Chapter 2
Consumption as Feelings

Studying consumers refers to how people perceive, learn, remember and feel in the context of acquiring and using products and services. Such an analysis is tremendously complex. In order to better grasp how consumers make choices and decide to buy, the enhanced knowledge of people's experience of the consumption itself and of all the accompanying sensations proves crucial. Applying the findings of neuroscience, as will be demonstrated in this chapter, provides useful clues. However, one is advised that, not surprisingly for a new discipline, neuromarketing has selectively addressed a diverse range of issues faced in consumer behavior. This is due to the varying complexity of the research tasks, constraints imposed by the available technology and the difficulty in staging different types of experiments.

2.1 From the Concept of Need to the Construct of Pleasure and Reward

The concept of a need occupies a central place in the theory of consumer behavior. However, "need" is not a readily operational term. How it materializes, translates into the specific wants and desires and ultimately leads to its own fulfillment has been a subject of many discussions. This fundamental question is ever more important since the consumer who has satisfied the need is expected to feel good and at ease, be willing to engage in repeat purchases in the future, and to share his/her positive experience with other members of the community. Consequently, addressing the notion of need satisfaction turns out to be equally crucial as the definition of the need itself. Yet, from the neurological standpoint, the architecture of a need is difficult to describe.

On the one hand, the need can be identified as a necessity to preserve one's physical existence. In that sense, the case of humans is no different from that of other animals. From this perspective, the concept of a need is better understood with respect to biological functioning, for example eating, and in such instances is

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amenable to modeling (see, for example, Fricke et al. 2006). Even so, the neuroscience hints at looking beyond the physiological need as just a state of deprivation (e.g. of energy) and adds to it the component of the promise of gratification. For example, appetite for food is, in part, initiated, by ghrelin – the hormone produced in the gut which triggers the brain to promote eating. Whereas it remains to be determined precisely how ghrelin affects different parts of the brain, it has been demonstrated on laboratory animals that this substance activates the same neurons as the palatable food, sexual experience, and many recreational drugs; in short neurons that provide the sensation of pleasure and the expectation of reward. The dopamine producing neurons in question are located in a region of the brain known as the ventral tegmental area (VTA). Since the activity in the VTA is known to produce the expectation of reward, it hints at the impact of the ghrelin stimulation in producing the pleasure sensation (Abizaid et al. 2006). The pleasure aspect of responding to just the essential bodily requirements was revealed in the neuroimaging experiments using the food stimuli. Namely, the activity in the mid-anterior parts of the OFC which tracks the changes in reward value of the taste and smell selectively decreases for the food consumed but not for other food (Kringelbach et al. 2003).

On the other hand, people do not operate exclusively as nature's pendula. The urges we experience are in many instances not just geared towards restoring the prior equilibrium state but their aim is to improve the personal well-being beyond the level experienced before. Indeed, there exists a "meta need" in human beings which is to grow, improve and reach the new horizons. In that sense and in agreement with Maslow (1970), one should make a distinction between the "deficit" needs resulting from internal imbalances and those needs which materialize more as reward/pleasure-oriented ambitions. Then, from marketing perspective a legitimate question to ask is which pleasures are more intense than others. Are the social pleasures as rewarding as the basic sensory ones?

Feeling Good

It is symptomatic that the industry starts recognizing the importance of the notion of pleasure for marketing strategy. In early 2009, Magnum – the ice cream division of Unilever – sponsored a large online test to measure the pleasure proneness. Based partly upon pictorial representations and partly on verbal questions and statements, the survey addressed a variety of experiences from the marketable sources of pleasure (food, music, art) to sex, love and personal fulfillment in covering the sensual and intellectual bases of joy. The mega experiment was designed as a comparative study to highlight the gender, age, national, occupation and personality differences on the scale of the Pleasure Quotient developed by the psychologists at the University of Leicester (UK). Based upon the frequency and intensity to which an individual is stimulated by different triggers it can possibly be determined who is more pre-destined for enjoyment.

(continued)

According to survey, the most popular declared sources of pleasure are (not surprisingly?) food and sex yet love, relaxation, family and gratifying auditory stimuli are important as well.

It is therefore relevant to note that from the perspective of the psychology of emotion, Frijda (2007) proposed a notion of "concern" as a relevant and important component of human lives. It is a general term like "need" but to a lesser extent reflects the "indispensability" nature. One particularly important type of reward especially for the stressed out (at work, home) individuals is enjoyment. "Having fun" is, therefore, a common goal of many contemplated activities – the hedonic idea known since Aristotle and Epicure. Relaxation through play (and toy possessions), daydreaming and exercising constitutes a vital purpose in people's lives and, consequently, in consumer behavior. The important aspect is that such desires tend to be far more spontaneous (or interpreted as such) than those directly driven by biology. Unfortunately, the scientific knowledge thereabout is quite fragmented. It is important to know, however, that playing as the pleasure-generating inclination is common also among animals. It can be posited that in line with the growing personal income, at least in the affluent markets, the shift towards hedonic consumption becomes a reality and will get stronger. This trend has a dual nature: a/ growing demand for hedonic products and services and b/the increasing importance of the hedonic attributes of product/services linked to human necessities (for example, savory taste in food, agreeable ambience in the restaurant or the department store, beauty in clothing, sound quality in the car stereo, uniqueness of the house design). In the end, both tendencies contribute to a stronger influence of pleasure-oriented and hence emotional factors on consumers' choices.

When addressing the purpose of consumer behavior, another complication with the use of the need-based concepts is that one is faced with the need "within a need" chain of sequence. Accordingly, the more general, higher order concerns imply resolving lower order (more immediate) issues along the way. For example, longing for love can produce a derived demand for dating services for some 100 million unattached Americans who lack time for the old fashioned romancing.

Also, classifying activities by their sheer expressions opens another Pandora's Box. For the illustration purpose, exercising may be an unexciting routine to stay in shape, fun if focusing on the agility of one's body, a pretext to meet physically attractive other people or a challenge – comparing oneself to others. Interestingly, regardless of the motive the exercising routines are the source of contentment through the stimulation of the vagus nerve – one of the central nerves – and possibly through repetitive transcranial magnetic stimulation (Kraus et al. 2007). The objective mechanisms of pleasure may in addition engage the brain hedonic hotspots whose activation magnifies liking reactions (Kringelbach and Berridge 2009). For that matter, the field of the affective neuroscience addressing the neural causation of pleasure offers a broadened perspective on the consumers' experience.

Consequently, instead of coping with the definitional problems regarding the nebulous nature of various (especially higher-order) needs, neuromarketing is

better equipped to approach the reward/punishment-related neural processes. In contrast to the generic notion of need, one can focus on different types of gratification (see Fig. 2.1), namely:

- Improving the present well being
- Preventing a harm – protecting status quo
- Recovering from the loss back to status quo

The three contexts above can be hypothetically conducive to different pleasurable experiences.

As will be demonstrated later in this chapter, in the monetary games the loss avoidance is not only logically but also neurologically synonymous with obtaining a reward and engages to a similar extent the underlying neural circuitry in the medial OFC (Kim et al. 2006). This, however, need not be a general case for the "in kind" types of consumption. The question of how often consumers act to preserve the status quo or reverse the misfortune is wide open but certainly worth studying from the perspective of the neuroscience. The more so, that traditionally marketers predominately addressed the consumer behavior in the light of approach-motivated search for additional benefits rather than in the spirit of the avoidance-driven posture. With the increasing role marketing plays in, among others, the health care, insurance and legal services this tendency is deemed to change.

One needs to emphasize, as we will elaborate later in the book, that framing the question based on whether the decision at stake is perceived as the problem *avoidance and removal* as opposed to generating *gratification* can play a key role. The way the problem is perceived makes a difference in terms of the feelings about the solution. Pain reduction and pleasure seeking are not the interchangeable concepts in view of the fact that the discomfort and pleasure are registered in different parts of the brain. Potential negative outcomes of actions are represented

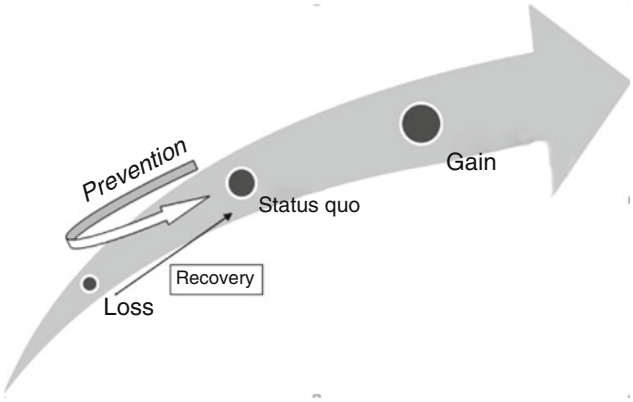

Fig 2.1 Varieties of rewarding experiences. Using the present status quo as the starting point, one can imagine improving the individual's well being by gaining in tangible terms (the upper right section). Yet, the prevention of loss–if one is aware of that–and the recovery from an earlier loss also produce a feeling of gratification. What the phenomena listed above have in common is that they all represent an *accomplishment* of a goal

mainly by the lateral areas of the OFC, while the ventral and medial PFC are involved in representing the impact of the positive outcomes (Ursu and Carter 2005). The discovery of two anatomically distinct mechanisms in the brain, one for punishment, and one for reward, provides a physiological basis for the dualistic motivation postulated in hedonism. Behavior is considered to be motivated by stimuli which the subjects attempt to minimize (pain) or by stimuli which the people try to maximize (pleasure). Mathematics of the corresponding calculations proves confusing at times – we can imagine when the pleasure becomes pain (overeating) but hardly the opposite.

Consequently, seeking pain relief is not tantamount to longing for pleasure. In fact, consideration of suffering and pleasure can simultaneously take place in decision making (for example, when being paid for participation in not so pleasant medical tests). Even more importantly, various consumer experiences comprise a mix of positive and negative emotional components; suffices to mention a morning commute on a fast but crowded subway system. Further, in terms of goals, looking for a painkiller to get rid of a headache creates different sensations than searching for an interesting book to read. The amount of consumers' emotional response potential depends on whether they are faced with the products that simply solve problems (the motivation is problem *avoidance*), or whether it is the desire for gratification which is dominant (with the *approach* motivation generating emotions at stake).

Aversive motivation means getting away from unpleasant condition. Whereas addressing the negative motivation should end in "going back to normal", dealing with a positive motivation is expected to increase the well-being **above** the initial level. The nature of the two goals is different and so could be the intensity of the accompanying emotions. Terminating or even reducing pain offers relief and may be a more concrete phenomenon for our body to register than the pleasure whose base point (i.e. no specific pleasure) may not be easily determinable.

