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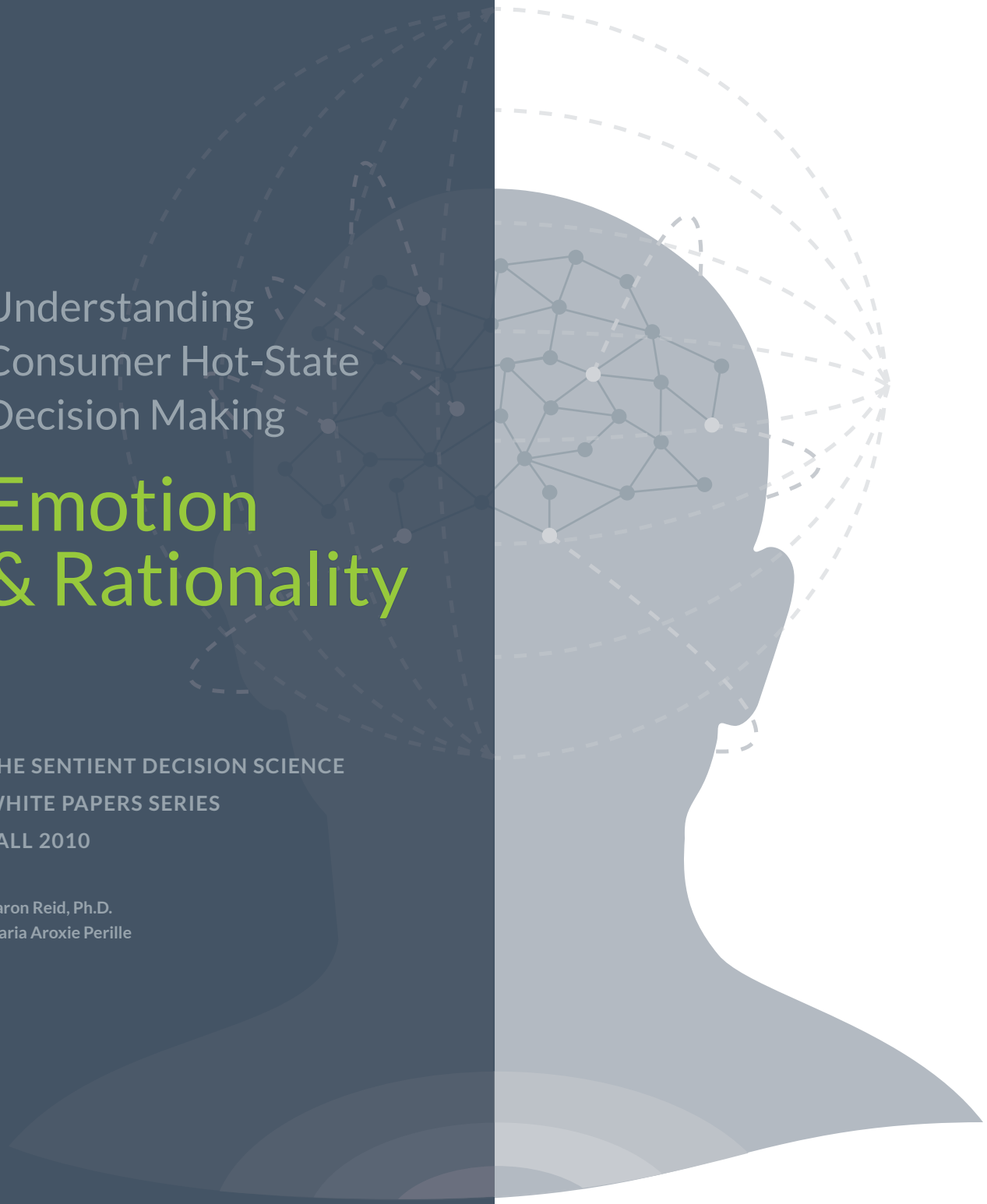

Understanding Consumer Hot-State Decision Making

Emotion & Rationality

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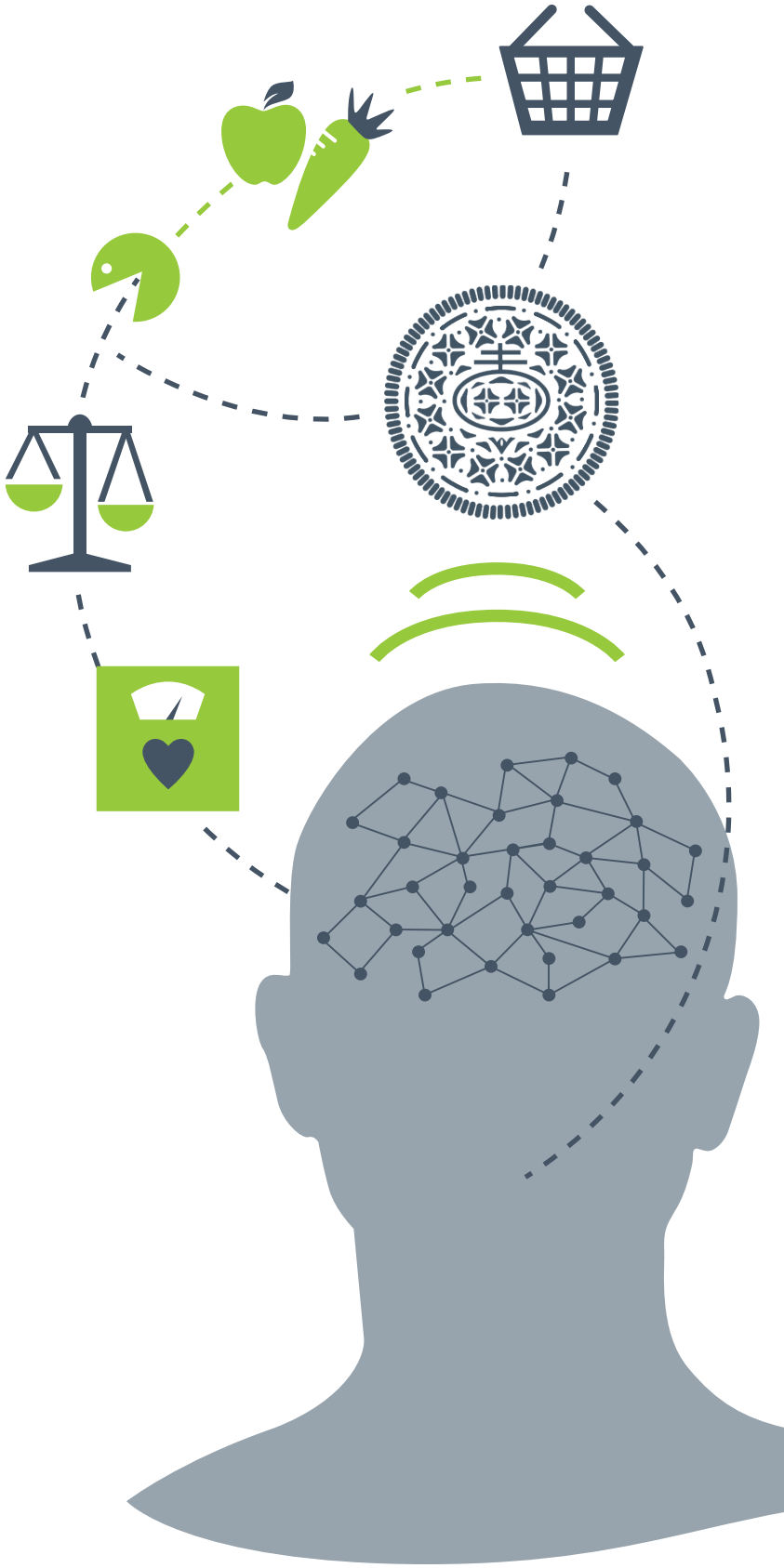
You are in the cookie aisle at the grocery store...



