer choice. One hundred and thirty-two students participated and were asked to identify either an in-group or out-group association, depending on condition. In the in-group [out-group] condition, participants were asked to write in the name of a specific "small, tightly knit social group that you [do not] belong to and [do not] feel a part of;" participants identified groups such as athletic teams, fraternities, sororities, etc. The desire to be associated with these groups was also measured on a scale of one to seven (1 = not at all; 7 = a great deal).

These participants then made choices in ten consumer categories that were familiar (ie cars, sunglasses, etc.). In each category they were asked which four options they preferred; two of the products were from one brand (brand A), and two

products were from another brand (brand B). Chan et al. (2012) found people in the out-group condition chose the reference-group-associated brand (brand A) less often than those in the in-group condition. Brands, in this case, were used as signals of identity and the choice of brand was clearly driven by desires to signal social identity. This research illustrates that people do indeed integrate identity motives through consumer choice as a way to express group belonging.

Shopping as a Learned Social Belonging Cue

Human beings have evolved in such a way that allows them to contribute to their group in various ways, such as cooperating and complying with group norms; evidence suggests that solidifying one's belonging to a particular social group is modulated by oxytocin (OXT) in the sense that positive social interaction leads to an increase in OXT (Carsten, De Dreu, & Kret, 2016). Although OXT has not been observed to have a direct casual effect on social behavior, social interaction deficits have been reversed through administration of the hormone OXT (Lee, Brady, Shapiro, Dorsa, & Koenig, 2005). OXT also has an important relationship with the ventral tegmental area (VTA) of the midbrain. Evidence suggests that OXT significantly enhances VTA activation in response to stimuli or cues that represent social interaction or behaviors (Groppe et al., 2013). This implies that our possessions, which are cues to social belonging, must also promote the release of OXT in the VTA, a structure that sends projections to a key area of learned rewards, known as the nucleus accumbens; thus shopping must be a social behavior and is

thus viewed by the brain as a cue to social bonding, which is naturally rewarding as implied by the impact of OXT on the VTA (Groppe et al., 2013).

Stephen Quartz and Anette Asp (2015) argue that the real goal of consumerism isn't materialistic at all—rather, consumerism may be driven by evolutionary need to belong to a group, and visible possession signaling through our consumer choices provide insight into who we are as individuals, both uniquely and in relation to a group (Chan et al., 2013). From a psychological standpoint, people present an obvious need to belong. Social animals, including humans, respond strongly to acceptance as a reward and rejection as punishment; this is because, according to evolutionary conclusions, social exclusion could mean exclusion from resources or protection (Aronson, 2012). The innate desire for social cooperation is observable among wild chimpanzees (Suchak et al., 2016), as are the negative consequences that result from the lack of learned social skills. In one observational study, researchers noted young chimpanzees separated from their mothers were often ostracized from the group and at the bottom of the social hierarchy (van Leeuwn, Mulenga, & Chidester, 2014). The response to and desire for a sense of belonging is a social phenomenon can even be observed cross-species in humans and chimpanzees (Marrus et al., 2011) indicating that social belonging is deeply ingrained in our ancestry.

It is important to note, however, that although human beings all have a powerful desire to engage in social actions with a group, we differ from chimpanzees in the sense that we do not necessarily all strive to belong to the same proximal group. This is clearly reflected in our material consumption options as well as

consumption choices. As human beings have evolved, our social interactions began to extend further than just our families or tribes, and we found other ways to socially signal who we are and what we believe through the objects we wear and possess, especially during adolescence (Piacentini & Mailer, 2004). For example, if an individual is an avid fan of the Denver Broncos, they may purchase more material goods that make this easily identifiable to an observer. These products (such as Broncos jerseys, mugs, hats, tickets, etc.) give a conscious signal to the onlooker that that individual, without question, is a fan of the Broncos.

The Medial Prefrontal Cortex

The key area of the brain that is considered to be associated with social categorization (in-group vs. out-group) is the medial prefrontal cortex (mPFC); when presented with in-group labels, activity in the mPFC is increased as compared to out-group labels (Molenberghs, & Morrison, 2012; Wang, Kessels, & Hu, 2014). Overall, the PFC sub-serves our highest-order cognitive abilities, including the decision to execute action. The PFC is responsible for inhibiting inappropriate actions and promoting task-relevant operations, while also allowing us to change and adapt our behavior to an unpredictable environment. The PFC is essential for goal-directed action selection, response activation and inhibition, performance monitoring, and reward-based learning (Szczepanski & Knight, 2014; Gonzalez et al., 2013). However, reward-based learning, specifically social reward-based learning, has been localized to the medial section of the PFC (van Kerkhof, Damsteegt, Trezza, Voorn, & Vanderschuren, 2013; mPFC demonstrated in Figure 1). This notable region in the

PFC has pathways that project to and receive information from the hippocampus, amygdala, ventral tegmental area, and nucleus accumbens, each of which will be discussed in depth throughout the remainder of this thesis.

Figure 1. Sagittal view of the Medial Prefrontal Cortex.