2.2 Pleasure

Inasmuch as studying the pleasure orientation still represents the crux of the marketing research, a proper understanding of the nature of pleasure is essential to clarify consumer decisions. One of its important features is that pleasure serves as the brain's way of short-cutting the rational process by subconsciously prioritizing the large selection of options available. In the process, we do not only choose what seems to be the best for us but also try to make sense of the outside world.

Since in the developed societies the basic needs are generally fulfilled (e.g. if we are hungry it is not usually for too long), there is a shift towards the higher-level desires along the Maslow's hierarchy. Similarly, to use Scitovsky's (1976) classification consumers focus less on the goods which satisfy the necessities and hence generate comfort, and pay more attention to the desire-satisfying goods which produce pleasure. What it means is that the rewards sought by consumers are more subjective, elusive and, consequently more difficult to define.

The determination of the value of reward is crucial for investigating the role of emotions accompanying consumption. At stake here is the intensity of longing and "passion" rates much higher than the "need." In the realm of modern affluent consumption, it is then useful to make a distinction (for a given individual) between the items which are emotionally perceived as "must-have" vs. the "nice-to-have" one. Consumers have feelings about the products and, as we shall discuss later, feeling good/bad about the planned/unplanned purchase is a very important determinant of the decision. In a broader context, it can be speculated that in the developed economies individual buyers enjoy a substantial discretionary income which allows for purchasing things which are not really a must. Hence, there can be a lesser tendency for a diligent rational scrutiny.

Distinguishing pleasure from satisfaction is necessary if the neuroscientists and marketers are to apply compatible terms. The question goes far beyond semantics and relates to understanding the intervening emotional and mental states. Whereas satisfaction is linked to the underlying cause for fulfillment – satisfying a goal, meeting a challenge – pleasure/reward can be autonomous. It may derive from activities which are not planned or just come about gratuitously following the events around us. It can as well include the vicarious pleasures, i.e. witnessing and feeling someone else's experience.

Finally, whereas both dis(satisfaction) and (dis)pleasure share (negative) positive valence, the latter notion is less constraining and more amenable to researching the *degree* of perceived reward. To illustrate the above point: Wanting food is physiologically conditioned and can produce satisfaction upon ingesting it. However, the sheer display (sight/smell) of food without consumption raises the levels of the neurotransmitter dopamine – suggesting the increase in pleasure (Volkow et al. 2002). Also, whereas satisfaction of the need may be thought of as an *outcome* related to goal satisfaction at a certain moment, pleasure can be construed not merely as a state of mind but as a cumulative *process* which stretches over time. Consequently, the sum total of pleasure linked to a particular event(s) becomes a relevant indicator of the reward and reinforcement (Rolls 2005).

Pleasure which is often equated with "liking" does not have to be consciously felt even though it implies that in such a case it is more difficult to plan for pleasure. As many people can attest, feeling good without knowing why is not quite uncommon (being depressed for no apparent reason is quite frequent as well). Berridge and Winkielman (2003) proposed a notion of the "unconscious liking" to name the affective reactions lying below the level of self-awareness – upon further activation it may lead to conscious liking but it is not indispensable just to encode preferences.

The degree of pleasure and the brain's sensitivity to it varies as a function of a number of factors including the secretion of hormones. Thus, for example, the women's menstrual cycle with its changing balance between the estrogen and progesterone contributes to the differences in the neural manifestations of liking (Dreher et al. 2007). Last not least, it is worth reminding that at least since Plato a condition of pleasure is also considered a harmonious state of body and mind.

In view of the above, the following discussion will focus on consumers' desires (or appetites) and related rewards obtained in the process of their realization.

2.2.1 *Desires and Rewards*

One can interpret the desires as the consequences of deficiencies – Ainslie (2001) uses the notion of "aroused appetites" – which can set in motion behavioral responses. They originate within the individual following the stimuli we are exposed to. Clearly, in normal people the adjustment process and the selection/consumption of the desired product/service lead to lessening of the original tension. While this idea forms the foundation of the drive reduction theory (dating back to Hull, 1952), one still lacks understanding of the specific intervening psycho-physiological processes. Findings from neuroscience point to the role of the neurotransmitters in regulating the homeostasis in the brain. In particular, the role of dopaminergic pathways appears crucial (Fig. 2.2). From the midbrain (substantia nigra and VTA) where the neurotransmitter dopamine is produced, it follows two routes to reach striatum, the amygdala, NAcc and the medial prefrontal cortex, respectively. The work of Schultz and his colleagues (Fiorillo et al. 2003) demonstrated the importance of dopamine in reward and reinforcement judged by the responses of the

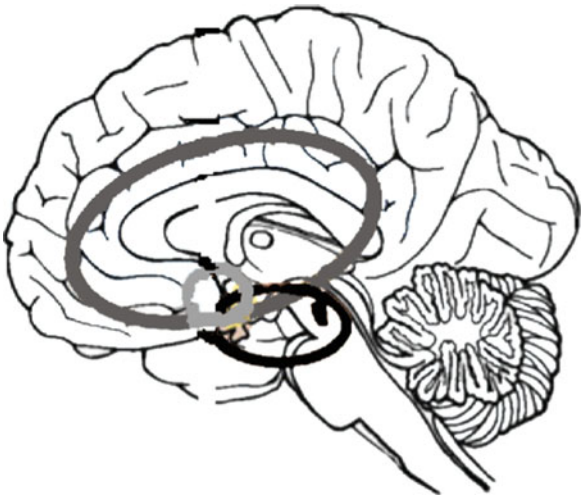

Fig. 2.2 Pleasure circuits in the brain (Kringelbach and Berridge, 2009) comprise deeper structures as well as the hedonic cortex: the OFC, medial prefrontal (dorsal and ventral), insula and cingulate cortices. The OFC is a neural pleasure marker responding to rewarding drugs, agreeable tastes and odors, touch, music, or winning money, and tracks changes in the significance of reward for food consumption. OFC projects to the subcortical NAcc involved in the positive affective reaction and particularly responsive to sweetness. Other components include subcortical areas like ventral pallidum, amygdala, hypothalamus, VTA and the periaqueductal gray matter (PAG) located in the brain stem. In addition to the networks, there are a few "hotspots" which enhance the liking response for sensory inputs. They respond if stimulated naturally or otherwise as they are susceptible to the opioid neurotransmitters. They have been detected in the NAcc and ventral pallidum but might also exist in other forebrain, limbic and brainstem regions

conducting dopamine neurons. Dopamine is linked to the reward seeking activities such as the approach, desire and consumption or addiction. It is proposed that the activity of the dopamine neurons stimulates motivation when the reward is anticipated. The corresponding mechanism is based on the experimental observation that when the reward exceeds the expectation some dopamine neurons intensify their firings in a burst-like fashion which consequently increases the desire and motivation towards the reward (Schultz 2006). To complement this model a steady (tonic) activity signals things as expected, and pauses in firing parallel a negative surprise ("worse than expected"). Thus, the presently dominant theory of dopaminergic function is based on the "reward prediction error" hypothesis – what the release of dopamine encodes is the **difference** between the actual and expected reward of an event.

The above discussion implies a very important response in the brain to positive surprises. This can extend to the interpretation of the joy the consumers feel when the event surpasses their expectations (such as the superior performance of the product or a breathtaking circus show). But since the dopaminergic system has not been found all too responsive to the negative prediction error, perhaps another brain apparatus (amygdala? insula?) and other neurotransmitters get involved as well in encoding the dismay. Further, the scheme would be incomplete without asking which system in turn influences the activity of dopaminergic neurons (Mena-Segovia et al. 2008).

There is another element of the function of dopamine, namely its role in learning and creation of beliefs to form knowledge about which behavior leads to which reward. Clearly, a confrontation of the actual with the forecasted outcome helps to develop more realistic expectations next time around. In addition, a positive connection between the uncertainty about the outcome and the increased release of dopamine in the human brain was observed (Fiorillo et al. 2003). The practical implication can prove far-reaching: in that context, more dopamine stimulates more risk-taking behavior for the sake of exploration of cause-effect relations and the eventual reduction of uncertainty in calculating the consequences of one's actions. In a certain way, such an attitude can help overcome the "hot stove" effect so eloquently described by Mark Twain and later quoted by the management scholar – James March. Namely, a cat that jumped on a hot stove would never jump on the stove again, regardless of whether it is hot or cold.

A different but not necessarily contradictory view holds that dopamine responds primarily to how much a particular reward is "wanted," which is separate from how much it is "liked" (Berridge et al. 2009). While tested mostly in the context of food consumption in the animal and some human studies, this approach showed that following certain manipulations one can eat/drink more as a function of want stimulation **without** a preceding change in liking. Also, the subjective pleasantness of meals is influential in the food choice, but may be less important in accounting for the variability in the quantity consumed (Finlayson et al. 2007).

Although common sense dictates that people want what they like, it is not always the case and wanting is different from liking also because different neural circuits are respectively involved. For example, affective value of a reward as reflected on a continuous scale is displayed in different brain areas than consideration of the "take

it or leave it" issue. This suggests a separation (different processing function) of apparently related but not identical tasks facing consumers. Grabenhorst et al. (2008) recorded with the use of the fMRI imaging the responses to a pleasant warm, unpleasant cold and various other combinations of these stimuli. When participants pondered the decision of whether they wished the stimulus to be repeated in the future – a "yes" or "no" question — activation in the MPFC was observed. Also, the dorsal cingulate cortex, anterior insula and VTA were simultaneously stimulated. When during the experiment the affective value was to be rated on a continuous scale, the pregenual cingulate and parts of the OFC were activated – these two areas tend to modulate pleasantness ratings for other sensations like tastes and odors, as well (Grabenhorst et al. 2007).

Separating wanting from liking has some far reaching implications for the theory of consumer behavior (Berridge 2003).

1. People do not always know what they like and equating buying with liking is not warranted. Consumers may want what they do not like.
2. Wanting does not produce affective reactions, liking does.
3. Wanting and liking can be enhanced separately.

It rests to be determined, whether the inferences from studies on sensory liking (and, more specifically, based on tasting food) apply as well to more abstract pleasure sensations such as social relations, videogaming or perception of beauty. So far, it has been shown that NAcc activates to both the pictures of attractive sexual partners (Knutson et al. 2008a) and during the anticipation of a monetary gain (Knutson et al. 2001). The fact that the NAcc is not just dopamine rich but also represents a part of the opioid neurotransmitter system is certainly a contributing factor.