Like any responsible health-conscious individual, you are watching your weight and nutrition. You are only in the cookie aisle anyway because you are on your way to the produce section! Suddenly, your eyes lock on that big blue bag of Oreo® cookies. You realize you are starving. Against your better judgment, you impulsively grab the cookies and add them to the otherwise healthy foods in your cart. Later that day, after you have eaten half the bag, you cannot quite comprehend what induced you to buy the Oreos®.

YOU ARE NOT ALONE...

When consumers encounter promotions while shopping, they are compelled to act on their visceral impulses. At Sentient Decision Science, we call this compulsion hot-state decision making. Hot-states lead to a reduction in immediate self-control (Loewenstein, 2000), and many marketing campaigns emphasize immediate action with hot phrases like "One day only!" and "Call now!", catchy slogans, such as "Hungry? Grab a Snickers®," Nike®'s "Just Do It," and Sprite®'s "Obey Your Thirst," to tap into these visceral states and motivate immediate consumer behavior. As a result, consumers often fail to return to a cold-state, where the rational mind might be able to carry greater weight on the decision.

From a marketing perspective, encouraging hot-state decision making has the potential to boost short-term sales since consumers will buy products during hot-states through simple reminders of their visceral depletions (e.g. "I am really thirsty!" or "I forgot how hungry I was!"). However, this may not always be the best strategy for long-term growth since consumers will often regret their decision later. Research continues to show that people are unable to fully comprehend why they acted so impulsively in past hot-states (Loewenstein, 1996), and decision regret can in turn lead to reduced customer loyalty and satisfaction. This is the key question for marketers and product managers. How do we capitalize on real consumer visceral response in the short-term while simultaneously building long-term consumer satisfaction? Understanding how hot-state consumer decision-making works is critical to maximize pleasure and minimize pain in your customer base. This paper enumerates the why's behind consumer hot-state decision making, and in doing so, better arms managers with insight that will lead to more effective short-term marketing without sacrificing the long-term customer relationship.

IN ESSENCE.

This paper enumerates the why's behind consumer hot-state decision making, and in doing so, better arms managers with insight that will lead to more effective short-term marketing without sacrificing the long-term customer relationship.

Hot-states are a universal phenomenon. They are formally defined as visceral states that markedly deviate from an equilibrium point, such as satiation (Loewenstein, 1996). These moments of heightened emotion are propelled by physical need-based drives, such as hunger, pain, and sexual arousal, and have a profound effect on behavior (Loewenstein, 1996). Hot-states often have a negative connotation because they motivate people to behave in impulsive ways. As a result, most traditional economists have not studied them seriously (Elster, 1998). However, once we understand and are able to quantify emotion's impact on decision making, we can model consumer hot-states in ways even traditional economists can appreciate.

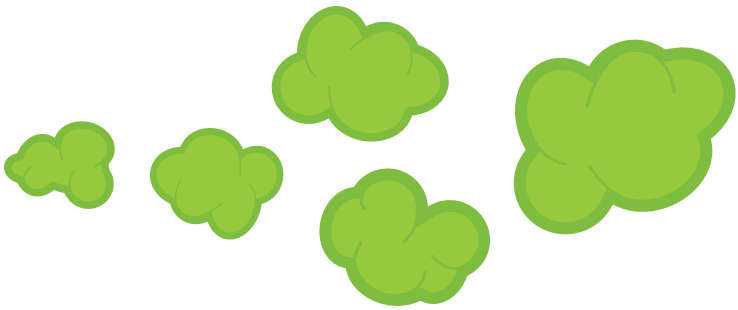
HOT-STATE:
Visceral states that markedly deviate from an equilibrium point, such as satiation.

IN OTHER WORDS...
A visceral decision making impulse which causes an immediate reduction in a consumer's self-control.

The function of visceral factors is rooted in evolutionary adaptations that act as survival mechanisms to regulate behavior and focus motivation on what is immediately essential to sustain life (Loewenstein, 1996). When in a hot-state, an individual narrows his focus on the immediate goal of alleviating or relieving the visceral deprivation. For example, when someone is in pain, visceral factors drive him to alleviate or reduce the pain, which becomes his most salient goal. As a result, visceral factors cause individuals to neglect other longterm goals in favor of alleviating the negative visceral state (Loewenstein, 1996).

The heightened arousal resulting from hot-states also causes a devaluation of other short-term alternatives by increasing the value of the option most strongly related to the source of arousal (Brendl, Markman, & Messner, 2003).

An interesting illustration of this comes from a study in which some participants initially tasted a small amount of popcorn, which served to heighten their emotions and value for food, while others did not taste any popcorn (Brendl et al, 2003).

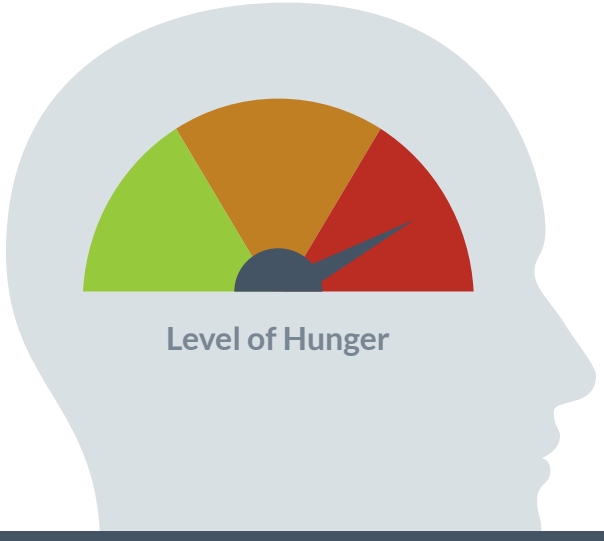


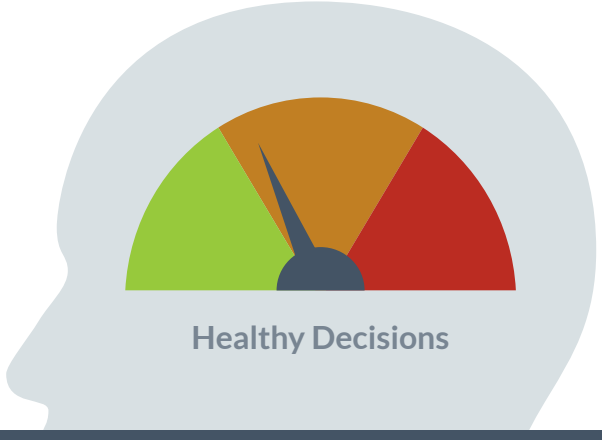
All of the participants then rated the attractiveness of various consumer products including some food and non-food items. The people who had tasted the popcorn rated non-food products lower than those who had yet to taste the popcorn (Brendl et al, 2003). This occurred because the popcorn tasters were in a hot-state and thus valued only products that would alleviate their hunger at the expense of devaluing unrelated products. Hot-states essentially shift the momentary weight of specific goals and thereby significantly influence short-term decision making.