When one feels as though they belong to a group, evidence suggests that even under minimally connecting social circumstances, activation of the mPFC can be detected via fMRI (Molenberghs & Morrison, 2012; Mitchell, Macrae, & Banaji, 2006). This phenomenon is extremely obvious when celebrities are used to endorse certain products or come out with a clothing line, as the purchasing of said products would constitute as a form of behavioral mimicry. Research has suggested that celebrity endorsements have had observable, positive impacts on product purchase intention (Ahmed, Seedani, Ahuja, & Parvani, 2015; Adnan, Jan, Alam, 2017; Khan, 2017; Green, Griffith, Aruguete, Edman, & McCutcheon, 2014). The area that generates feelings of social connection in the mPFC is also active when one thinks about both the self and others (Hutcherson, Seppala, & Gross, 2014; Wagner, Haxby, &

Heatherton, 2012), and is also involved in emotional memory (Jin & Maren, 2015) and stress regulation (Kern et al., 2008). Interestingly, the mPFC is also activated when individuals view a product that they would hypothetically purchase (Quartz & Asp, 2015). These findings indicate that objects with social value serve as a clear in-group/out-group indicator that the mPFC is able to pick up on. This goes back to the brand clothing choices in the aforementioned Chan et al., (2012) study in which clothing choices had the capacity to serve as grouping cues which rapidly enabled social categorization (either "hipster," "preppy," or "other") from an onlooker. In other words, our clothing choices serve as a constant reminder that we belong to a group, and the purchase of more clothing during times of acute stress may feel like spending time with a friend after a tough day.

The mPFC is also responsible for mediating a reversible stress response that can be either adaptive or maladaptive (Wang, Perova, Arenkiel, & Li, 2014); the response behavior is elicited by projections to the brain stem as a means of survival (Warden et al., 2012), a structure indicated by Figure 2. The brain stem is responsible for basic autonomic functions and includes the midbrain, pons, and the medulla oblongata. The sorts of 'decisions' we tend to make regarding our stress-behavior response, along with other types of behavior, is a form of bottom-up processing that can take up to 10 seconds before the impulse reaches the neocortex, where we are given options for behavior (Soon, Brass, Heinze, & Haynes, 2008). Projections from the mPFC to the brain stem, specifically neurons located in the dorsal raphe nucleus (DRN), are also responsible for encoding reward, through 5-HT and glutamate (Liu, et al., 2014).

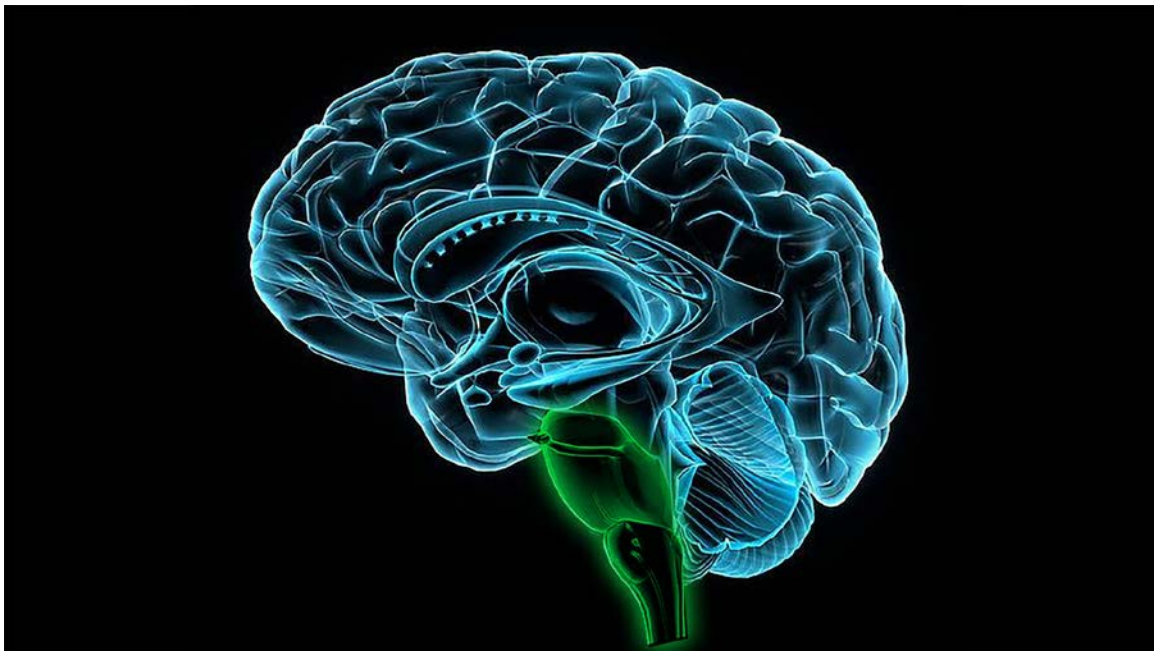

Figure 2. Sagittal view of the Brain Stem.

Behavioral Mimicry as "Social Glue"

Chartrand and Bargh (1999) conducted an experiment in which they tested and supported the hypothesis that the perception of another individual's behavior (be it body posture, mannerism, or facial expression) increases the tendency for the perceiver to behave in a similar manner; a behavioral process that also involves the mPFC (Yin, Ramsey, & de C. Hamilton, 2011). Chartrand and Bargh argue this interaction between the actor and another individual unconsciously mimicking the action creates a sort of 'social glue' based on empathy. This 'social glue' is what ultimately helps in solidifying our place within the group of which we wish to belong or solidify our sense of belonging. This idea is clearly reflected in our clothing choices, as implied by the results found by Chan et al., (2012) in which participants

often reported a stronger inclination toward brands representative of their self-proclaimed in-group.

In situations where individual distinctiveness is low (for example, when you are walking through a busy mall or participating in an experiement) people tend to want to acquire products that are distinctive more so than when an individual is in an environment of high distinctiveness, such as hanging out with your family (He, Cong, Liu, and Zhou, 2009). This is likely related to the notion that passive social interaction is more likely to be a positive experience among members of the same in-group (Aronson, 2012). Furthermore, low self-esteem, which can result from the a lack of social support (Chul-Ho & Ik-ki, 2016) has been observed by Yurchinsin *et al* (2006) to correlate strongly with increased consumer spending in an attempt in order to improve their mood by reaping the emotional benefit tied to feeling of social-belonging that the purchasing of in-group affiliated products provides.