There is more to be clarified about the causes of liking. Certainly, trying and consuming things represents a real test and a basis for affective evaluation, and the situational factors color the experience. Yet, there are instances when feeling of liking emerges spontaneously. We see a person (or even a dog) and instantly intuit whether we like her or not. Love at first sight serves as an extreme yet not uncommon manifestation thereof. A mysterious nature of liking has, among others to do with the pervasiveness of stimuli. A while ago, Zajonc proposed an "absurdly simple" explanation. It posits (for a more recent validation, see Zajonc 2006), that the sheer repeated exposure to stimuli is crucial in forming preferences – something the advertisers must have known for a long time. This effect applies not just to conscious processing but, even more importantly, to subliminal stimuli (Zajonc 1980). Why is that out of a number of relatively neutral bits of information (symbols, numbers, certain words) those which are presented more often elicit a more favorable attitude? The mechanism involved stems from a basic assumption of conditioned stimulus. Namely, as the frequency of the stimulus increases and no harm is produced, people become more comfortable with the event; develop the approaching attitude, and consequently a positive affect to the object in question. In a more recent study, Krawczyk et al. (2007) demonstrated that prior subliminal (20 ms) exposure to pictures of previously unfamiliar grocery items (snacks, candy, soap, drinks) led to a subsequent stronger preference over the non-exhibited groceries. fMRI scans

showed a reduction of the visual cortex activation during later exposures relative to the early ones indicating that repeated exposure (even at the subliminal level) leads to a greater fluency for an item. In addition, later non-subliminal exposures generated stronger activation of the medial prefrontal cortex and in the limbic areas. Hence, the connection between the exposure and the preference lies not only in the enhanced visual fluency. Repetitive exposure also engages the brain areas which compute the value of the items and the individual's preference.

Winkielman and colleagues developed a *hedonic fluency hypothesis* (Winkielman et al. 2003) which extends the logic of the mere-exposure effect. They theorize that all other things being equal, stronger preferences emerge for objects (1) presented with higher clarity or higher figure-ground contrast, (2) presented at longer durations, and (3) when mental processing of objects' attributes is facilitated with the perceptual or semantic primes. Further, the same hypothesis implies the "beauty-in-averages" effect which stipulates that the prototypical objects are better liked then the out-of-ordinary ones.

There is a corollary to this proposition in that people are more likely to predict the outcome they like rather than the undesired one. This represents one of the frameworks of what is typically labeled as wishful thinking (for a review, see Krizan and Windschitl 2007) and a reflection of the optimism of the deciders. The logic of this phenomenon can be interpreted as a larger than real perception of the positive outcomes in the actual world (for the differences between the optimistically and the pessimistically-inclined individuals refer to the subsequent chapter). In line with the above arguments, a study involving the Rutgers University graduate students looked into their anticipated rate of use of the presents they expected for the holidays. When contrasted with the actual frequency of use as reported 4 months later, the original estimates proved significantly higher. What is more, the usage rate seems to be much more accurately predicted by the outsiders who do not know the gift-receiving individuals.

Modeling the repetitive nature of many desires and rewards is a challenging task. One still needs to explain how people move forth and back from the state when they feel a certain urge, to a condition where as a consequence of behavior/consumption the need subsides and then re-emerges (Vohs and Baumeister 2007). A search for explanation calls for a mechanism which produces "fading away" of positive emotions – the phenomenon highlighted by Wilson et al. (2001). Accordingly, continued pleasures wear off; continued hardships lose their poignancy (Frijda 2007). But following perhaps a similar mechanism, pleasure after suspense is considerably stronger than what the same event produces without prior uncertainty.

Research in neuroscience adds a new twist, however. Human (and perhaps animal) brains are wired to respond to novelty. It has been namely shown that dopamine whose secretion is linked to pleasure is also released when people encounter new stimuli. This activity is reflected in striatum richly endowed with the dopamine receptors which manages the interaction between the individual and the outside world. Accordingly, the new information reaches the striatum with the supplement of dopamine, produces a gratifying experience (Berns 2005a) and in turn directs striatum to re-focus in proportion to the intensity of the novelty signal

(Zink et al. 2005). One way to explain this phenomenon is that whereas the pursuit of new experiences entails risks, at the same time it offers a promise of new positive sensations. The more so, that under uncertainty, the level of stress hormone cortisol rises in the brain, and together with the dopamine secretion can ultimately produce a strong feeling of wellness. In a series of experiments, Maimaran and Wheeler (2008) showed that the abstract novelty exerts an impact on subsequent consumers' choice of the real things. They used arrays of different geometric shapes to demonstrate a dual phenomenon: (1) exposure to variety of nonrepresentational symbols enhances the variety – seeking behavior when it comes to real choices, (2) as a separate trend, consumers favor uniqueness in actual preferences when previously primed with the uncommon abstract cues.

Novelty seeking extends to such areas as education and entertainment. As a matter of fact, the concept of the Discovery TV channel or programs like National Geographic was based upon such assumption. Yet another area where the consumers' penchant for novelty has been duly recognized is the computer- and video-gaming. This industry is not only keen on supplying a steady stream of new products but, in addition, designing games incorporating the features changeable by the user (different scenarios, level of brutality, and degree of difficulty).

The curiosity factor in humans dovetails with another feature: boredom. Mojzisch and Schultz-Hardt (2008) proposed a model of mental satiation which posits that repeated performance of an action reduces the person's need for achievement. This in turn is followed by a loss of motivation to perform the usual action and requires determination to persevere. Such lack of motivation in the first phase of the satiation process coincides with a decrease in brain activity in the NAcc, the ventral pallidum, and the medial OFC – all linked to processing hedonic sensations. In the second phase of the satiation process, growing aversion parallels the increased activity in the amygdala, the anterior insula, and the ACC which are associated with the unpleasant affect and volitional control. Baars (2001) conducted an experiment during which the participants had their brains PET-scanned when they played a computer game (Tetris) for the first time, and subsequently after a month of daily practice. The result was that the areas of excitation remained unchanged with only the degree of activity in each area getting lower. This reflects a gradual task automation which at the same time frees resources available for simultaneous unrelated functions. It is in that context that the tendency of vivid rewards to fade away into habit as one becomes more skilled at procuring them may lead to the continuous exploration of the environment in search of new thrills.

Thus curiosity-boredom dimension is instrumental for the analysis of the timing of satiation and its relation to the intensity of pleasure. The critical aspects in that context are the pacing and the length of pleasure as joint proxies for the value of sensation. This point can be illustrated with the examples drawn from the eating habits showing that augmenting the variety of food on the table sustains interest in eating, increases the food intake and delays the development of satiation (Hetherington et al. 2006).

2.2.2 *Pleasure and Reward*

In contrast to pleasure which represents a desirable experience, in relation to consumer behavior the reward has an additional *reinforcing* connotation in that it tends to stimulate a repetition of the preceding behaviors. As mentioned above, a highly interconnected network of brain areas including orbital and medial prefrontal cortex, amygdala, striatum and dopaminergic mid-brain engages in *reward* processing. Reward can be attributed different dimensions – different types of values guiding behavior. A recent study by Hare et al. (2008) located three separate areas in the brain in charge of distinct valuation tasks. The *goal values* that measure the predicted reward associated with the outcomes generated by each of the actions considered are correlated with the activity in the medial OFC. The *decision values* that gauge the net value of taking the different actions correspond with the activity in the central OFC cortex and the deviations from the individuals' previous reward expectations (prediction errors) seem to be portrayed in the ventral striatum.

Thus, the key approach to studying the influential forces in consumer behavior relates to addressing various aspects of pleasure and factors affecting its scope (and to an extent of its opposite – discontent). From that perspective, one obvious modern trend to look at is the demand for "cosmetic" drugs in people's pursuit of rewarding experiences.

2.3 Neuroscience and Yearning for Comfortable Life

In the quest for a long and rewarding life, people value the clarity of thought, good memory, the emotional stability and the "feel good" spirit. Consequently, it is not surprising that even healthy people turn to modern medicine to achieve such enhancements. The phenomenon might be not so new if one bears in mind that the military has experimented with such means for years. While we do not address the issue of procurement of those medications (official or not – some are marketed as just the dietary supplements), the matter of fact is that the enhancing drugs have become socially acceptable as people cope with the increasing stress of life, want to feel optimistic, stay calm, concentrated and boost the processing power of their brains. This development is characteristic of various groups of populations. On the one hand, the use of the prescription stimulants has been on the rise among the US high school and college students involving as many as 25% of the total population on some campuses (McCabe et al. 2007). In a national US study, more than half of respondents aged 16–24 years stated their interest in enhancing their intelligence and performance through medications (Canton 2004). On the other hand, it is the mature people as well who display an interest in drugs and supplements which foster the cognitive functions. The sales of just one category – products which promise an improved memory in the middle age and beyond – reached one billion dollars annually in the United States alone (Hall 2003).

Three different categories of prescription drugs are in demand by the "off label" users.

- Opioids for treating pain
- Central nervous system (CNS) depressants to ease the anxiety and sleep disorders
- Stimulants for the treatment of the day time sleepiness (narcolepsy) and the attention-deficit disorder (ADD)

The "neurocognitive enhancement" refers to the attention, working memory and inhibitory control. Drugs that target the dopamine and noradrenaline neurotransmitter systems are not only effective at improving deficient executive function but also enhance the normal functioning. Interestingly, with respect to complex spatial working memory tasks, the improved accuracy of processing is the most pronounced in the people with the lowest initial performance level (Elliott et al. 1997). When the research findings get publicized by the media, even the average person might find it difficult to resist the temptation of becoming a brain athlete. What is good for the jet pilot (Yesavage et al. 2002) should not be bad for the hard working professionals in the modern competitive world. It is not surprising, then, to see that, for example medications to treat the chronic sleep problems are used for off-label applications such as to increase alertness in the normal people.

Cosmetic medications are not just about augmenting cognitive skills. Some of them improve the mood and enhance pleasure and constitute the subcategory of the "lifestyle" drugs whose global sales were estimated to surpass $29 billion by the year 2007 (Atkinson 2002). Is it possible and reasonable to hide the fact that certain substances help release far more (and instantaneously) dopamine than naturally? As Chatterjee (2004) suggests, neurologists and other clinicians are likely to encounter patients–consumers who view physicians as the gatekeepers in their own pursuit of happiness. As between 33–50% of American women are dissatisfied with how often they reach orgasm (http://www.webmd.com/sexual-conditions/orgasmic-disorder?ecd=wnl_wmh_030308), one can easily conclude that demand is there.

Little if anything is known about how the healthy consumers' perceive the psychopharmacological products. However, one pioneer survey demonstrated that when presented with a hypothetical option, healthy young people are more willing to resort to pharmacology to enhance their personal traits that are not believed to be fundamental to self-identity. This implies a greater acceptance of off-label medications (such as amphetamines) which improve performance in the field of cognitive fitness as opposed to drugs which alter the individual emotional styles (Riis et al. 2008).