Let's return to our Oreo® example. Assume your long-term goals are maintaining a healthy weight and eating nutritiously. However, when you walk into the grocery store your visceral state of hunger is not at an equilibrium point because you haven't eaten in eight hours. When you see the Oreos®, the driving force of your hunger leads you to seemingly act irrationally by behaving in contradiction to your long-term goals. You are in a hot-state, so you buy and eat the Oreos®. All that has happened is that your emotions, which dictate your preferences, have shifted and intensified on a particular object. In the moment, you have a greater emotional reaction that motivates you to alleviate your hunger and give into your gut, quite literally, rather than abide by your long-term values of health and nutrition. Your values have not necessarily changed. Instead, the quantity and intensity of the emotion that is elicited by the different stimuli has increased, thereby making some values more prominent than others in the short-term context.

IN SHORT.

"The driving force of hunger leads you to act irrationally by behaving in contradiction with your goals."





Since hot-states often result in people acting impulsively to get their drive states back to equilibrium, they seem to cause a disconnect between long-term self interest and behavior; something that is preposterous to the traditional economist (Loewenstein, 1996). This is where irrationality enters the picture. Irrational is often defined as "not endowed with reason," so by definition, if someone makes a decision based on emotion alone, he is labeled as irrational. We can better understand perceived irrationality when we know why people make impulsive decisions that may be self-destructive in the long-term.

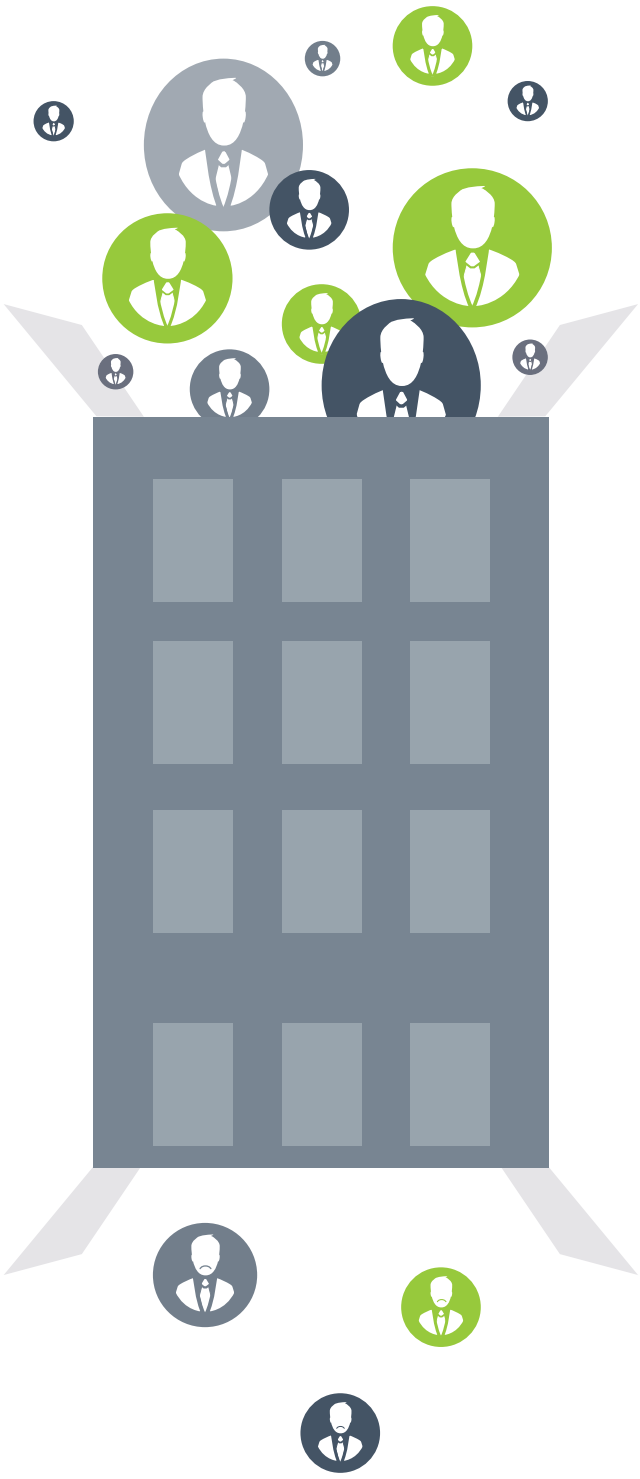
It is natural to have an emotional reaction to stimuli. In fact, emotion is our most fundamental cue to what we value. This draws into question whether emotion should be stigmatized as irrational. Hot-states seem irrational on the surface, and while they are much more complex, they are also predictable. Though hot-states lead people to value their short-term, immediate goals over longterm goals, they do not necessarily cause people to violate their self-interest. Instead, values simply shift and immediate goals become more salient in the individual's self-interest. Are hot-states irrational if they are survival instincts that help focus our behavior on what is most important in our immediate environment? And if not, should we redefine irrationality?

Before tackling that grand debate, let's take a closer look at human's awareness of the influence of hot-states on their behavior.

"Research shows people are unable to fully comprehend why they acted so impulsively in past hot-states."

TWEET THIS @SENTIENTINSIGHT

Fear is a hot-state & decreases productivity



For example, it is not unusual for firms to downsize to increase profitability. However, sometimes the opposite actually happens to the firms suffer because downsizing reduces profitability. This may be because downsizing induces fear in the workers who become less productive as a result.

~Kaufman, 1999

By understanding hot-states and not automatically discounting them as irrational, we can better predict and make sense of human behavior. There are many great examples of behavior that would seem irrational, but once they are further examined with what we now know about hot-states, they make sense.

Fear is a hot-state, and it drives people to act in their self-interest by avoiding the stimulus, but it also has a negative hedonic impact of causing distress. In this case, it also leads to a decrease in productivity since the workers fear for their jobs. By understanding how fear impacts decision making and behavior, we can better predict how the workers will react to the downsizing news.

Interestingly, people are notoriously inaccurate when predicting how hot-states will impact them in the future. As a result, individuals often underestimate the importance of hot-states and do not have adequate guardrails in place to ensure they act according to their long-term self-interest.

A fascinating study by Dan Ariely and George Loewenstein (2005) examined this phenomenon by looking at sexual arousal and its impact on decision making (Ariely & Loewenstein, 2005). When in a cold-state, and asked to predict how they would act in a hot-state, participants indicated that they would practice safe sexual behaviors, such as "us[ing] a condom if [they] didn't know the sexual history of a new sexual partner." However, once sexually aroused, participants' willingness to engage in unprotected and unsafe sex increased dramatically (Ariely & Loewenstein, 2005).

In other words, people were unable to predict how they would act in a hot-state when they were not currently in that hot-state. Arousal focused the individual's motivation on satisfying the primary immediate goal of sexual satisfaction while discounting other previous considerations like behaving in safe ways. Similarly, in our Oreo® example, the shopper may go to the store thinking that she will only buy what is on her shopping list even if she is hungry, but she is unable to fully understand how she will act when in that hot-state.