Clothing items we deem as "our possessions" serve as an explicit indication of the social, as well as unique, self we choose to present to onlookers. Seeing as behavioral mimicry serves as a sort of social bonding adhesive, it is not surprising that unintentional mimicry of our peers, or other in-groups, can influence our clothing choices. These choices also serve as a reminder to the self, more specifically the mPFC, we do belong to a group, and the purchase of clothing during times of stress can be viewed by the mPFC as an adaptive coping strategy as shopping is a social belonging cue.

CHAPTER THREE: ADAPTIVE AND MALADAPTIVE RESPONSES TO STRESS

The Learned Idea of The Self

According to Albert Bandura, the psychologist who conducted the famed Bobo Doll Experiment, there are many pathways through life, and at any given period, people vary substantially in how successfully they manage their lives. The beliefs they hold about their capabilities to produce results by their actions are an influential personal resource as they negotiate their lives through the life cycle (Bandura, 1997, pp. 162). In other words, how an individual perceives his or her own capability for successfully performing an action is primarily based on the results of previous actions; when we are able to repeatedly predict what is going to happen after we complete an action, a sense of self develops (i.e. when I do this, this outcome proceeds). In order to develop this sense of self, however, three things must happen: one must perceive causal relations between events, understand causation through action, and be able to recognize oneself as the agent of the action; the sense of self is a learned idea. For example, imagine if a four-month-old baby were presented with a rattle. Initially, babies produce actions that affect their environment through flailing actions; the baby might kick the rattle through pure happenstance, and thus cause the rattle to make a sound. But as this baby begins to realize that they are the reason the rattle made a sound, he or she may test their sense of agency more playfully and pick up the rattle instead.

Bandura maintains actions that involve "manipulation of physical objects produce quick, recurrent, predictable, and easily observable effects" (Bandura, 1997). A causal set married to exploratory verification will produce an accelerated

development of personal agency. If the exploratory verification is rapid enough after the performed action, much like the rattle is for an infant, it is much easier to learn and feel the "rewarding benefits" that that particular behavior in that particular setting will (almost) always produce that same result. However, where we see individual divergence in what actions are performed by the unique individual as they grow stems from the differences individuals experience in their environment, the influence of an ever-changing society, as well as how life events shape neurodevelopment.

Impact of Stress

One environmental factor that greatly influences individual divergence in learned responses is stress, especially when one is faced with a potential gain or reward (Lewis, Porcelli, & Delgado, 2014). Stress also impacts our emotional memory (Wang, Wu, Zhu, Li, & Cai, 2012; van Ast et al*.,* 2013; Anagnostaras, Gale, & Fanselow, 2001), which can clearly be seen in the structural changes in the hippocampus (HPC), such as the decrease in structural volume, that occur as a result of prolonged exposure to hormones that are secreted during stress. Exposure to stress, and byproducts of stress hormones, contribute to a feeling of low energy, and in instances of chronic or prolonged exposure, depression can occur (Mills, Reiss, & Dombeck, 2008). Other biological changes, such as adverse effects on growth, development, or metabolism can occur as a result of the dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, the body's natural stress response negative feedback system regulated by the mPFC. Long lasting HPA changes can are

especially observed when prolonged stress occurs during developmental stages in early life (Kim, Pellman, & Kim, 2015; Hanson et al., 2015; Suri & Vaidya, 2015; Nicolaides, Kyratzi, Lamprokostopoulou, Chrousos, & Charmandari, 2015).

Limbic Structures and Coping Behavior

The HPC (Figure 3) sends projections to multiple structures, including the mPFC; this specific relationship may be responsible for retrieving target memories related to particular environmental cues as well as consolidating episodic memories (Gonzalez et al., 2013; Jin & Maren, 2015; Preston & Eichenbaum, 2013; Shimamura, Jurica, Mangels, Gershberg, & Knight, 1995). The recall of relevant memories retrieved via the hippocampal-mPFC circuit, also integrated with spatial memories, is key to establishing a prospective response strategy to stress (Seamans, Floresco, & Phillips, 1998). Much like the use of drugs that alleviate discomfort and directly activate the reward pathway (i.e. opioids), the strong reward one receives while actively partaking in the learned behavior as a reward cue, such as shopping, in turn reduces stress (Ulrich-Lai et al., 2010). In other words, because shopping is a learned reward in the sense that it is a cue for an innate reward, it activates the reward pathway and thus alleviates stress; using any behavior that is a learned reward as a coping mechanism, as is the case with retail therapy, that particular behavior can be either therapeutic or addictive, depending on whether it is a maladaptive response (addictive; i.e. HD), or an adaptive response (therapeutic; i.e. retail therpay) to external stressors.

Along with the HPC's role in contextual fear memory, the amygdala (AM) is also highly active during times of stress (Hanson et al., 2015). The basolateral nucleus of the AM (BLA), specifically, is involved in the permanent storage of conditioned fear (Gale et al., 2004) and has projections to both the mPFC and HPC (Yang & Wang, 2017; Akirav, & Maroun, 2007). The BLA sends glutamatergic projections to the HPC, which has been observed to be both necessary and sufficient for facilitating the direct up- or down-regulation of glucocorticoid receptors and memory-related genes in the HPC (Rei et al., 2015).