As if in response to the popular demand, new classes of drugs, such as ampakines and cyclic response element binding (CREB) protein modulators are being synthesized. These medicines are not being developed to treat diseases/disorders. Rather they augment the normal encoding mechanisms associated with the acquisition of long term memories (Chaterjee 2006).

The scope of applications of the new life-improving chemicals is potentially quite broad and, as the example below illustrates, may extend to dealing with lesser nuisances.

Viagra might not just treat impotence but also help overcome the jet lag. In a lab simulation, the fraction of a pill made rodents adjust 50% faster to the 6 h time advance. This generates hope that the drug can be equally effective with the humans. The explanation has to do with the Viagra-induced release of the so called cyclic guanosine monophosphate (cGMP) which temporarily advances the body clock in the brain. Even though the drug does not seem to work when the clock is set back, it still offers a better promise to humans than the hormone melatonin which is quite popular nowadays. Because of the small dosage involved, no erectile side effects would occur (Agostino et al. 2007).

2.3.1 Comfort Foods

A presumption that the psycho-medications may also enhance normal abilities applies to the "natural" substances as well, notably those found in food. Advances in the neurochemistry and the quickly spreading public awareness thereof may actually renew the interest in the more natural "food for mood" products. The "natural" label clearly reduces concerns related to absorbing chemicals. The growing popularity of gingko bilkoba leaves' extracts is just one example of the trend. Richard Wurtman of MIT long ago argued that many food constituents can actually affect the chemical composition of the brain. Those components consist of certain amino acids (the building blocks of protein), choline, and the ordinary carbohydrates. They possess the ability to modify the production or release of the neurotransmitters and constitute a potential tool for amplifying or decreasing synaptic neurotransmission (Cansev and Wurtman 2007). At least five to six of the 30–40 neurotransmitters that are used by the brain cells can be affected by the nutrients. For example, carbohydrates cause the pancreas to release insulin into the bloodstream. That lowers the blood levels of all amino acids except the tryptophan. Since the tryptophan competes with some other amino acids in order to pass through the blood–brain barrier, when the level of those other substances get lowered, more tryptophan passes into the brain where it gets converted into serotonin.

Whether the high-carbohydrate meal will make the eater calmer and more efficient mentally depends on the time of the meal. At dinner, it will relax you but served at lunch it may make people sluggish and sleepy some time after.

Whereas neurochemistry explains the mechanisms whose symptoms have been known for a very long time, the knowledge gained creates a new incentive to modify one's diet and demand for food supplements. Tyrosine and choline can serve as examples. The first has anti-stress effects and helps cope with the diminishing attention. The second – a building block of the neurotransmitter acetylcholine – seems to mediate the memory, intelligence and mood. However,

there is a price to pay – the choline-rich foods (for example, egg yolks) contain cholesterol.

Also, the long-chain omega-3 fatty acids (DHA and EPA) found in the oily fish, get a lot of attention as they are essential for normal brain development and function. Fish oil is rich in DHA and EPA which in the lab studies matched the performance of the antidepressant drugs in preventing the development of signs of depression (Carlezon et al. 2005).

Whether indeed the food constituents taken in the natural or in the chemically synthesized form can make normal people smarter needs to be proven. It is not hard to imagine, though, that the same expectation to improve the work performance and keep the positive mood can lead consumers to use the foods and supplements to enhance their processing power faced with difficult buying decisions.

The orexin neurons, a newly distinguished family of neurons in the hypothalamus, connect with almost the entire brain and can control food intake, metabolism and food-seeking behaviors guided by alertness and reward. They project to NAcc and VTA – whose role in the reward function and motivation was discussed before. When energy levels fall, they become active and stimulate wakefulness and activity to ensure an animal seeks out food. Conversely, glucose and hormones such as leptin block them, which explains why we feel sleepy after a meal (Saper et al. 2002) and finish it with a coffee.

In sum, the implications of the food we eat are of dual but not necessarily separate nature. For one, it impacts the performance on a variety of the physical and intellectual functions. At the same time, it influences the nature of person's behavior including the long term transformations. For instance, over a longer period of time, the appropriate change of diet (to be enriched with fatty acids and vitamins) can temper aggressiveness as demonstrated in a study of young British inmates (Eves and Gesch 2003).

> What about the red wine which if drunk with moderation has a beneficial impact on the sexual desire and fulfillment of (Italian) women? One hypothesis (Mondaini et al. 2009) links this phenomenon to the contents of polyphenols in the red varieties of the classical drink which warms up the mind and soul.

Food preference and selection may thus result not only from the sensory pleasure of seeing, smelling and tasting it, but also from conscious learning and unconscious inferences about how our mind performs as a function of what we ingest. The old saying: "we are what we eat" acquires a stronger symbolic meaning when related to the neurological bases of personality. It can be expected that the dissemination of the findings in psychopharmacology will create an ever growing market for the neurocognitive enhancement products. In this context, one can ask whether the consumers' habit of using stimulants which moderate their

mood and cognitive skills before, during and after the buying process does not produce a far greater impact than what is traditionally accounted for under the "situational factors."

2.4 Brain Reactions to Food Consumption, Patterns of Liking and Preference

A wide range of pleasures materializing during human life is registered through the reaction of biological senses.

One of the prolific areas of the neuromarketing research relates to the consumption of food and beverages – they form not only the basis of the fundamental physiological needs but also a source of pleasure. Observing people's eating habits offers a convenient vantage point to notice not only how the decisions are made but also to analyze how the ingestion takes place. Further, the reactions to taste can be easily manipulated neurologically by changing the experimental framework, and are good proxies for "liking" – a gauge of sensory pleasure. In contrast, the corresponding research on acts of consumption with respect to other product/service categories appears a bit more difficult to conduct as will be shown later.

When ingesting food, we are exposed to a barrage of stimuli. For example, there are different pleasurable aspects of wine drinking. They derive from the taste of the wine itself, the act of drinking or sensations produced after wine is consumed (Duncker 1941). Eating a chocolate bar stimulates the sense of taste (flavor), the sense of touch (the texture), vision (attracted to not only the product itself but also to its logo and packaging) and even the auditory sensations (the sound of biting, like the one designed by Nestlé Crunch). Traditional introspection is clearly not so well suited to detect the unconscious attitudes and reactions. It is only recently that we became capable of uncovering the brain mechanisms corresponding with such phenomena.

A typical format of experiments involves the beverage consumption as, in contrast to solid foods, liquids can be administered with a pump to the subject inside the scanner – the person will thus avoid chewing and related head movements.

2.4.1 Drinking and Learning

The framework of some of the beverage drinking studies can be illustrated with reference to one of the experiments by O'Doherty et al. (2006) who looked at the beverage liking associations following the consumption experience. The purpose was to investigate coding of preference by using the abstract symbols visually accompanying the drinks tested. In this experiment, subjects were first asked about their pleasantness ratings for four different fruit juice beverages and the odorless control solution. Subsequently, the participants were shown five different abstract visual cues, each of which preceded the following degustation of one of the five

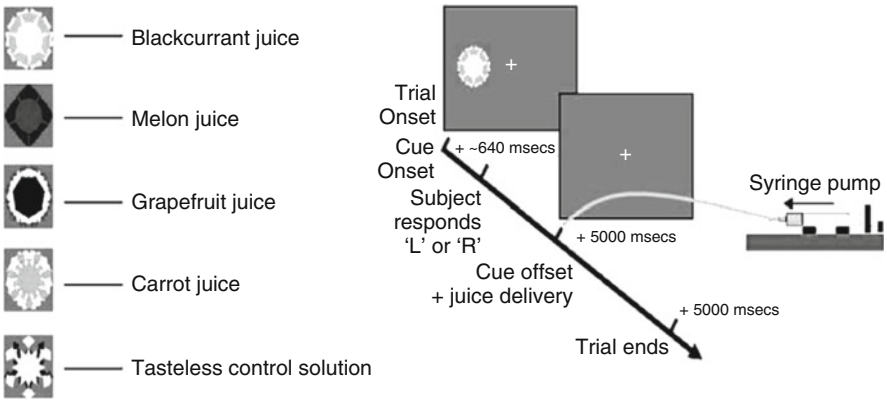

Fig 2.3 Conditioning to the taste of juice – task illustration (courtesy John O' Doherty). (Left) Fractal stimuli used in the experiment. Each fractal was paired with a different flavor stimulus. (Right) Illustration of timeline within a trial. At the beginning of each trial, a cue stimulus was presented on either the left or right side of a fixation cross

drinks. To avoid bias, formally the participants' job was to indicate where on the screen the stimulus had been presented. Five seconds later, the cue stimulus presentation was terminated, and at the same time 0.7 ml of the relevant flavor stimulus was delivered intra-orally. After another five seconds, a new round of the same experiment was conducted. Figure 2.3 illustrates the procedure.

As hypothesized by the above–quoted authors, in the course of the experiment the previously neutral visual cues quickly became the predictors of the participants' drink preferences. This was confirmed through the observation of the brain structures related to reward and reward-related learning: the ventral striatum, the midbrain (in the vicinity of the dopaminergic nuclei), the amygdala, and the OFC cortex. As a result, activity in the ventral mid-brain closely corresponded with behavioral preference. Thus, the greater the activity in this area in response to a predictive cue, the more the associated beverage was preferred. Yet another region of interest – the ventrial striatum – showed a strong dual response. In response to the cues, the activity in this area appeared to be equally strong for the least preferred as well as the most preferred juice. This might suggest that ventral striatum registers the relative strength of the available stimuli leaving the evaluation of the absolute pleasure to the ventral mid-brain. Two parallel patterns were also observed.

1. Responses to the cue associated with the most preferred stimulus – pushing the button upon seeing the cue on the screen – were significantly faster than the cue associated with the least preferred stimulus by the second block of trials. This suggests that greater liking produces a faster reaction to a stimulus.
2. There was evidence of an increased arousal due to anticipation of the subsequent presentation of both the most and the least preferred stimuli. This was revealed by the anticipatory eye pupil dilation in the subjects shortly after they saw the fractal symbol and before they sampled the drink.

Knowing that abstract pictures can represent the pleasure associated with the "real thing" raises the issue of how the image of the product and its actual consumption reinforce the experience. Rolls and McCabe (2007) at Oxford University examined the response to chocolate consumption *with* and *without* the product images. Participants divided in two groups according to their affinity for chocolate were presented first with the appetizing pictures of chocolate bars and then tasted the liquid chocolate fed to them through a tube while in the fMRI scanner. The cravers consistently rated the experience as more pleasant and their brains also reacted differently. Three regions crucial for pleasure sensation and addictive behavior – the OFC, the ventral striatum and the cingulate cortex – displayed greater activity in the chocolate lovers compared to non-cravers. At the same time, combining the sight and taste of chocolate produced a stronger reaction in both cravers and non-cravers, than either stimulus separately. Hence, seeing the food we eat plays a meaningful role in enjoying its taste.