In addition to underestimating the impact of future hot-states, people tend to discount the influence of past visceral states on their behavior. In one study, women who had previously gone through the pain of childbirth were asked if they would choose to use anesthesia during their next childbirth (Christensen-Szalanski, 1984). The majority said no. However, when they were in the hot-state of labor for their next child, they overwhelmingly favored an epidural (Christensen-Szalanski, 1984). This phenomenon is called temporal discounting (discounting the pleasure or pain of a stimulus as it is further from your immediate environment).

Temporal discounting helps to explain the relapse in behavior of many drug addicts because in a cold-state they cannot imagine how they will act in a hot-state even though they have experienced many of them before (Loewenstein, 1996). In fact, past behavior resulting from hot-states often seems inexplicable to individuals since they can remember what they did at a cognitive level but have difficulty recreating the level of emotional arousal, which is what is at the heart of the hot-state (Loewenstein, 1996).

Since hot-state decision making is so hard for consumers to understand and predict themselves, one might suspect that it is not possible to measure and predict hot-state influences on consumer behavior. This may be the case for traditional economists but it is not a limitation for today's behavioral scientists. In order to do so, though, we must first appreciate how emotion, and its intensity, drive the decision making process.

We need emotion to function & make decisions

Our strongest neuroscientific evidence argues that without emotion, we have no values and preferences upon which to make decisions (Bechara & Damasio, 2005). Contrary to being a cue to irrationality emotion is a mechanism that is critical for good-decision making.

The central influence of hot-state emotions on consumer decision making has traditionally been overlooked and not adequately measured quantitatively in market research. Historically, economic theories, such as subjective expected utility, have focused only on a rational, deliberate decision making processes in which individuals essentially weigh their options through cost-benefit analysis

(Savage, 1954; Fishburn, 1968). These economic models posit that people should always make decisions that are in their self-interest. If individuals do not maximize their long-term expected utility, they are labeled irrational.

Traditional economic theories tend to disregard emotion as a key force in the decision making process and discount the fact that people often consciously and subconsciously rely on their emotions to drive their decisions and behavior (Elster, 1998).

Emotions are adaptive for the individual and motivate behavior by signaling factors in our environment that are most important to us (Frijda, 1994). In essence, emotions enable us to navigate our complex daily environments, which are filled with thousands of marketing messages, by directing our attention toward and away from stimuli that are relevant or irrelevant to our goals and values. Emotions are thus able to signal what is important to the individual (Frijda, 1994).

In a consumer decision making context, people develop preferences for products based on how the choice options elicit emotional responses. In essence, emotional reactions inform individuals of what they value, and the degree of emotion experienced is an indication of the degree of preference. For example, if exposure to the Banana Republic® brand evokes a rush of excitement in a consumer, this indicates that the Banana Republic® brand is highly valued. Once brand preferences are developed through our emotional value mechanisms they can become cognitive constructs that we can reference readily to make quick, consistent choices across the plethora of brands we encounter daily. These developed preferences inform the decision between a shirt from Banana Republic® and a comparable shirt from Express®. The emotional value of the Banana Republic® brand will likely lead to a choice of the Banana Republic® shirt as long as the emotion for the brand outweighs the emotional reaction to the difference in price between the two brands. In other words, since emotions signal the relative importance of a stimulus to the individual, then emotion leads to values, which lead to preferences, which lead to the decision to buy the shirt, and then the subsequent behavior of actually purchasing the shirt. This process is illustrated in Figure 1.

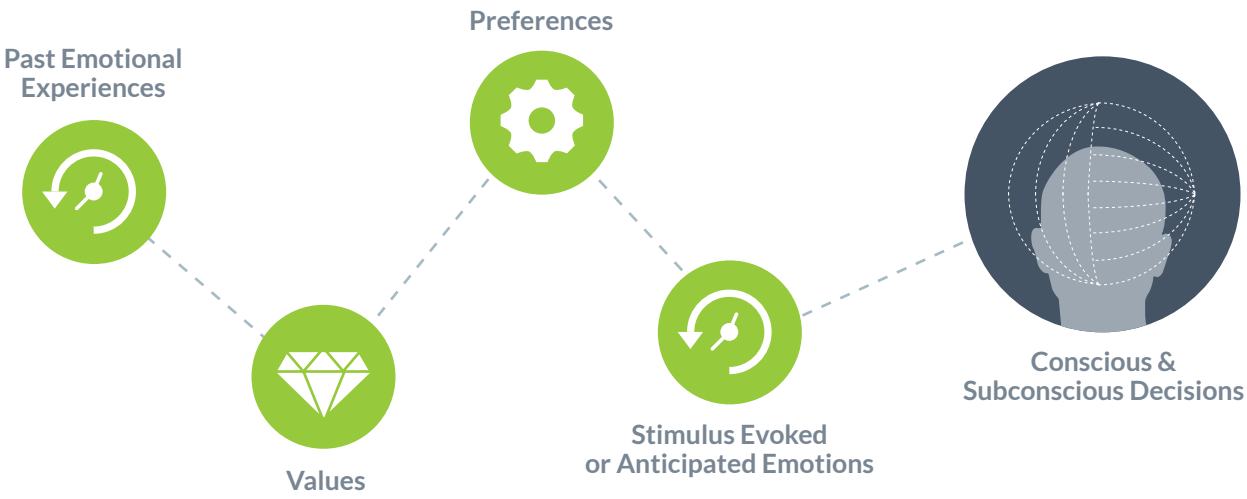


FIGURE 1

In this way, decisions stem from emotions. Emotions form the foundation of our values from our experiences in the past, and emotions are invoked in the present and act as a visceral representation of what we value.

In the absence of an emotional response to a stimulus (e.g. a Banana Republic® shirt), individuals would have to rely on a tedious and exhaustive reasoning process to determine their preferences (Bechara & Damasio, 2005). The absurdity of this notion is well illustrated in the advice Benjamin Franklin once gave his nephew. As the story goes, Franklin's nephew was distraught because he could not decide between two potential girlfriends. To mitigate his nephew's internal struggle, Franklin advised him to do "moral algebra," weighing the benefits against the costs (Gigerenzer, 2007). Franklin first instructed his nephew to create a pro-con list for dating each woman by tabulating the two women's qualities and shortcomings. He then told his nephew to systematically cross out equivalent qualities until there was a clear winner who had more pros left than the other woman. Imagine if you had to conduct this kind of mental arithmetic for every choice you made throughout your day. Exhaustive reasoning? Try exhausting reasoning!

Consider a consumer deciding which house to purchase by precisely listing all the possible attributes of multiple options and then determining which house has the most logical reasons in its favor. One house may have hardwood floors whereas another does not, but that house is not necessarily better suited for the consumer and may not make him happier in the long-run. Even after listing all of the pros and cons, in the absence of emotion the poor consumer still would not be able to decide (Bechara & Damasio, 2005). He needs to take his emotional responses to the attributes of each house into account to arrive at a meaningful preference.

Neuroscientific Evidence of Emotion in Decision Making

Evidence for the critical role of emotion in decision making comes from the neuropsychological literature. Bechara and Damasio determined that emotions are an integral factor in decision making by studying patients with damage to a specific part of the brain, the ventromedial prefrontal cortex (VMPC). The VMPC is implicated in planning as well as risk and fear processing (Bechara & Damasio, 2005), and patients with VMPC damage have serious deficits in decision making. The patients with VMPC damage take an abnormally long period of time to make decisions, and their ultimate decisions are often not in their best interest.