Figure 3. Sagittal view of the hippocampus (HPC).

Chronic stress would produce a prolonged down-regulation of memory-related genes in the HPC due to the up-regulation of glucocorticoid receptors which is overall what contributes to the dendritic retraction in the hippocampus that results in its decreased volume discussed above (Conrad, 2008). GABAergic interactions between the BLA and mPFC have also been observed to be imperative to fear memory expression (Stevenson, 2011). Disconnection studies have shown that

the disruption of top-down information transferred between the mPFC and BLA increased choice of the larger, riskier option, suggesting that this circuit facilitates the encoding of actions and outcomes to urges for riskier rewards, such as spending money on unnecessary things, as they become less beneficial (St. Onge, Stopper, Zahm, & Floresco, 2012). The projections from the BLA into the mPFC and HPC seem to be associated with coping behavioral responses to stress-inducing stimuli (Martijena, Rodriguez Manzanares, Lacerra, & Molina, 2002; Berretta, 2005).

Object Value

Behavioral addictions are one instance of individual maladaptive responses to stress that the American Psychological Association is slowly beginning to recognize. Behavioral addictions are now considered a valid category of psychiatric disorders, shown by their recent addition of pathological gambling in the DSM-5 section of 'Substance-Related and Addictive Disorders'. In the field of psychology, addiction is defined as:

> a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring any time in the same 12-month period: (1) Tolerance, as defined by either of the following: (a) A need for markedly increased amounts of the substance to achieve intoxication or the desired effect or (b) Markedly diminished effect with continued use of the same amount of the substance. (2) Withdrawal, as manifested by either of the following: (a) The characteristic withdrawal syndrome for the substance or (b) The same (or closely related)

> substance is taken to relieve or avoid withdrawal symptoms. (3) The substance is often taken in larger amounts or over a longer period than intended. (4) There is a persistent desire or unsuccessful efforts to cut down or control substance use. (5) A great deal of time is spent in activities necessary to obtain the substance (such as visiting multiple doctors or driving long distances), use the substance (for example, chain-smoking), or recover from its effects. (6) Important social, occupational, or recreational activities are given up or reduced because of substance use. (7) The substance use is continued despite knowledge of having a persistent physical or psychological problem that is likely to have been caused or exacerbated by the substance (for example, current cocaine use despite recognition of cocaine-induced depression or continued drinking despite recognition that an ulcer was made worse by alcohol consumption).

Where this unique branch of addiction begins to diverge from conventional behavior and other addictions is a "behavioral addiction" connotes a form of reinforcement that derives from the performance of a particular behavior itself; in other words, behavior performed for its own sake (Robbins & Clark, 2015). The inclusion of pathological gambling in the section regarding addictions could be an important step to understanding the underlying commonalities between other behavioral addictions that are currently dispersed throughout other sections of the DSM-5. This would include disorders such as 'feeding and eating disorders', and other impulsive-compulsive excessive behaviors such as excessive Internet usage, exercise, tanning or shopping, which are all examples of maladaptive behavioral responses.

Monterosso, Piray, and Luo (2012) reviewed key findings in the application of neuroeconomics in the same light as the study of addiction. These researchers discovered neuroeconomics centers around the topic of the neural representations of 'Value'; this idea of Value is synonymous with the term "decision utility" used in behavioral economics. In behavioral economics, the individual is seen as the "rational maximizer," or decision maker, of his or her interests in the objects "utility." However, in neuroeconomics, the term "Value" is applied to describe how rewarding, and thus motivating, a particular outcome or behavior is. The overwhelming majority of decisions your brain makes are fast, largely involuntary, and intimately linked to this idea of Value (Quartz & Asp, 2015; Itthipuripat, Cha, Rangsipat, & Serences, 2015; Berridge & Aldridge, 2008), which can fluctuate when compared to the mean Value of alternatives (Pais et al., 2013). If we place too much "Value" on an object or a behavior, it can lead to dire consequences, similar to an individual with an opioid addiction.

One great example of too much "Value" placed on objects is Hoarding Disorder (OCHD). The DSM-5 defines OCHD using the following criteria: "(1) persistent difficulty in discarding or parting with possessions, regardless of their actual value; (2) perceived need to save items and distress associated with discarding them, which results in (3) accumulation of possessions that clutter living areas and compromises their intended use" (Morris, Jaffee, Goodwin, & Franklin, 2015). Morris et al. (2015) also assert that nearly 2-6% of samples pulled from the adult community exhibit symptoms that align with the DSM-5's criteria for OCOC. If you have ever seen the show Hoarding: Buried Alive on TLC, it is clear to see the

distress and anxiety individuals with OCHD experience when all of their belongings with self-perceived value must be discarded in order for them to manage their psychological illness. The homes of individuals suffering from OCHD are often full, floor-to-ceiling, with anything and everything—boxes covered in dust, books that haven't been touched in years, old cassette tapes, instruction manuals for objects that have since been lost underneath mountains of other knick-knacks, food items, clothing, and shoes. While collecting and accumulating items may be typical behavior for children under the age of six, most individuals living with OCHD retrospectively state that these tendencies began between the age of eleven and fifteen (Morris et al., 2015).