The beverage's image (also figuratively speaking), however, is mentally embodied in more subtle ways. The pioneering work by Read Montague and his colleagues (McClure et al. 2004b) addressed this point with respect to two popular sodas. Their study added a neuroscientific component to a traditional blind-taste test. At first, in a blind test no significant differences were manifested in the rate of selection of Coke over Pepsi – a similar proportion of the participants favored the former as the latter. Also, no significant correlation was found when the subjects verbally declared preferences and when they revealed their actual preference during the experiment (that is Pepsi fans were, unknowingly, quite likely to prefer Coke and vice versa). However, when in a subsequent round the participants were to disclose their preference for either the drink served in a Coke (Pepsi) cup or in the unlabeled one – they were told that the unlabeled could contain either Coke or Pepsi – the favorable strong bias for Coke emerged. In the third series with the participants confined to the scanner, the image of the familiar can (Pepsi or Coke) preceded the delivery of the drink. This was contrasted with a different routine – showing the neutral sign indicating that either of the drinks would be administered a moment later. The knowledge that Coke would be delivered produced a strong reaction in such brain areas as: bilateral hippocampus, parahippocampus, midbrain, DLPFC, thalamus, and left visual cortex. In case of Pepsi, however, no such response was observed. The contrasting reactions should be ascribed to cognitive processing of the label connotation as the gustatory sensation in the consumers' brain (specifically, in the ventral putamen). The importance of this inquiry is that it produced a brain picture of the cultural conditioning of the preference among the substitute branded drinks and showed its separation from the region which processes the taste impressions. It is pretty revealing that a few years later when Koenigs and Tranel (2008) replicated this experiment with the participation of the patients with a damage to the VMPC – area involved in processing emotion – this group addressed the brand information "open mindedly" and did not demonstrate the preference bias when after a blind test in the next stage the brand identity was disclosed.

The above-mentioned studies shed new light on more general issues of information processing by consumers. In particular, they direct our attention to the

simultaneous impact of various sensory stimulations on the reactions of the human mind. With respect to denoting the taste, flavor, and food reward, it is the OFC which plays an important role. In what applies to foods and beverages, distinct sensory inputs fuse into a unitary flavor percept which is encoded in the orbital cortex. In the process, the perceived affective value is registered and the perceived pleasantness of the eating experience computed and represented (Small et al. 2007). This exemplifies one of a variety of circumstances when the OFC forms a part of the large-scale neural system in charge of decision-making blending emotion and cognition.

2.5 On Beauty

Preceding discussion leads to an exciting question for marketers regarding the secret of beauty and attractiveness as seen from the neural perspective. Many recent findings in the field of *neuroaesthetics* shed fresh light on some old wisdom and their importance goes beyond sheer theorizing. People not only feel rewarded when contemplating beauty in art but also in the everyday life and in social contacts with each other. Consumers long for objects which are aesthetically pleasing and, for that reason, associable with glamour and luxury. They enjoy not only beauty per se but the surrounding beauty as well. For example, the presence of visual art on packaging conveys the perception of luxury (Hagdtvedt and Patrick 2008).

> In the words of one former GM executive, the company is in business of creating "art, entertainment and mobile sculpture, which, coincidentally, also happens to provide transportation". This is echoed by the former BMW's Design Chief (Chris Bangle) whose ambition was to make the "moving works of art that express the driver's love of quality."

2.5.1 Beauty in the Eye and the Brain of Beholder

Processing visual information leads to aesthetic evaluation of the form, proportions and color. It is amazing but not just coincidental that many of the tasteful and harmonious aspects of the appearance of objects and people reflect the canons of nature. For example, in a study of "naïve" observers viewing the genuine and stretched pictures of the classical sculptures, the neural response to the original work involved a stronger activation of the right insula when spotting the latter (Di Dio et al. 2007). When participants were next asked to express their opinion regarding the beauty/ugliness of the same pieces of art – original photographs vs. modifies ones – they overwhelmingly preferred the former. This suggests that the right insula reaction to the golden ratio displayed in the original statues must have

reflected **positive** feelings. Let us mention that the golden ratio (1: 0.618) has been the standard in sculpture and architecture since antiquity, has some unique mathematical connotations and is also characteristic of a number of proportions in the human body and face. When it came to evaluation, the judged-as-beautiful images selectively activated the right amygdala – the phenomenon which the authors ascribe to the emotional memory retention function of amygdala. The amygdala acted as if it was recognizing emotional experiences from the past (Di Dio et al. 2007). In sum, the study gave support to the idea that there indeed exists the objective standard of beauty encoded in the neuronal reactions. Together with this biological heritage, the subjective judgment based on individually registered experience mediate the perception of beauty.

Ability to discern proportions and symmetry seems to affect the degree of visual processing of artistic beauty. Drago and co-workers have shown that people who are able to more accurately detect a midpoint of a line drawn on a screen, also tend to be more emotionally sensitive to paintings (Drago et al. 2008). In a truly large scale international endeavor with participants from five culturally diverse countries, the self-determined ratings of the emotional impression of the artwork created by the relatively unknown American abstract painter significantly correlated with the precision in the geometric task. Authors ascribed this association to the broad specialization of the right hemisphere which controls both the attentional skills (necessary for line bisection) and the evocation of emotion.

Is it possible to put in the fitting rooms of the clothing stores the mirrors which make people look slimmer? The idea is not as far-fetched as one might think.

It is clear that the notion of rhythm is not limited to aural sensations alone. It is present in visual arts as well. Some repetitive patterns arouse our interest and attention more than others. As noted already by Smets (1973), the abstract patterns with a redundancy of 20% evoked a sharp peak in the brain arousal and seemed to create an optimal pattern of stimulation in the brain. Such designs present a desirable amount of order – too much chaos becomes overwhelming, too little does not sustain interest. The preference appears to be innate and universal as the newborn infants prefer such patterns and the tendency is common in various cultures. Wilson (1998) notes that Smets' high arousal designs bear resemblance to friezes, logos, colophons, and flags used throughout the world. It turns out that the valued works of modern nonfigurative art share a similar degree of order and organization (Fig. 2.4).

Kawabata and Zeki (2005) showed that the experience of visual beauty correlates with the activity in the medial OFC and is clearly linked to reward. In their study, participants were shown in the scanner many different paintings from abstract, landscape and portraits to still lifes – and rated their perception of beauty. Regardless of varying individual preferences, whenever a person viewed the artwork she found appealing, there was an increased activity in her OFC. Furthermore,

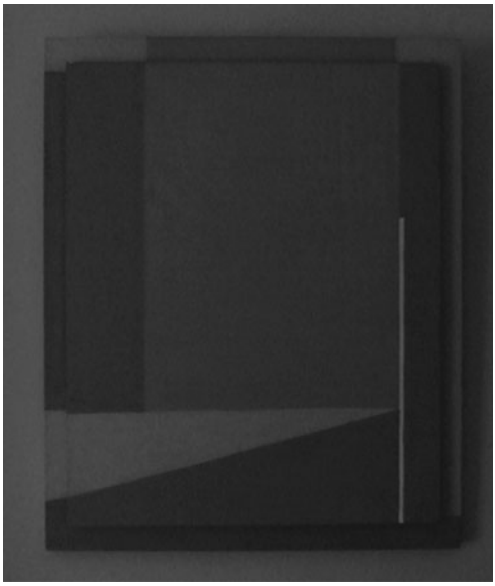

Fig 2.4 Example of geometric harmony by H. Stazewski (from author's collection)

the rise in that activity matched the ratings the paintings received from each individual thus confirming the subjective experience. In addition, beautiful pictures stimulated activity in the ACC and the parietal cortex which are associated respectively with the reward and the spatial attention. Ugly pictures in turn evoked reactions in the motor cortex – the meaning of that reaction being wide open to interpretation (perhaps suggesting a physical evasion).

The real-life experience and memories provide a framework against which the aesthetic perceptions are categorized. What happens when the conventional setting in which the appealing objects/images gets replaced by the atypical one? Inspired by the great surrealist artist – René Magritte – famous for depicting ordinary objects in non-traditional contexts, an experiment was designed to trace the neuronal ramifications of the "misplaced beauty." It was discovered that the increased patterns of activity in the medial OFC were no different for the positively rated pictures of the original compared to the computer-manipulated renditions of the artwork. Similarly, there was no difference in the enhanced activity of the lateral OFC (known to represent the punishment aspect of a variety of experiences) to the unattractive pieces regardless of the setting (Kirk 2008). Interestingly, the average scores for likeability were similar for both normal and abnormal setting. However, the out- of-context setting contributed to a much greater polarization of opinions, i.e. more extremely positive and negative and less indifferent judgments. This highlights the difference between the more conservative and the more creative mind frame of individual subjects. At the same time, the prefrontal areas proved significantly more engaged when objects were shown in the non-traditional context. Hence, the pre-established logic of "where the things belong" is invoked when the very novel

arrangements are presented for aesthetic judgments. Also, the context in which a picture appears sometimes leads us to imagine things which are not there. For example, with a vague background, we have a lot more opportunities to fill in the missing data than in the case of a bright, clear background; so we are apt to "see" images that are consistent with that scenery (Zhaoping and Jingling 2008).

A Certain Smile of La Gioconda

What people see depends on how they look and that logic has implications for product design, packaging and interpretation of marketing communications whenever the facial expressions or body posture are involved.

It was thought previously that the most famous smile ever depicted – the elusive facial expression of Mona Lisa – appears and disappears depending on which part of the mouth and from what angle the viewer is looking at. More specifically, however, it turns out that lighting and size of the picture (or a distance from it) play a role in sending the mixed signals about her perceived feeling. In an experiment by Spanish researchers (Alonso Pablos et al. 2009), when the viewers moved in closer or viewed a larger replica of the masterpiece, they started discerning the smile as if in proportion to the size of Mona Lisa's lips. But the most intriguing piece of the puzzle came to light when the subjects first stared for 30 s at either a black or white screen followed by a shot of the Mona Lisa. Previewing the black screen apparently increased the likelihood of seeing Mona Lisa's smile. This would have corresponded with switching-off the off-centre channels (see Chap. 1) leaving the on-centre cells as the true detectors of that enigmatic smile portrayed by the genius Leonardo.