A VMPC patient named Elliot provides a startling example. Before damage to his frontal lobes, Elliot was a smart, successful businessman. Life as he knew it began to deteriorate when he could no longer make decisions in his best interest because he had VMPC damage. As told by Damasio (1994), he partnered with disreputable businessmen, made unwise investments, experienced a divorce and had several subsequent brief, miserable marriages, and even unwisely denied social security disability payments.

Bechara and Damasio explain Elliot's poor decision processes with the somatic marker hypothesis, which suggests that individuals can eliminate or reinforce alternatives based on their initial emotional reaction to them. According to the somatic marker hypothesis, we either feel an immediate sense of alarm or experience positive affect in response to different choices that guide our decisions, almost like gut feelings (Bechara & Damasio, 2005). These gut feelings inform us of the potential consequences of certain decisions and allow us to consider the future and our own wellbeing.

THE IRONY.

"The patients with damage to their VMPC lacked this essential emotional marker mechanism and could not filter possible alternatives and subsequently acted irrationally. The great irony here for economic theory is that they were not perceived as irrational because they relied on emotion, but rather they were considered irrational because they did not use emotion."

The patients with damage to their VMPC lacked this essential emotional marker mechanism and could not filter possible alternatives and subsequently acted irrationally. The great irony here for economic theory is that they were not perceived as irrational because they relied on emotion, but rather they were considered irrational because they did not use emotion. In contrast to standard economic theory, the VMPC patient research provided alarming evidence of emotion's critical role in functional decision making.

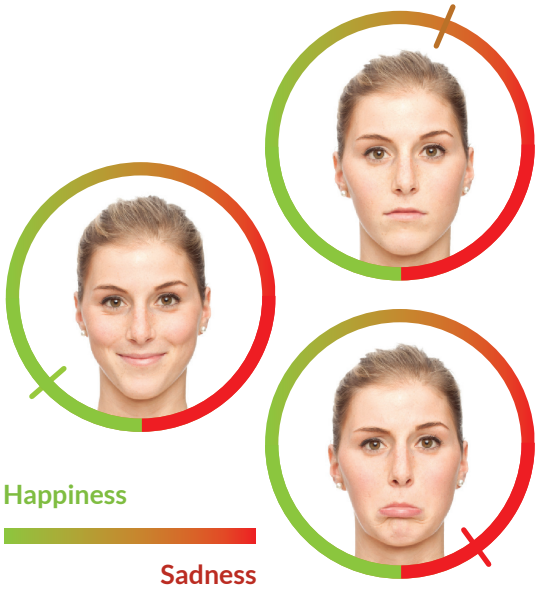
The somatic marker hypothesis goes a long way in emphasizing the importance of emotion in decision making. Yet, at the same time, by only taking valence into account and not the degree of that emotional reaction, the somatic marker hypothesis is limited in its quantitative explanatory power. This limitation spurred new quantitative research on the impact of emotion in decision making.

A standout emotion-based model that advances beyond the simple valance flagging nature of the somatic marker hypothesis is the predictor-valuation model from Montague and Berns (2002). The predictor-valuation model finds its footing in neuroeconomics, which seeks to evaluate how individuals make decisions by examining brain regions. The model suggests that there is identifiable neural activity that can explain the valuation of objects by regulating economic appraisals of stimuli. A neuroimaging study on the consumptive behaviors of monkeys revealed how common activity in the orbitofrontal-striatal (OFS) circuit allows for the valuation of objects that are otherwise not easily comparable (Montague & Berns, 2002). By using a common currency of reward expectancy, the model explains the valuation of objects with very different attributes (Montague & Berns, 2002).

To draw a comparison to consumer decision making, traditional models have difficulty finding a common denominator to compare the relative value of drinking six ounces of water to eating six ounces of broccoli, yet these two different alternatives can easily be compared with the predictor-valuation model by analyzing activity in the OFS.

Since values are derived from emotion, the model provides even greater physiological evidence for the importance of emotion in decision making. Yet, the predictor-valuation model is silent on the higher order cognitive processes at play in decision-making. With its "winner-take-all" emotion algorithm the model does not clearly distinguish the difference between cognitive assessments of symbolic information and emotional responses in the valuation that are observed in the OFS (Reid & Gonzalez-Vallejo, 2009). This cognitive hole in the model begs for a more robust perspective that can simultaneously incorporate the impact of hot-state emotions and cold cognitive deliberation that defines so many consumer decisions.

Do Sweat It



"By quantifying emotion, we can better understand the complexities of emotional intensity and how emotion interacts with our rational minds to inform our decisions. The ability to accurately quantify emotion is critical to predicting consumer hot-state decision making."

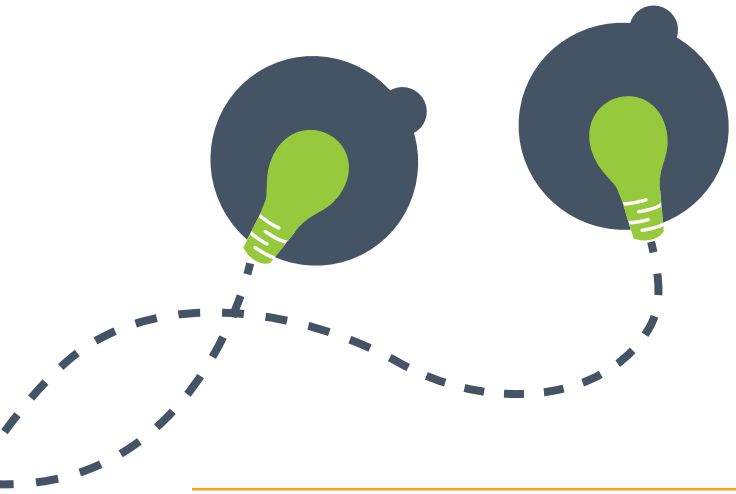
Emotion's role in decision making is more complex than just identifying what types of emotion are triggered by certain products. And while the valence of emotion plays a vital role in decision making, the weight and intensity of that emotion is equally important from a market research perspective. In order to enhance the accuracy in predicting behavior, it is necessary to quantify emotion. By quantifying emotion, we can better understand the complexities of emotional intensity and how emotion interacts with our rational minds to inform our decisions. The ability to accurately quantify emotion is critical to predicting consumer hot-state decision making.

One such model that quantifies the weight of emotion is the proportion of emotion model (Reid & González-Vallejo, 2009). This model is better predictor of behavior than a simple additive emotional models (e.g. Montague & Berns, 2002), because it combines consumer emotions and rational assessments into a single predictive algorithm. The model further explores the complexities of decision making that other winner-take-all models, such as the somatic marker hypothesis, either ignore or take for granted. Whereas Bechara and Damasio's (2005) somatic marker hypothesis and its extensions posit that the strongest valence signal "wins" and determines subsequent action, the proportion of emotion model

finds its unique contribution in the way rational cognitive trade-offs combine with emotional weights in a single predictive choice formula.

SCR *(skin conductance response)*

SCR uses electrodes to measure the microseimen units of sweat produced in one's palms, which is a measure of visceral arousal.