Retail therapy, on the other hand, can be viewed as a socially adaptive response to external stressors. For the sake of clarity, I will define retail therapy as simply the use of socially rewarding behavior for the sake of improving one's current mood. Custers and Aarts (2005) maintain that the unconscious linking of behavioral states to positive affect will affect people's wanting to accomplish these states. This would imply that when one is feeling down, they might turn to a behavior they know will improve their mood, such as shopping as it is extremely socially rewarding. Thus, any known behavior can be considered mood-motivated if that specific behavior, or the behavior's outcome, has been attached to positive affect (Custers & Aarts, 2005). This phenomenon can also be seen in art therapy, as art also activates the reward circuitry (Lacey et al., 2010) and is also used as a form of stress-relief through self-expression (Curl, 2008; Abbott, Shanahan, & Neufeld, 2013). Merely the anticipation of reward (ie positive affect) that is linked to a particular behavior

influences motor-preparation and execution (ie going to the store with the hope of purchasing products that allow for creative self-experssion) (Pornpattananangkul & Nusslock, 2015).

Revisiting the example of an infant choosing to play with a rattle in a unique way in order to produce sound, both the behavior of manipulating their environment as well as the sound the rattle makes are encoded as a reward. In an example of an individual shopping, both the behavior of shopping and the anticipated social response are rewarding.

In October, I had the opportunity to interview Celeste Cole, a student at Regis University. Cole maintains that she experiences the rewarding capability of the behavior of shopping without the social benefits that accompany the actual purchasing of an object. Cole recounts an experience in which she had a day that she characterized as "tougher than usual" and decided to go to TJ Maxx, a stimulus-rich department store chain. She recalls filling up a metal shopping cart full of clothing, decorations for her home, among other things; however, after filling her cart, she decided against purchasing any of the items she had accumulated and left the store in order to save money. Cole admitted that the act of going into the store and going through the motions as if she were going to purchase her cart full of things was just as rewarding as actually buying them.

The ability to resist the urge to purchase all of these items is also a form of conditioned learning that requires top-down control in which an individual has the ability to predict the negative consequence that results when you spend a large sum of money. This top-down control is clearly outlined in our food intake (Volkow,

Wang, & Baler, 2011). It would appear, from the collected evidence presented by Volkow, Wang, and Baler (2011, pp. 43-44) that a large fraction of obese individuals exhibits an imbalance between an enhanced sensitivity of the reward circuitry and impaired function of the executive control circuitry that weakens inhibitory control over appetitive behaviors. Under the light of consumerism, however, there are only monetary indicators that would suggest impaired control of such behaviors.

Seeing as coping strategies are dependent on individual personalities (Carver, Scheier, & Weintraub, 1989), individuals who exhibit more restraint, or do not act prematurely in response to stress, tend to exhibit a negative correlation to addiction even though the outlet may be the same (ie Internet usage; Chou et al., 2015). Individuals that utilize the coping strategy of retail therapy exhibit restraint, as they often must first remove themselves from a stressful situation in order to partake in consumer activities. Thus, it can be concluded that although the acquisition of products can be addictive (as seen in individuals with OCHD) when used as a restraint coping mechanism, shopping can still activate the reward pathway to a non-addictive degree and thus be viewed as an adaptive stress response.

CHAPTER FOUR: STRESS, THE REWARD PATHWAY, AND THERAPEUTIC IMPLICATIONS

The Reward Pathway

Imagine it is 1954, at McGill University in Quebec, Canada, and researchers James Olds and Peter Milner are setting up their experiment. In this experiment, they have 15 male hooded rats and test each in an operant conditioning box (also called a "Skinner box" as the apparatus was designed by B.F. Skinner while he was still a graduate student at Harvard University). The box is an enclosed case that contains a bar or a key that an animal, in this case, a rat, can press or manipulate in order to obtain food, water, or electrical stimulation as a type of self-mediated reinforcement. Olds and Milner, using electrical stimulation as reinforcement, were not concerned with simply eliciting a behavior by means of stimulation as other researchers had been doing for a couple decades; rather, they were focused on the location of stimulation itself and neural implications it had served as reinforcement. In early stimulation studies focused on the regulation of emotional responsiveness, the septal nuclei were often a desired target for electrode stimulation. However, Olds and Milner found that this was not accurate and that the nucleus accumbens (NAc), located in the central portion of the forebrain (indicated by Figure 4) is the key area involved in the mesolimbic pathway, also referred to as the brain's reward pathway.

The reward pathway relies mainly on the transport of dopamine (DA) from the ventral tegmental area (VTA) to the NAc via its many connecting dopaminergic projections; it is crucial for the recognition of rewards in one's environment as well as initiating the behavior necessary to acquire said reward (Koob & Le Moal, 2008). The NAc is also involved in reward seeking, primarily a function attributed to the

multiple glutamatergic inputs received from the BLA, HPC, and mPFC (Stefanik & Kalivas, 2013; McFarland, Lapish, & Kalivas, 2003). The NAc is involved in optimal decision-making (Steele, Peterson, Marshall, Steubing, & Kirkpatrick, 2018; Jang et al., 2017). Under acute stress, HPC projections to the NAc become highly active (Lipski, Dibble, Rinamanm & Grace, 2017) and thus increase the excitability of the reward pathway (Shalev, Erb, & Shaham, 2010; Nevell et al., 2010; Pavlovsky et al., 2013; Adams & Epel, 2007).