Certainly, in admiring visual arts the color palette is a distinctive striking feature people are most aware of, already from a distance. While the specific hues like the Siena gold or the Italian blue sky depicted by Tiepolo are deemed gorgeous by a casual observer, it is the context in which they appear and their contrast which account for the complete impression of beauty. The subject of color in marketing is so vast that one cannot do it justice within the confines of this chapter. At the same time, neuroscientists have not yet thoroughly addressed the important issue of the **meaning** of colors. For example, is there a natural validation of the specific use of red and green lights in traffic regulation? The realization of some simple rules proves quite telling. For one, the experience of living on Earth makes people expect that darker colors will be on lower surfaces and lighter colors on the higher ones. This natural order of things forms a basis for the implicit harmony in many settings. The importance of this rule goes beyond the sheer aesthetics – applying this concept to the design of the spaceship contributed to the comfort of the astronauts, helped them maintain balance and prevent nausea (Barrett and Barrett 2007). Classification of colors includes such categories as "hot" (reds, yellows, oranges as pertaining to fire) and "cold" (grey, blue, greens as epitomized in water) varieties with the first exerting the invigorating and the second the soothing effect. What do they signal neuronally is

not clear, though. One indication of a mechanism at play is that the subdued green light enhances the production of dopamine and provides a calming sensation.

Colors and Healing
One area where the connection between the visual beauty, harmony and a positive stimulation is of great importance is the health care environment. The "white on white" combination still common in many facilities feels unnatural and not conducive to a relaxing atmosphere. The brains of the recovering patients need stimulation and change. What colors and in what arrangement perform such function is still an open question. In one case of a medical center in India, sherbet-tone colors were chosen specifically for their healing quality, giving a sense of joy and liveliness.

And in a survey investigating color associations of medicinal pills in 11 countries, Lechner et al. (2006) reported the following associations:

Medium Red: powerful, fast acting
Dark Red: energizing
White: plain, common, dependable
Black: discomfort, disgust, unhealthy, failure
Blue-Green and Yellow-Orange: innovation and first in class

Since the tablets are taken orally some analogies to food colors are quite evident.

In sum, it should not surprise that nature itself proves an inspiration and a benchmark for the appreciation and design of marketable beauty. For an average person, nothing symbolizes aesthetic pleasure more than the flowers because they are beautiful in shape, color and smell and abound in infinite variety. They certainly make us happy – when recognizing a gift, both men and women receiving flowers appeared to display the authentic 'thank you' smile far more often than when given a pen (Haviland-Jones et al. 2005).

2.5.2 Angular or Round?

From the fact that biological conditionings and learning form predispositions for beauty follow practical implications. One of the cherished aspects of visual arts is the uniqueness associated with creativity. What is unusual in the shape of objects certainly attracts attention – people respond to odd objects/manipulations faster than to normal ones (Becker et al. 2007). For example, the v-shaped images reminiscent of the angles in the eyebrows, cheeks, chin, and jaw in angry expressions attract attention before rounded pictures (as in happy facial expressions). They are perceived as threatening but perhaps for that reason people have a tendency to linger on

them (Larson et al. 2007). That does not make things appear more beautiful, yet. For practical purposes, actually the opposite relation is true: a softer, rounder and less aggressive surface which offers a smooth visual experience becomes a source of pleasure. Possibly, sharp contours shape a threatening image that triggers the inhibitory reaction by the consumer. And, as a legacy of the evolutionary past, products whose shapes resemble those of human or animal figures or those of natural elements seem more fascinating to the viewers (Chang and Wu 2007).

If something visually appealing can be broken down into smaller modules and their features and interconnectedness can be analyzed in a fractal-like fashion, then one would come closer to deciphering the fundamental formula for "prettiness." The proportions, contrast, variety and sequence of the elements entail the secret of attractiveness. The implications for marketers are potentially manifold: from plastic surgery to jewelry, crafts, fashion products and the palatable integration of ingredients on a plate.

> As mentioned by a famous design theorist – John Maeda – a dinner in a completely white environment (walls, furniture, plates) not uncommon in Japan tastes differently than in a traditional European décor regardless of the menu (Maeda 2006).

2.5.3 Beautiful Sounds

Life without music would have been quite deprived of the excitement. What makes it so beautiful that the listeners feel deeply moved, repeatedly sing, hum or whistle the tune? Accompanied by words or not, the abstract sounds have the magnificent power to produce a variety of moods in the listener which is also why music is used for the purpose of priming in psychological studies. The combination of the scale (major vs. minor) and tempo (say allegro vs. largo) of the piece are the two main factors in the classical music. For example, the first movement of Beethoven's famous "Moonlight" Sonata Number 14 in C Minor which is played slowly and quietly undeniably generates a sad and upsetting mood. At neuronal level, response to Western classical pieces marked distinct areas of the brain as a function of different moods experienced by the listeners in a pioneering study. With respect to music deemed happy by the participants, the increased activity was revealed in the ventral and dorsal striatum, ACC and the parahippocampal gyrus. In turn, sad music reflected in the greater activation of the hippocampus and the amygdala whereas the neutral tunes engaged the insula (Mitterschiffthaler et.al. 2007). The above experiment leads one to think that beauty is internalized with the brain-created labels corresponding with the evoked feelings. Beauty can be pleasant per se but it will appear more rewarding when sounding happy. It is the music's ability to affect people's moods that makes us repeatedly choose familiar pieces, sometimes as a background – a phenomenon less common with the visual arts. Pitch is another,

albeit secondary characteristic of music. Pitch recognition and corresponding sensitivity to it are contributing factor of melody appreciation in its full richness. One of the mysteries of identifying the right tone is that its processing is related to handling a different type of signals – the spatial information. People who are tone deaf, for example, have more difficulty rotating objects mentally than people who are not (Douglas and Bilkey 2007). Perhaps this link between the pitch fluency and the spatial orientation may explain why sounds and voice categories are alluded to in spatial terms like basso profondo or alto.

Of potential interest to marketing is the topic of beauty in poetry and literature whether in written or spoken format (as in the theatre plays). Reference to acclaimed texts which are part of the school curriculum and widely popular can prove useful in inspiring various marketing communications and role-modeling. Surprisingly, there are no reports to date on neuronal investigations of beauty in the metaphors, vivid descriptions of the world around us or of our soul. There is, however, indication that music and language are processed in the same areas of the brain, namely the left inferior frontal cortex (Levitin and Menon 2003) suggesting a possible analogy in studying the captivating verbal expressions.

Does the concept of beauty apply to other sensory experiences? As for smells, there are distinguishable scents which produce the sensations of admiration and attractiveness. Creating ever new adorable blends is a top priority for the cosmetics and fragrance industry. Common belief holds that the evaluations of scent are culture-dependent and learned through experience. However, there is a common denominator which the nature has in stock for all the humans regardless of culture. Khan et al. (2007) came up with a model that predicts the universal pleasantness rating of a scent based just upon the molecular structure of the substance. This shared innate palette of olfactory pleasantness may undoubtedly serve as a foundation for development of successful truly global scents as well as smell components of many products – from car interiors, to cleaning and hygiene products, to printed items, and many others.

It is somewhat intriguing that the specific term “beautiful” is hardly used (at least in Western and Slavic languages) to describe experience related to taste or touch. It could be just the question of semantics as we certainly recognize a palatable meal or the most delicate caress. Or, it is just that the notion of beauty is implicitly reserved for more esoteric, fanciful and less mundane experiences.

As mentioned earlier, the processing fluency of the perceiver could account for positive evaluation (Reber et al. 2004). Apart from the individual differences, across the board the processing performance is positively influenced by the stimulus similarity to prototypes known to subject (Winkielman et al. 2006) as well as by priming. This assumption would explain certain phenomena of popularity in mass culture and fits the broader context of the discussion of familiarity and liking to follow next.

In sum, demystifying beauty leads to conclusion that dealing with it is not much different from enjoying all other aspects of consumption. It makes us tick as it amplifies the sensations of dealing with plain emotions. If the recipe for beauty can be deciphered from the brain studies, the marketers may learn something new about the creative talent and the “production” of aesthetic enjoyment.

2.6 Coordinated Role of Senses in Enhancing Positive Experience

Of importance are the synergies between the different types of signals like audio and visual. Already the ancient Greeks noticed music's soothing effect on emotions, and its influence on such physiological factors as the blood pressure, breathing and digestion were documented during the Renaissance. We know that certain canons apply to hearing preferences. For example, for quieter sounds low frequencies are deemed more suitable, otherwise higher frequencies are found more pleasant (Västfjäll and Kleiner 2002).

An interesting question, though, relates to the mechanism through which the naturally occurring sounds (e.g. screams, erotica, explosions, etc.) impact the brain. First, let us note that as Bradley and Lang's (2000) work demonstrated the pictures and sounds originating from the same source (e.g. rollercoaster, weapon) loaded in a very similar pattern on people's scales of pleasure and arousal. Likewise, the free recall was the highest for emotionally arousing stimuli regardless of modality. Importantly, these findings were confirmed when the subjects' somatic reactions were measured. Listening to unpleasant sounds resulted in larger startle reflexes as measured by the visual probe, greater corrugator eyebrow muscle activity and, simultaneously, in the stronger heart rate deceleration compared with listening to pleasant sounds. Electric skin conductivity responses were larger for emotionally arousing (pleasant and unpleasant alike) than for neutral materials. In sum, emotional processing of acoustic stimuli highly resembles processing of emotional pictures and suggests that the functioning of memory is quite universal regardless of the mode of the data retrieval. In addition, in information processing, a similarity of reaction to emotional stimuli in the context of perception (viewing, seeing the picture, listening, smelling) and in reading the word was observed (Lang et al. 2005). This was also confirmed in imagery and anticipation, for example, of a reward in gambling and with respect to erotica (Bradley and Lang 2007).

2.6.1 Joint Influence of Visual and Audio Stimuli

One interaction between the perceptions of the two senses is that hearing is affected by seeing. To learn how the brain perceives sounds it helps to know that in a noisy environment, observing movements of the lips improves hearing. This should not be too surprising as the deaf people provide the best example of "visual hearing" by reading lips. Vision compensates for hearing problems: the subject understands speech better if s/he also improves the eye-sight when using spectacles. In a sense, we see what is difficult to hear and hear what is difficult to see. For example, the syllables *pa* and *ka* are acoustically similar which makes them difficult to separate, e.g., when talking on the telephone. Yet, visually they are quite different, which becomes evident by having a look at the mirror when pronouncing *pa* and *ka* – one

good reason to use the videophone. At the opposite end, *za* and *sa* may not be distinguished visually but are clearly different when listened to. Researchers have documented illusions when the image of the lips steers the hearing impression towards yet a third sound when the conflicting audio-visual signals are blended. As shown by Kislyuk et al. (2008), the visual stream can qualitatively change the auditory percept at the auditory cortex level even though the acoustical features of the stimulus remain the same.