In a series of studies that evaluated the model, participants' emotional reactions to different stimuli, such as consumer choices between diamond rings, financial gambles, and mate selection, were measured by skin conductance response (SCR). SCR uses electrodes to measure the microseimen units of sweat produced in one's palms, which is a measure of visceral arousal. Since SCR only measures the quantity of emotion and not whether it is positive or negative, a valence measure was also employed to determine whether the arousal was approach or avoidance emotion (Reid & González-Vallejo, 2009).

The studies demonstrated that emotion can serve as a tradeable common currency in decision making, like reward expectancy in Montague & Berns' (2002) study, such that emotional arousal is a measure of how much a consumer values a particular choice attribute (Reid & González-Vallejo, 2009). At the same time, the proportion of emotion model goes beyond the common currency described by the predictor-valuation model because it combines both symbolic information and affective weights.

To illustrate the cognitive and emotional trade-offs in a consumer decision, envision a young single woman passing by a Tiffany & Co. store with a couple of friends. As any fantasizing young woman would do, she casually decides to go into the store and look around. At one of counters there are two emerald-cut rings. One ring is .83 carats and costs $5,250; the second ring is 1.05 carats and is $9,300. During this casual browse, the woman imagines that she wouldn't have a strong preference for either diamond ring (a classic example of temporal discounting). If we were examining this young woman's choice in a laboratory setting, her palms would produce essentially the same proportion of sweat when considering the price and carat size of each diamond ring.

Fast-forward two years. The same woman is madly in love and recently engaged. She and her fiancé elatedly enter a Tiffany & Co. store in search of that perfect engagement ring. Her eyes lock upon that same 1.05 carat diamond ring and the smaller one next

to it. Her hot-state changes everything. She now has a stronger positive emotional reaction to the larger carat size and while she is cognitively struggling with the higher price, she doesn't feel the same strong negative sting when considering the $9,300 price tag. Her hot-state emotions are functioning as a weighting mechanism on the differences in the diamond attributes as she cognitively goes back and forth between the options. In a hot-state, when the larger diamond arouses the woman, she has a disproportionate amount of emotion elicited to the carat size stimulus as compared to her emotional reaction in a cold-state. Because the proportion of emotion model effectively captures the emotional weights of different attributes and quantifies their impact relative to cognitive considerations, it can predict what consumers' preferences will be in a hot-state.

This has profound implications for how we conduct market research. If we are in a category where purchase decisions are commonly made in a hot-state, then our research will need to assess which attributes evoke the most hot-state emotions thereby carrying greater weight in the decision context. If marketing predictive models are always built on consumer valuation during cold-states, we can expect that those models will be off the mark when trying to predict consumer behavior in a hot-state environment. This calls for more elegant research design that can evoke consumer hot-states (e.g. deprivation exercises, priming and other saliency cues) and assess what is most important to consumers when in that mind set.

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Modeling Hot-States in Marketing

Since hot-states change the emotional weights that are elicited in correspondence to different alternatives, the proportion of emotion model can quantify the intensity of emotion that hot-states induce. In the diamond ring example employed by Reid and González-Vallejo (2009), the two attributes were carat size and price. When individuals are in hot-states of desire rather than cold-states, their values of the two attributes based on symbolic information will be stable, but the emotional weights tied to each attribute will change according to the rise and fall of their emotions in the moment, thereby influencing the decision outcome.

Mathematically, this engagement ring shopping experience is represented by the equation below. The ring that the woman chooses in her hot-state has a carat size of 1.05 and costs $9,300 while the other ring is 0.83 carats and costs $5,250. In this scenario, the value of ß1 increases so significantly in the hot-state that it causes the positive pull of carat size to dominate the negative pull of price, thus shifting the direction of choice. The couple purchases the ring in the hot-state but not in the cold-state.

Excitement

Anxiety

Quantifying the Gut

A Model of Hot-State Decision Making

$$d^* = ß_1 \left[\frac{\max\{|a|,|b|\} - \min\{|a|,|b|\}}{\max\{|a|,|b|\}} \right] - ß_2 \left[\frac{\max\{|p|,|q|\} - \min\{|p|,|q|\}}{\max\{|p|,|q|\}} \right]$$

The sign and magnitude of d* determines the strength of preference. If d* is positive, then the consumer will choose the more expensive 1.05 carat ring. ß1 is the degree of the emotional reaction to the carat size, and ß2 is the degree of the emotional reaction to the price, measured by SCR. These variables indicate the importance for carat size and price, and they are weighted against the cognitive symbolic information for each attribute.

Cold-State Example:

$$d^* = \left(\frac{0.49\,ms}{0.88\,ms}\right)\left[\frac{1.05\,ct - 0.83\,ct}{1.05\,ct}\right] - \left(\frac{0.39\,ms}{0.88\,ms}\right)\left[\frac{\$9300 - \$5250}{\$9300}\right] \quad d^* = -0.08$$

In a cold state, the carat sizes evoke a degree of arousal equal to 0.49 microseimen units of sweat, and the price tags evoke 0.39 microseimen units of sweat. Proportionately, the emotion elicited by the larger diamond is not enough to outweigh the negative pull of the cost.

Hot-State Example:

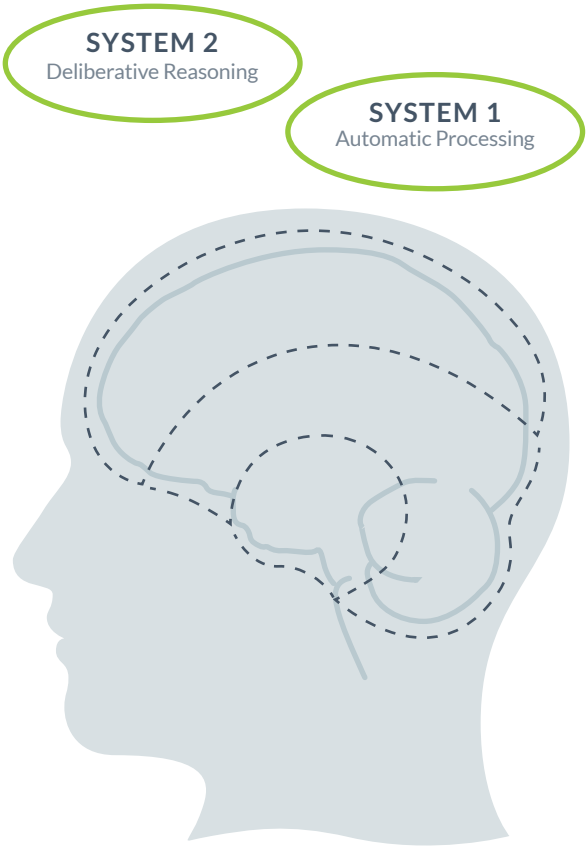
$$d^* = \left(\frac{0.65\,ms}{0.88\,ms}\right)\left[\frac{1.05\,ct - 0.83\,ct}{1.05\,ct}\right] - \left(\frac{0.23\,ms}{0.88\,ms}\right)\left[\frac{\$9300 - \$5250}{\$9300}\right] \quad d^* = 0.04$$

However, in a hot state, the same carat sizes evoke a degree of arousal equal to 0.65 microseimen units of sweat, and the price tags only evoke 0.23 microseimen units of sweat. Now, the emotion elicited by the larger diamond size overwhelms the negative pull of the cost, and the bride-to-be decides to purchase the more expensive ring, as the equation above demonstrates.