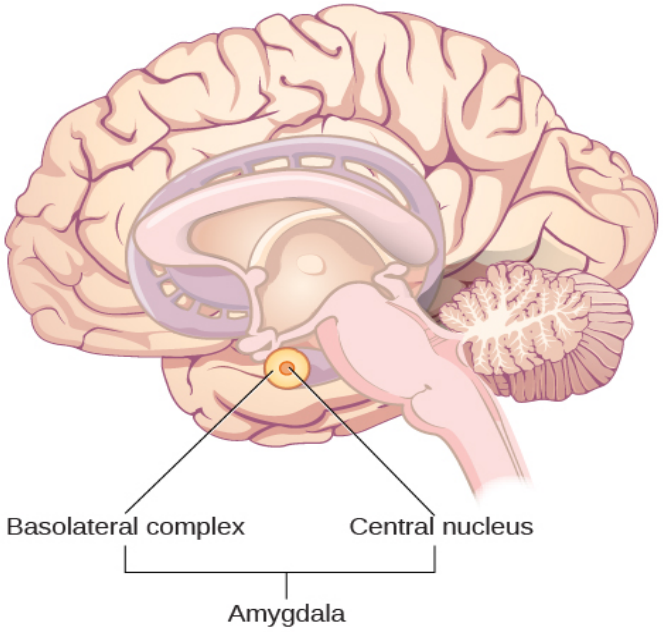

Figure 4. Sagittal view of the basolateral amygdala (BLA) in relation to the central nucleus.

Self Managing Stress

Throughout history, human beings have sought ways to self-manage and treat personal stress and enhance affect through behaviors that activate the reward pathway, exhibiting activities such as binge eating sweet-tasting foods (Pool, Brosch,

Delplanque, & Sandler, 2015), excessive running or exercising (Otsuka, Shiuchi, Chikahisa, Shimizu, & Sei, 2015), or spending money on seemingly unnecessary items (Lerner et al., 2004; Garg & Lerner, 2013)—just to name a few. Even non-conscious awareness of a saddened state can cause an individual to engage in certain behaviors to elicit a therapeutic emotional response. In a study conducted by Custers and Aarts (2005), the notion that the nonconscious operation of a behavioral goal can emerge if the representation of the specified behavioral state is associated with positive affect is strongly supported. Custers and Aarts (2005) performed an experiment that consisted of three consecutive tasks: an affective priming task, a mouse-clicking (filler) task, and a goal-relevant lottery task. In the affective priming task, participants were asked to evaluate priming adjectives as either “good” or “bad”. Ten blocks of adjectives were presented over 40 trials. In each block, five adjectives were related to socializing, another five adjectives were non-words; five positive words and five negative words were presented twice. A mouse-clicking task was then administered to assess conscious motivation. In this task, participants were asked to indicate on a nine-point response scale (1 meaning *not at all* and 10 meaning *absolutely)* whether they worked quickly on the priming task to ensure their participation in the lottery task. Custers and Aarts found that participants who had associated the lottery task with positive affect indeed worked faster on the mouse-clicking task. However, in order to set "happiness" as the behavioral end goal, an individual must first learn to associate that particular behavior or action with elated feelings.

Research suggests that stress increases an individual's willingness to spend money on unplanned gifts for oneself and the purchasing of self-gifts, as "retail therapy", reduces residual sadness (Rick, Pereira, & Burson, 2014; Atalay & Meloy, 2011). Additionally, a positive relationship was found by Yurchisin, Yan, Watchravesringkan, and Chen (2006) between self-reported increases in instances of consumer behavior and a negative emotional state, indicating that individuals do indeed tend to partake in the naturally rewarding behavior of shopping more-so when feeling down in order to improve mood. Stress also elicits more effort toward action when paired with reward-associated cues, even if the individual who exerted more effort did not describe the reward to be more pleasurable than it would otherwise have been under non-stressful conditions (Pool, Brosch, Delplanque, & Sander, 2015; Custers & Aarts, 2005). This is because the hormones released during stress lead to an up-regulation of the brain's reward circuitry (Shalev, Erb, & Shaham, 2010; Nevell et al., 2010; Pavlovsky et al., 2013; Adams & Epel, 2007). Stimulation of the pathway originating in the BLA and terminating in the NAc reinforces behavioral responding in order to earn additional stimulation of the reward pathway (Stuber et al., 2011). Natural rewards, such as eating or shopping, provide general mean to stress reduction, likely due to the mediating function of the BLA (Ulrich-Lai et al., 2010). Aversive (non-rewarding) stimuli, such as specific stressors, is also integrated and learned via the amalgamate dopaminergic projections from the VTA to the BLA (de Oliveria et al., 2011) thus indicating that the BLA is imperative to stress regulation, the reward pathway, and the relationship between them.

The Endocannabinoid System

In the PFC, the endocannabinoid system acts as fine-tuning system in response to aversive stimuli, and activation of endocannabinoid receptors in the mPFC promotes antidepressant and anxiolytic responses (McLaughlin, Hill, & Gorzalka, 2014) and is imperative to reward sensitivity (Rademacher & Hillard, 2007). Impairment of the endocannabinoid system has been observed to lead to development of anxiety disorders or depression implying that this system plays a role in the termination of glucocorticoid release and the buffering of extensive physiological consequences of prolonged stress (Morena, Patel, Bains, & Hill, 2014). This would help explain why after a stressful day, one would not find shopping as extremely mood-boosting for an overwhelmingly extended period of time.

The Reward Pathway and Mood

In a study conducted by Corral-Frias, Nadel, Fellous, and Jacobs (2016), an exceptionally strong, or highly sensitized reward circuit was observed to elicit a higher self-reported positive affect as well as higher resilience following induced stress. In addition, patients with major depressive disorder (MDD) have indicated, via fMRI studies, dysfunctional reward-related processing (Zhang, Chang, Guo, Zhang, & Wang, 2013; Minami et al., 2017), implying that the reward pathway and activation of this pathway is very closely linked to positive affect. This implication is an important principle that art therapy focuses on.