Baumgartner et al. (2006) contributed to the above mentioned line of thought by examining the impact of visual and musical stimuli on brain processing. Highly arousing pictures of the International Affective Picture System (Lang et al. 2005) and classical musical excerpts were chosen to evoke the three basic emotions of happiness, sadness and fear. The measurements were taken using the EEG Alpha-Power-Density, heart rate, skin conductance responses, respiration, temperature and psychometrical ratings. Results showed that the experienced quality of the presented emotions was highest in the combined conditions, intermediate in the picture conditions and lowest in the sound conditions. Furthermore, both the psychometrical ratings and the physiological involvement measurements were significantly increased in the combined and sound conditions compared to the picture conditions.

It is for a reason that the alarm signals combine the video and audio components to strengthen the effect and raise the level of awareness.

Such findings demonstrate what the movie producers and moviegoers know already – that music can markedly enhance the emotional experience evoked by the affective pictures. As a next step, the movie theaters for all senses such as the Prime Cinema 5D in Berlin and Vienna take a step from the three dimensional representation further to incorporate the smell of a dozen different odors and the movement sensations like blowing the wind into spectator's face or rocking the seat during a stormy scene. Further experiments aim at equipping the theaters with the water fountains to imitate the rain effects. Certainly, the right synergy of visual contents and sound effects is a crucial challenge also for designing successful videogames. The fact that they allow for replays is beneficial for the players who can modulate their experience in the consecutive runs by not only adjusting the graphics but also the acoustic component of the game.

Speech is a vast area which is tool of communication. For that matter, the accurate recognition of the emotional aspect of speech is such an important and growing research topic (see Chap. 5). Johnstone et al. (2006) conducted an fMRI study to examine the responses to vocal communications expressing anger and happiness. The participants listened to vocal expressions of anger or happiness and simultaneously watched the matching or incongruent facial expressions. In contrast to angry voices, the happy ones produced a greater activation in the right anterior and posterior middle temporal gyrus (MTG), left posterior MTG and right inferior frontal gyrus. With respect to the left MTG region, happy voices were linked to

higher activation only when accompanied by the happy faces. The left insula, left amygdala and hippocampus, and rostral ACC showed an effect of selectively attending to the vocal stimuli. An important conclusion points to the strong neural impact of just the sound of happiness.

2.6.2 Not Just Sounding Right

Some car owners recognize their automobile by the sound of the shutting door. This smash effect is often a result of the teamwork contributed by the sound designers, engineers and psychologists and is meant to be as unique as possible for a specific make. The objective of this particular as well as other sound patterns exhibited by the vehicle is to strengthen the image of durability, safety, and trust. This leads to a total concept of a car from the form, touch and sound point of view. Bisping (1997) conducted a series of experiments to show that the luxury cars were positioned in the powerful/pleasant quadrant, while sounds from sporty cars together with trucks were scattered in the powerful/unpleasant quadrant of the sound matrix. The ratings of the interior sound from the standard middle-sized cars stood in the powerless/pleasant quadrant. It was the low frequency level envelope (the beginning, middle and the end of the sound) which correlated unevenly with the ratings of unpleasantness-pleasantness and weakness/powerfulness. As a result, the perception of power can merely increase by a certain degree without reducing the pleasantness. From such a perspective, the characteristic (and patented) loud sound statement by Harley Davidson motorcycles represents the optimal combination and a strong selling point of the product.

Sounding Wrong
A safety feature which automatically locks the car doors once en route may simultaneously produce the emotion of fear when the sudden activation accompanied often by a characteristic unpleasant loud noise creates an impression of being incarcerated.

The sound attribute of the product design could prove of significance for electrical appliances, such as vacuum cleaners, dishwashers, hair dryers, blenders and mixers. The notion of the "sound quality" may be difficult to define but certainly from the marketing perspective the originality is one of its components.

The "melodic" kettle designed in 1982 for Alessi – the fancy Italian kitchenware manufacturer – incorporated the singing whistle imitating the harmonica style alert inspired by the barges navigating the Rhine River.

There is more to the sound than just acoustics. Wilson (1998) in his book on "consilience" emphasized that it is not just the issue of sound but also a question of rhythm which matters. Beat and sound are the result of movement which can be easily inspired by music or even poetry.

Understanding how the secondary sensory impressions match/reduce the primary perceptions of the product is crucial for designing the complete positive consumer experience.

One of the stereotypes people have is that of congruity of multimodal sensory experience emanating from the use of products. For example, a "heavy duty" electric appliance would distinguish itself by its form, rugged surface finish and low-pitch loudness. By manipulating any of these, one can obtain a rewarding surprise effect as when the "cute" device producing a strong loud buzz conveys the sensation of power (Ludden and Schifferstein 2007). This effect reaches beyond the experience with mechanical equipment: Zampini and Spence (2005) showed how the enhanced sound of sparkling water created a perception of a more bubbly soda.

Equally useful is to figure out the relative importance of specific sensations which jointly produce a global impression. To illustrate the point, the visual component of, say Microsoft Windows logo, can be appealing and pleasing and for that matter important for the computer user. However, when a person is multitasking and not looking momentarily at the screen, it is the sound of the Windows "opening" which conveys a signal that the operating system is ready for action.

If there is a biological canon for aesthetics, the question of how the perceptions obtained by one modality are affected by other senses becomes even more intriguing. A series of experiments shed light on the interactions. Even if we do not know exactly how they happen, we at least get an idea of what causes the distortions. For instance, Demattè et al. (2006) investigated the nature of joint olfactory and tactile information processing. Participants perceived fabric swatches as softer when simultaneously smelling a lemon scent; not so when being exposed to an animal-like odor.

2.6.3 Commonality of Senses: Odor and Music

The feeling of familiarity is synonymous with an awareness of the previous occurrence of an event without a full conscious recollection or identification. This phenomenon applies to all types of sensory experiences as the everyday encounters produce associations in a multimodal format. Familiarity tends to magnify the sensations whenever the nature of stimuli is amenable to relevant comparisons – with respect to odors, familiar ones appear stronger than unfamiliar and this accounts for the emotional attachment to, for example, childhood experiences (Hirsch 2006).

Plailly et al. (2007) found out that the feeling of familiarity of odors and music activates common neural areas of the left hemisphere which to an extent incorporate the regions specializing in linguistic processing and the recognition memory. In a similar vein, the opposite feeling – detection of novelty – also shows common organization for odor and music sensations. Thus, it can be posited that just like the everyday experiences generate multimodal associations, the processing of familiarity is of multidimensional nature as far as human senses are concerned.

In terms of linguistic processing, the descriptors of odors (written words like garlic, cinnamon or jasmine) evoke activation in the olfactory cortex and the amygdala. As compared to neutral language terms, reading just single words breeds emotions which most probably remain undetected to the individual (Gonzalez et al. 2006).

A number of practical applications follow a better understanding of the role of smell in managing consumption and developing attitudes. For example, ambient odors of orange and lavender reduce anxiety and improve mood in a dental office and the smell of peppermint lowers cravings for cigarettes. In Chap. 1, we mentioned the role of food aroma in contributing to the satiation (or otherwise, if the impact on some individuals is insufficient it produces eating disorders). This leads to a whole new field of engineering products with specific retronasal aroma stimulation based upon the assumption that a greater aroma release/stimulation leads to a faster feeling of fullness (Ruijschop et al. 2009). Trying to assure a stronger aroma-texture congruency (as exemplified by the vanilla pudding in contrast to lemon custard) is one approach. "Fooling" the brain by providing lighter foods or even beverages fortified with the aroma of heavier ingredients could be another. A scientist cum practitioner – Alan Hirsch – developed the scent crystals: one formulation for the salty foods and one for the sweet varieties which can be sprinkled on regular food to add to the flavor and make people feel satiated faster. In another series of experiments, he created useful illusions. For example, combining the floral and spice scents helps women to appear on the average 12 pounds lighter in the eyes of (heterosexual) men. This might have also to do with the sexual attraction. Indeed, Hirsch and Gruss (undated) found that the combination of lavender and pumpkin pie smell increases the arousal in men, as measured by the blood flow, by as much as 40%. Analogous findings were reported regarding the impact of aroma upon the age perception (Hirsch and Ye 2005).

The preceding discussion raises the issue of substitution between various product inventions serving the same purpose as the example below illustrates.

In the category of alarm clocks, much effort has been devoted to gentle methods of awakening. Some innovative solutions focused on the selections of soothing sounds like that of flowing water, wind blowing or a soft birdsong. Other options included gradual increase in the intensity of the built-in light. Still, the aromatic alarm clock by British inventor – Alfie Lake – proposes even a more novel approach. It emits the lavender mist around midnight and the scent of the fresh baked bread at the moment to wake up (http://www.alfielake.co.uk).

2.6.4 Touching Products

The sense of touch has been less studied relative to other senses in humans. Nowadays, scientists are reaching beyond cases where the tactile sensations

represent clearly the dominant input, i.e. when checking the comfort of a chair or the fit of the door handle. It is known that the tactile qualities come to play along visual characteristics when it comes to estimation of physical properties such as dimensions of objects. Spence (2004) demonstrated an interrelationship between touch and vision in his experimental work. While vision tends to dominate our perceptions, different textures can influence the impression. Very rough textures lead to vision domination, whereas a fine texture allows the touch to be the dominant sense. A change in the sound can also alter the perception of a texture. For instance, the sound of sandpaper being scraped causes one to assess a texture as rougher than one would judge it to be without the rasping noise present. The nervous system seems to combine visual and haptic information in a fashion similar to the maximum likelihood estimate rule: visual and haptic estimates are weighted according to the reciprocal variances characteristic of the visual and haptic neurons. When experimentally distortions are introduced to complicate the visual perception, the measurement derived from touch seems to dominate (Ernst and Banks 2002). The question is whether a similar algorithm can be used for integrating the observations of other product qualities like, for example, the smoothness of wood flooring. It is quite impressive, indeed, not only to realize the preferences people have for the oiled surfaces but to find out that with the bare feet (and wearing a blindfold) consumers are able to discern various qualities (Berger et al. 2006). Further, it is revealing for a layperson that such a characteristic as the soft grip associated with the rubber finish layer can make a difference in the aesthetic evaluation of such items like the wall shelving (Leong 2006).

Vision Affects Touch
Daniel Goodwin of the Rochester Institute of Technology noted that the addition of high gloss pearlescent coloring to the plastic packaging film allowed one hand soap manufacturer to create an artificial tactile sensation. The bar of soap "looked" more slippery through the wrapper just due to the image of the packaging alone (based on personal communication with the author).