Balancing Depth with Simplicity

Since emotion and hot-states play such a central role in decision making, market research firms that measure emotion can more accurately predict consumer preferences and behavior. Effective techniques need to merge both a quantitative and qualitative analysis in order to explore decision making as more than just a winner-takes-all process. After taking into account attribute importance as well as emotional intensity and combining this with qualitative research methods, research firms can then assess the impact of hot-states on consumer decision making.

The advent of neuromarketing and brain imaging research provide a wealth of data that support emotion's quantitative impact on the decision process. Technological tools such as fMRIs and EEGs measure the neural activity in different functional areas of the brain, thus providing insights into physiological valuation mechanisms. Yet, while the idea of having access to millions of neural data points sounds convincing, these techniques produce data with a large amount of noise and thus require this level of measurement in order to achieve stability. In addition, some techniques, including fMRI, are expensive, time consuming, and are only able to evaluate one individual at a time in a relatively unrealistic environment, which may have consequences for evoking relevant hot-states. In contrast, priming and response time methods get around these issues by assessing emotional connections on hundreds of consumers in a single day. Yet these methods also have their own limitations. Reviewing which method is right for your research question as you design a study to model hot-state decision making is critical. A brief review of methods follows.



Subconscious and Conscious Influences on Decision Making

PSYCHOPHYSIOLOGICAL TECHNIQUES

Psychophysiological methods are perfectly suited for revealing consumer emotion. Participants are brought into a lab or consumer testing center and are presented with varying stimuli (brands, static and dynamic advertisements, new products, etc.) and their natural physiological response to the exposure is recorded. There are advantages and disadvantages to the various techniques which are reviewed below.

Functional Magnetic Resonance Imaging (fMRI)

fMRI measures blood flow in the brain. Brain scans show which areas of the brain are most active when processing a stimulus (e.g. exposure to a brand, advertisement, new product, sensory sample, etc.).

Some of the advantages of fMRI include

- Brain scan data is hard to argue with (results are very convincing to clients)
- Definitive emotional data (interactions with Amygdala and stimuli)
- Heat maps show level of activity across all regions of the brain

Some of the disadvantages of fMRI include

- Not yet broadly available to business community
- Unnatural environment for participants (in tube)
- Time consuming to collect data (one at a time participation)
- Less representative than larger sample response time techniques
- Time consuming to analyze data
- More expensive than EEG, SCR and Response Time techniques
- Not yet broadly available to business community

Electroencephalography (EEG)

EEG measures electrical brain wave activity across the entire brain region to show which areas of the brain are most active when processing a stimulus (e.g. exposure to a brand, advertisement or new product).

Some of the advantages of EEG include

- Brain wave activity is very convincing to clients
- Test arousal and boredom (alpha, beta and theta wave activity)
- Frontal lobe activity differentiates between approach related emotion (left frontal lobe) and avoidance related emotion (right frontal lobe)
- Less expensive than fMRI

Some of the disadvantages of EEG include

- Not yet broadly available to business community
- Time consuming to collect data (one at a time participation)
- Less representative than larger sample response time techniques
- Time consuming to analyze data
- More expensive than SCR and Response Time techniques

Skin Conductance Response (SCR)

Skin Conductance Response (SCR) is a psychophysiological method for measuring degree of arousal. It is a method that is used widely for "lie detection" because it serves its purpose of revealing what people may not be willing or able to tell us about their emotional responses. As detailed above, Reid & Gonzalez-Vallejo's (2009) use of SCR shows how incorporating emotion into traditional models of choice increases the accuracy in predicting consumer preferences between diamond rings.

Some of the advantages of SCR include

- Emotional data is not dependent on self-report
- Ability to show concepts, messaging, designs and gauge emotional response
- More natural participant environment (non-invasive and greater mobility)
- Less expensive than fMRI and EEG

Some of the disadvantages of SCR include

- Labor Intensive
- Time consuming data collection (one participant at a time)
- Extensive data analysis time
- More expensive than response time techniques

Priming and Response Time Techniques

Priming techniques were originally developed in the Cognitive psychology literature and were adapted by Social Psychologists to study stereotypes (an area where people either can't or won't reveal their true emotions). These methods have been recently adopted in the study of consumer behavior (Dijkerthuis et al., 2004). The IAT (Greenwald & Banaji, 1995) and Sentient PRIME™ and Subconscious Activation of Goals (SAG) methods measure the impact of subconscious processes (including emotion) on choice and willingness to pay price premiums for products.

Using these methods, researchers can collect data from representative samples of hundreds of shoppers to ensure that the subconscious findings are generalizable to target populations. The method can be run among qualitative research participants following exposure to products in focus groups or IDIs. Total sample sizes can be as small as 25-30 or up to hundreds or thousands of consumers broken out by market segment if the method is run using online software.

Some of the advantages of priming and response time techniques include

- Captures subconsciously activated goals to determine product and brand success at delivering on those goals.
- Reveals the strength of automatic emotional associations with products, packaging and brands.
- Determines the subconscious attribute associations that connect with activated goals to drive emotional preference.
- Provides emotion-based ROI by tying into brand premium measures at the individual level and predicting future market sales.
- Delivers a practical and efficient solution: implemented in person or in online studies to collect hundreds of completed interviews each day across market segments.
- Cost-effective relative to Psychophysiological methods.

Some of the disadvantages of priming and response time techniques include

- Harder to show link to brain activity to clients (brain wave data is very convincing)
- Online environment is not as controlled as lab or in-person research center
- Accurate data interpretation is critical

Emotional intensity can be measured with any of the above physiological or behavioral methods. These measures are then plugged into the proportion of emotion model as emotional weights to predict consumer choice. Once you've implemented research techniques to measure consumer emotion you're in a position to apply this knowledge to the benefit of your business and the marketplace. This places us back where we began, with the power to influence consumer hot-state decision making we have to ensure that we're winning in both the short and long term. We need to maximize pleasure and minimize pain for our consumers.

"The heightened levels of arousal that define hot-states play a powerful role in consumer decision making."

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Maximize Pleasure & Minimize Pain for Consumers

Understanding hot-state decision making can provide a significant short-term boon in purchase behavior. But ethically, and from a long-term business health perspective, we don't want to sacrifice long-term consumer satisfaction for short-term reward.

The first note of solace on the ethical front is this: people do not respond emotionally to things they don't value. Thus, if a consumer is responding emotionally to your product, it is because the value for that product is inherent in the consumer. The debate on consumer values, and the attempt to influence what consumers actually value, is better left to be battled on the socio-cultural level. Consumer values are influenced heavily by culture and that cultural influence is in a continual state of evolution. For instance, in the U.S. there is currently a growing cultural value for sustainability and care for our natural environment. As the culture exerts its influence on the consumer, the emotional response to products and services that align with sustainability and environmentalism heightens, and the market then has a sure sign that these values are increasing in importance for consumers. Thankfully, most enterprises are in the business of providing products that consumers value, rather than imbuing consumers with values. Those values are largely coming from external sources.