Mentioned in the previous chapter, Lacey and her research team (2010) observed that art itself is considered a rewarding stimulus indicated by fMRI studies indicating activity in reward-related regions. A preliminary study conducted by

Kaimal and Ray (2016) allowed 39 individuals to create art in an open studio format in order to investigate the impact of visual art making on affect. Before and after the open studio activity, participants were asked to fill out questionnaires regarding affect and general self-efficacy as well as provide a narrative summary of their work. These researchers found that in this context, art-making correlated to an overall self-reported decrease in negative affect, an increased positive affect, as well as increased general self-efficacy (Kaimal & Ray, 2016). Additionally, active artistic activities (i.e. drawing) as opposed to passive, yet still cognitively focused, approaches to art (i.e. looking at a Picasso painting) yield significantly greater reports of stress reduction in participants (Abbott, Shanahan, & Neufeld, 2013). This implies that the rewarding stimuli and thus therapeutic affect change is perhaps attributed to the active, personal creative expression of oneself in times of stress as opposed to the physical stimuli on its own. In the case of retail therapy, one is actively solidifying their social self via shopping for the concrete creative expression of self through their unique purchase choices.

In times of stress, intentional glucocorticoid suppression in rats has been observed to result in increased sensitivity of the VTA as well as decreased activity in the shell of the NAc (Barrot et al., 2000). The shell of the NAc is most sensitive to the effects of stress and is crucial in allowing the HPC to have preferential control over appetitive (naturally reward-based) learning; the core of the NAc, on the other hand, seems to work in opposition to the shell as it dampens the preferential control of the HPC granted by the shell and allows strong BLA inputs to dominate over appetitive learning (Ito & Haven, 2011) thus indicating stress enhances reward-based learning

and learned stress response. The increased sensitivity of the VTA is likely a result of stress hormone-dependent increase of excitatory receptors in the VTA (Berry et al., 2016). Excitatory receptor activation in the VTA strengthens originally weak glutaminergic projections carrying information about the environment (Zellner & Ranaldi, 2010) thus resulting in a robust extracellular DA increase in the mPFC and NAc (Holly & Miczek, 2016). Increased DA in the NAc can be viewed as an obvious indication of reward acquisition and thus positive affect as suppression of DA levels in the NAc specifically has been observed to elicit a depressive state in animal models (Saki et al., 2017) as well as humans (Zhang et al., 2013).

In human beings, self-stimulation of the reward pathway with the use of addictive drugs, such as cocaine, also lead to an increase of extracellular DA in these areas (Wauquier, 1976; Volkow & Morales, 2015). When this pathway is continuously stimulated by repeated action or drug usage, addictions develop. However, in a culture that spends 2.5% of their annual income on apparel alone, and in a country that views any and all economic growth as beneficial, it is easy to see why activation of this pathway in this context would be more socially accepted than the activation of this pathway with drugs or food intake which are just as equally stimulating. From collected evidence presented by Volkow, Wang, and Baler (2011, pp. 43-44) a large amount of obese individuals exhibit an imbalance between an enhanced sensitivity of the reward circuitry and impaired functioning of the mPFC and hippocampus in concert, which are structures of executive control circuitry (Milad et al., 2007; Miller et al., 2007). Impaired functioning of these structures weakens inhibitory control over appetitive behaviors (Volkow et al., 2011). Under

the light of consumerism, however, there are only monetary indicators that would explicitly suggest impaired control of such behaviors. However, just as with food intake, moderate indulgence in retail spending and material acquisition as a coping response to stress utilizes the reward circuitry and stress-induced learning to seek out and promote rewarding actions that will ultimately produce a positive affect in individuals.

Although shopping can reasonably be considered a social behavior and thus socially rewarding due to the influx of oxytocin, an individual must first already view this creative social behavior as rewarding and associate positive or elated feelings with that behavior to feel the "therapeutic" benefits, similar to art therapy (Custers & Aarts. 2005; Lacey et al*.,* 2010; Abbott et al., 2013). Much like when an individual going through a break-up seeks social comfort from friends, social comfort can also be found through purchasing clothing items that reflect who you are as an individual (Escalas & Bettman, 2005; Belk, 1998; Chan et al., 2012). Under stress, these social behaviors become even more rewarding through the secretion of, and interaction between, OXT, stress hormones, and the effect these hormones have on the NAc (Dolen, Darvishzadesh, Huang, & Malenka, 2013) thus heightening the ability of the VTA to detect and focus attention to shopping cues and promoting behavior.

CHAPTER FIVE: CONCLUSION

During my senior year of high school, I felt drawn more and more to the newly developing field of neuroscience, which is what initially led me to accept my enrollment offer to Regis. I distinctly remember visiting the campus during the college's science weekend; the moment I knew Regis was the school for was when a human brain was placed in my hands during the tour of the Psychology and Neuroscience department. Early that morning, I recall sitting in the science amphitheater and listening to a panel of students talk about their experience at Regis, encouraging us, the prospective students, to join clubs, participate in school-hosted activities, and promising us that college wasn't as scary as high school had made it seem. One student panel member, in particular, was in the honors program. She explained to all of us in the amphitheater about her thesis project and how everyone in the honors program was required to write one. I immediately began thinking of what I would be writing about four years down the road. By the end of that same day, I knew I wanted to research retail therapy. On my first day as a Regis student, I came in with a question; now, four years later, I am not only able to answer the question but defend my answer.

In summary, shopping is a social behavior that can be motivated by many different factors (Sheth et al., 1991); social belonging and current or anticipated emotional state being two of the major influences on the pleasure seeking drive in consumer behavior (Quartz & Asp). Certain visible objects, such as our clothing, have the capacity to quickly signal to others what social group we belong to (Chan et al., 2012), or how we behave (Howlett et al., 2013). These implications can influence our

purchase decisions, such as what brands we choose to buy (Chan et al., 2012) or what products we deem as "cool" (Quartz & Asp, 2015).