Second, from a business model perspective, a short-term visceral delight that is followed by deep post decision regret does not have any legs for sustained business growth. We do not want to induce regret in a consumer base whom we're hoping will praise and recommend our products in the marketplace. This creates an interesting challenge for the marketer and product manager. How do we capitalize on hot-state decision making while simultaneously delivering a satisfying experience? Two basic human truths help answer this question and serve as guides in implementing hot-state decision making in your initiatives:

The first truth is that not all hot-state decision making is in conflict with long-term goals. In fact, inducing hot-state decision making within a context that is consistent with long-term goals is the perfect storm: you create immediate consumer delight without any lingering post-decision regret. Hot-states can be aroused in relation to long-term values, just as they can be for short-term visceral delight: all that is required is the evocation of emotion. Thus, if consumers are passionate about certain long-term values, then you can be sure that activating goals related to those values will arouse consumer emotion.

As an example, consider again the rising cultural values of sustainability and environmentalism. These are concepts that arouse a lot of emotion in certain segments of the population. From a hot-state decision making perspective this is ripe for capitalization. If you offer a product or service that is consistent with these values, you are in a unique position to capitalize on hot-state decision-making while simultaneously delivering on consumers' long-term values. Marketing that raises the salience of consumer environmental values will heighten in-the-moment arousal. Delivering a product that satiates that desire produces an immediate sale that simultaneously avoids post-decision regret because it is in line with long-term values. This maximizes pleasure and minimizes pain.

If you are a marketer or product manager, you can put this first human truth to use by answering the question:

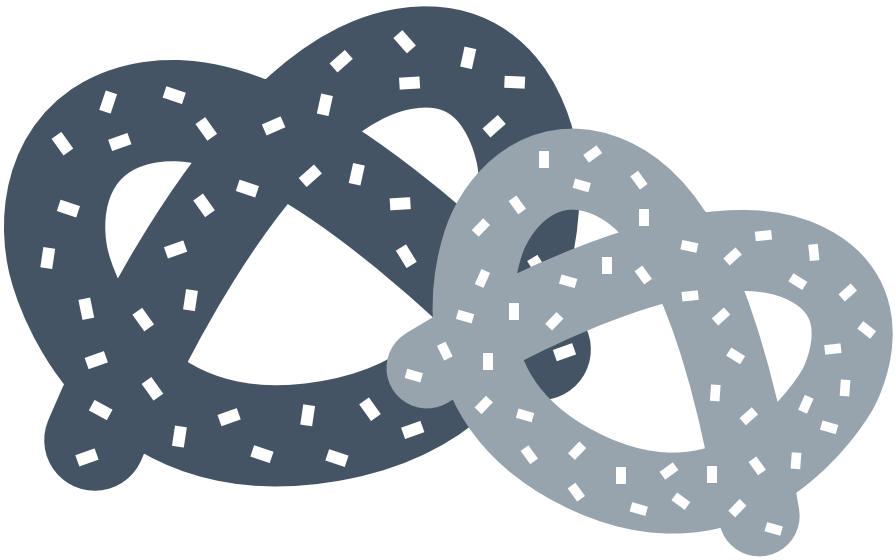
Which of my product benefits arouse emotion in the short-term while also arousing emotional satisfaction in the long-term?

The second truth is that the human condition is characterized by a constant state of reconciling short-term decisions with long-term goals. On a daily basis, consumers are faced with decisions that satisfy short-term needs while compromising long-term values. To reconcile these conflicts, consumers conduct a "mental accounting", not allowing themselves to get too far afield from their ultimate goals. Consumers do this in two ways. First, when consumers feel too deviated from those long-term goals, their decision making realigns naturally with those goals because they begin to feel greater emotion for choice options that put them back in sync with their long-term values. Second, consumers use post-decision justification to reconcile their short-term choices with their long-term goals. We call this justification "cognitive recalibration."

For marketers and product managers, this human truth is critical for business planning. The human tendency to consume short-term rewards is part and parcel of who we are and that tendency is not going away. This creates a natural market for products.

If you are a marketer or product manager, you can put this second human truth to use by answering the following questions: how does my product suite provide options that serve consumers' short-term as well as long-term goals? How well is my marketing providing consumers with reasons for their purchase that justify their decision?

For example, if you are in the Salty Snack category, you might ask yourself how well is my marketing inducing short-term arousal that is easily justified cognitively after the fact. If one of your products is seen as a guilty pleasure, or special indulgence, messaging around the fact that periodic indulgences are justified will help reduce consumer post-decision regret. Similarly, if your product line lacks a snack that aligns with consumer long-term values of healthy eating, you are likely losing significant revenue to a competitor who offers that choice. An optimized product line allows the consumer to wax and wane between her short-term and long-term values while still remaining within your brand suite, thereby maximizing her pleasure and minimizing their pain naturally.



In Conclusion

The heightened levels of arousal that define hot-states play a powerful role in consumer decision making. Since consumers are often in a hot-state when they make the decision to purchase a given product, it is essential marketers and product managers understand the dimensions of hot-states and how their products and brands align in order to better predict consumer behavior. Many current market research techniques do not sufficiently quantify differing degrees of arousal, and thereby cannot accurately predict how consumers will behave in a hot-state. Cold-state research may lead to predictive models that lack validity in hot-state consumer situations.

Very few models on the forefront of psychological research effectively incorporate consumer hot-states into the decision making equation as well as the proportion of emotion model does. To understand consumer hot-state decision-making and continue to move the industry forward, it is our responsibility as market researchers to continually improve on existing models. Enterprises that incorporate techniques in their research toolbox to effectively leverage emotion and its weight in the decision making process will have models of consumer behavior that more accurately predict future market trends. Using behavioral science techniques to model emotion and following the human truths of hot-state decision-making will empower marketers and product managers to maximize pleasure and minimize pain for consumers and thereby benefit both short-term and long-term business goals.

If a consumer is responding emotionally to your product, it is because the value for that product is inherent in the consumer.

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As an entrepreneurial consumer psychologist, Dr. Reid founded Sentient Decision Science, Inc. to bring the visionary advances from the behavioral sciences to business in a practical and accessible format. Sentient is a leading behavioral science based research and consulting firm providing best-in-class implicit research technology, applied behavioral economics and marketing science based brand consulting to optimize product, pricing and promotion development and emotionally differentiate brands through strategic positioning and communications.

Dr. Reid is an expert in how emotion influences choice and the subconscious drivers of behavior. His publications include mathematical models of consumer irrationalities in top peer-reviewed psychology journals, such as the Journal of Experimental Psychology and the Journal of Behavioral Decision Making as well as industry leading recognition from ESOMAR. His landmark publication of "Emotion as a Tradeable Quantity" was the first to quantify how emotion influences choice as a behavioral weighting mechanism.

Under Dr. Reid's direction, Sentient Decision Science has developed patent-pending, cloud based, globally scalable implicit research technology that quantifies consumer emotions and neural network associations with brands, products, packaging and advertising. This technology was recognized with the EXPLOR award in 2011 as the most impactful application of technology in market research. By quantifying these gut-feelings, and integrating with rational trade-offs in a single unifying choice algorithm, consumer behavior predictions are significantly more accurate.

Since 2007, the Sentient Consumer Subconscious Research Lab, has been a pioneering R&D force in the development of advanced implicit research methods, most recently demonstrating the unique neural signature of implicit self-identification with brands. The lab houses state-of-the art eye-tracking, EEG biometric and implicit affective priming technology.`

We'd like to recognize **Maria Perille** (*Behavioral Science Intern, Sentient Decision Science, Inc.*), for her work involved in the Hot-State Decision Making.

More writing by **Dr. Reid** and **Ms. Perille** on how behavioral science principles are applied to real world behavior can be found on:

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