The mPFC is responsible for social categorization and mediating stress responses, and is also heavily involved in social-reward based learning and emotional memory (Molenberghs, & Morrison, 2012; van Kerkhof et al., 2013; Kern et al., 2008; Jin & Maren, 2015). The mPFC has projections to the BLA and HPC (Ying & Wang, 2017; Akirav, & Maroun, 2007), which are both involved in emotional memory and stress coping behavior (Martijena et al., 2002; Jin & Maren, 2015). A negative affect as a response to stress can trigger riskier behavior (Berretta, 2005; Lewis et al., 2014) such as spending more money than usual in an effort to improve mood (Yurchinsin et al., 2006). Shopping has been observed to reduce sadness (Rick et al., 2013; Atalay & Meloy, 2011), although it is the social aspect, and not the spending of money, that activates the reward pathway due to the release of OXT during socially bonding behaviors (Song et al., 2016), such as behavioral mimicry (Chartrand & Bargh, 1999). This makes sense, as we do not usually feel the same affect change when doing our weekly grocery shopping or paying monthly bills.

In a consumerist culture, such as the U.S. that attributes a majority of its GDP prosperity to consumer purchasing (Scopelliti, 2016), it is reasonable to assume that shopping is rarely viewed as anything other than positive unless it results in addiction, implied by the recent research being dedicated to disorders such as compulsive buying (Müller, Mitchell, & de Zwaan, 2015). How much value we place on an object or behavior can influence our behavior, and fluctuates when compared to other behavioral or possession alternatives (Monterosso, et al., 2012; Itthipuripat

et al., 2015; Pais et al., 2013); a function primarily mediated by the center of the reward pathway, the NAc (Steele et al., 2018). Individuals with Prader-Willi syndrome, a genetic disorder that often causes obesity and constant hunger beginning in childhood, have been observed to eat excessively as a consequence of dysfunctional reward processing system in response to food stimuli (Miller et al., 2007; Milad et al., 2007); this indicates the importance of this circuitry in moderating indulgence in naturally rewarding behaviors such as eating or shopping. A similar over-valuation of possessions can be seen in individuals with compulsive buying disorder (Müller et al., 2015) and Obsessive-compulsive Hoarding Disorder (OCHD; Morris et al., 2015).

Hyper-activation of the reward pathway has been linked to higher resilience in stressful situations as well as increased overall positive affect (Corral-Frias et al., 2016), whereas dysfunction of this pathway has been linked to major depressive disorder (Zhang *et al,* 2013). Affect can be both a motivator of consumer behavior (Yurchinsin et al., 2006; Sheth et al*.,* 1991; Lerner et al*.,* 2004; Garg & Lerner, 2013) as well as a by-product of consumer behavior, as long as positive affect has been previously linked to consumer behavior (Custers & Aarts, 2005; Pool et al., 2015).

Although coping strategies, as well as learned rewards, vary depending on the individual as well as their environment (Bandura, 1997; Carver et al., 1989), stress elicits more effort toward action when presented with cues that imply reward (Pool et al., 2015), and it is the responsibility of the mPFC-HPC pathway to correctly identify a reversible, adaptive behavioral response (Wang et al., 2014) elicited by the brain stem (Warden *et al.,* 2012). Rewarding behaviors have been observed to elicit

anxiolytic effects (Ulrich-Lai et al., 2010) and social behaviors, in particular, are often used as a healthy response to stress (Cutrona & Russell, 1989) and belonging to a group has proven to be beneficial in terms of evolution (Aronson, 2012; Suchak et al., 2016).

As mentioned earlier, consumerism is often viewed as having only detrimental repercussions; individuals are seen as merely customers, and the spirit may become weakened by material attachment (Pope Francis, 2015). While excessive consumerism does contribute to the "extreme consumerist" society Pope Francis cautions us about to be wary of in his encyclical entitled *Laudato Si': On Care for Our Common Home,* if we simply shift our lens and look at the underlying neurological communication that drives an individual to consume, we may be able to understand why human beings have a tendency to want to consume *more.* Moreover, further research exploring the unique relationship between activation of the reward circuitry and coping behavior (and vice versa) may encourage individuals, especially parents of young children experiencing stress, to establish an adaptive behavioral coping strategy that is rewarding to the individual experiencing acute stress. Although the detrimental effects of chronic stress during childhood have been well researched (Kim, Pellman, & Kim, 2015; Hanson *et al.,* 2015; Suri & Vaidya, 2015; Nicolaides, Kyratzi, Lamprokostopoulou, Chrousos, & Charmandari, 2015), I believe that there is a lack of lay person education regarding *how* exactly to manage acute stress especially in childhood. If behavioral coping mechanisms are established early in life the specific behavior may change, but overall I believe it will lead to a better ability to cope with stress in the future.

Retail therapy, as a whole, can be viewed as an adaptive restraint stress response as it places an appropriate value on consumer behavior and uses the social expression through purchase choice as an outlet through which to reduce unfavorable emotional states. As stress increases the sensitivity of the VTA, cues, such as the advertisements that are evident almost everywhere in the U.S., become increasingly more appetizing, thus driving the mPFC to initiate action in order to acquire the learned reward. Especially individuals that already perceive shopping as intimately linked to positive affect, consumer behavior, as a stress response would indeed be therapeutic. While retail therapy is not a behavioral coping strategy that can universally serve to relieve stress, it is one scientifically backed outlet.

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