There is one other very interesting feature of getting in contact with objects: touching them stimulates the desire to buy by conferring the sensation of ownership. It is as if holding something in one's hand gives the feeling of possession. Consequently, having touched the object increases the consumer's willingness to pay a relatively higher price for it (Peck and Shu 2009). This applies not only to clearly positive haptic impressions but to neutral ones as well. Obviously, such a finding attests to a relative advantage of the traditional stores as opposed to shopping online. In that latter case the challenge for e-tailers is to create a visual proxy for possession utility.

The above discussion has one important consequence. Unless for some reason consumers are deprived of the use of any of their senses, what they perceive is always a multi-modal experience. The evidence of the commonality and the mutual

influence of different categories of sensory stimuli has consequently far-reaching marketing implications.

2.6.5 Sharpening the Senses

The ability to quickly recognize and evaluate the environmental stimuli is crucial not only for assuring the biological survival of the animals but also for the consumer choices. Arevian et al. (2008) identified a mechanism of "dynamic connectivity" – fast re-wiring of neuronal circuits to filter out the response noise from the sensing neurons. Upon feeling a stimulus such as an odor, numerous neurons begin to fire. When too many neurons are stimulated at the same time, the outside signals can be difficult for the brain to interpret. With the more activated neurons "pacifying" the less triggered neighboring ones, the brain may rapidly sift through the input and the interpretation of the signal is greatly facilitated.

At least with respect to the excitatory neurons of the olfactory bulb, the neuronal connections are not as hard-wired but rather far more flexible than previously assumed. By filtering out the noise, the stimulus can be more clearly recognized and separated from other similar stimuli. Thus when exposed to a scent, we are quick to determine that it belongs to the floral category just to figure out a moment later which specific flower variety it comes from. The corresponding mechanism can be computer-modeled and applied to other modalities and areas of the brain as well where similar inhibitory connections are widespread. This produces the same effect as sharpening a blurry picture using a photo-editing computer program except that the brain does it much faster.

Having addressed the interplay of sensory perceptions and their influence upon the quality of signals the consumers deal with, let us turn attention to the role of mood and emotions in consumer behavior.

2.7 Emotions, Mood and Behavior

Distinction between the rational and the emotional style of buyer behavior has been long established as a suitable theoretical dichotomy. Many studies focused on the relative importance of the hedonistic vs. functional attributes of different products. Okada (2005) proposed that buying "fun products" often necessitates a strong justification to overcome the potential onset of a guilt feeling. In a series of lab experiments, the hedonic products (e.g. a DVD player) obtained higher ratings than separately presented utilitarian items (a food processor). Yet when faced with the "either-or" alternative, the utilitarian variety had a higher probability to be selected. Further, the concern for justification appears to have different purchasing strategy implications with reference to both categories. Acquiring pleasure items is more likely to induce the consumer to spend more time searching for the best deal – correcting for the impulse – as opposed to be willing to pay a higher price for the convenience of procuring oneself of the

utilitarian item when immediately available (Okada 2005). Marketers consider product offerings as bundles of benefits. According to such view, on the one hand products incorporate features which are functional, measurable and easily verifiable (for example, gas mileage of a car model) and, on the other, the attributes which are more pleasure-oriented. In that context, some hypotheses suggest that meeting the functional performance standards produces just the feeling of satisfaction while fulfilling the hedonic aspirations enhances the feeling of delight (Chitturi et al. 2008).

Pertinent dimensions of hedonic pleasure in consumption of numerous items contain attributes which are difficult to reckon. In a recent challenge to inventors posted on the innocentive.com web site, a food product company encouraged the development of a new variety of the chewing gum. A kind which would change one fruity taste to another within 5 min after the first bite. Clearly meant to offer an additional benefit to consumers, by enriching their experience the new composition will complicate the choice quandary. Pairing the flavors and selecting the sequence and the pace of change from one taste to another become thus key elements of the product design and consumer selection.

Based on surveys and observations, marketing researchers attempted to ascertain which items are actually purchased more as a function of the consumer's emotional attitude as opposed to adopting a logical utilitarian stance (Chaudhuri 2006). It might be not surprising that objects of art are purchased based on emotion but is quite telling that the same applies to the acquisition of family homes – the most expensive item people ever buy (Ben-Shahar 2007).

The neuromarketing perspective offers new twists. What is tempting is to use the brain imaging to assess the degree of positive emotions bred by the product experience. Since the "satisfaction" and "delight" can actually be positioned along the continuum from serenity to ecstasy, the difference between the two self-reported outcomes could neurologically be interpreted as the distance between the less and more intense manifestations of the same type of emotion. In addition, the technical division between hedonic and utilitarian benefits may prove of a lesser practical significance than assumed so far if subjected to further scrutiny. Possibilities of transition from one category to another are potentially more common than might be thought. For example, a very efficient brake system and fast acceleration are not just some performance gauges but a source of the driver's feeling of power, control and even safety. Another important aspect to look at is the disparate nature of consumer's impression when evaluating the tangible element of the product functioning in contrast to rating the product on its ability to elicit jubilation. And the less clearly defined the consumer reference benchmark, the more confusing the task of confronting it with the actual experience.

On a related note, as we shall show later, the urge to buy a rewarding product/service works in the opposing direction to the procrastination resulting from the necessity to justify the perceived luxury. Further, the emotional as opposed to rational evaluation of the things to buy (and use) is not only a function of the products themselves but is also personality-driven. Consequently, it is plausible that different individual character traits steer the consumers towards one evaluative mode rather than the other regardless of the nature of the product to buy.

2.8 Decision Processing Systems

In what clearly draws on Jung's approach, Kahneman and Frederick (2002) made a reference to two modes of decision processing as System 1 and System 2. Decisions relying on System 1 processes are of non-deliberate nature. They are quick, non conscious, automatic, and emotion-based. They reflect habits, occur spontaneously and require low processing skills or energy expenditure. In contrast, decisions relying on System 2 reflect the intellectual reasoning. They are slow, rule-based, controlled, skillful and effortful, and involve analytic reasoning and rational choice. It follows that System 2 processing characterized by a conscious deliberation and resistance to external pressures allows for the exercise of *free will* (Table 2.1).

System 1 is a default mode most of the time, and to a great extent unconscious. Action is frequently directed by if-then rules that have been created previously, such as "If there is wind on the lake, then I will go sailing." In the process, we learn and alter the if-then rules.

Febreze strategy
Introduction and cultivation of habits is of great interest to marketers. Learning what triggers the customary behavior (e.g. specific temporal cues, prior activities) helps to develop a marketing communications strategy focusing on the use frequency. When Procter and Gamble realized that in the real life the bad smell conditions do not occur frequently enough for the acculturation of its odor eliminating product – Febreze – the company decided to create a different association. The chosen cue focused on a common routine of making bed and arranging the freshly washed laundry. Tying a clean smell to a clean space was positioned as a finishing touch to a daily task – almost a symbolic action quite opposite to the original emergency function of the aerosol.

Many behavioral economists maintain that models entrenched in pure calculation of costs and benefits of action do not reflect the reality of human behavior (Loewenstein 2008). From that vantage point, it does not make much sense to

Table 2.1 Two systems of reasoning

System One/X-system/Reflexive/Intuitive	System Two/C-system/reflective
• Evolutionarily old	• Evolutionarily recent
• Universal	• Heritable
• Independent of general intelligence	• Linked to general intelligence
• Independent of working memory	• Limited by working memory capacity
• Slower to change	• Prone to change
• Nonverbal	• Linked to language
• Holistic	• Analytic
• Affective (what feels good)	• Logical
• Associative- judgments based on similarity and temporal contiguity	• Deductive, rule based
• Rapid parallel processing	• Slow serial processing
• Concrete images	• Abstract images
• Crudely differentiated- broad generalization	• More differentiated
• Crudely integrated- context specific processing	• Integrated- cross context
• Experienced passively and preconsciously	• Experienced actively and consciously
• Automatic and effortless	• Controlled and effortful
• Self-evidently valid: "Experiencing is believing"	• Reason-based via logic or evidence
• Implicit	• Explicit
• Domain specific	• Domain general
• Parallel	• Sequential
• Stereotypical	• Unbiased
Brain regions involved:	*Brain regions involved:*
• VMPFC	• LPFC
• NAcc	• Medial temporal lobe
• Caudate	• Posterior parietal cortex
• Amygdala	• Hippocampus
• Lateral temporal cortex	• Rostral ACC
• Dorsal ACC	

Compiled from Evans (2008), Lieberman (2007)

juxtapose the affect-based and the rational "cool" decision making process. What matters is that the separation of emotions from reason appears artificial. Certainly, using computer programs to calculate the best solution out of possible options could under certain circumstances be the most efficient way to go. Especially, tangible characteristics are far more amenable to System 2 process. In that sense, the *utility theory* is a normative concept: what people should do rather than descriptive of what they actually do. And armed with a better understanding of the power of emotions, consumers might eventually develop strategies to manage the affective aspects of choosing, buying and using (see Chap. 5). In such a way, cognition can impinge on emotion – a reverse of the more common phenomenon when emotions impact cognition. Depending on how we view the **context** of emotion the latter can change in nature. From that perspective, Davidson's (Davidson and van Reekum 2005) work is quite telling. He showed that when people reappraised the negative pictures by imagining possible negative outcomes of such scenes, neuronal activity in the amygdala intensified above the level characteristic of simply watching the

pictures. In turn, when subjects were advised to conjecture positive outcomes the amygdala activation lessened. Hence, the thought of consequences of a situation – a process within the domain of the PFC – alters the initial feeling stemming from the pure observation, and reflects in the functioning of the amygdala.

No matter how superior the rational method may appear it bears a substantial intrinsic cost: solving the problems analytically and thoroughly drains substantial energy. Biology affects one's cognitions through energetic components of mood and emotion. Changes in arousal and affect re-direct resource availability for competing cognitive processes. Consequently, knowledge and reasoning alone are deemed not sufficient for making advantageous decisions, and for that reason the role of emotion in decision-making has been underestimated. Further, emotions can exert a dual impact: emotion is beneficial to decision-making when it is integral to the task, but can be disruptive when it is unrelated to the task. For example, anxiety serves as an emotional risk warning, but it can get massively 'out of synch' with our rational judgments, so that even when we 'know' that, for example, the risk of air travel is smaller than that of driving a car, the information conveyed by our emotions trumps the reason. An intriguing question in view of the above is what can prompt a decision maker switch from one system to another. We shall revert to it later.

Except when leading to self-destructive behaviors emotion-based decisions need not be necessarily bad. Emotions contribute the *interest factor* to the contemplation of buying and give the reason for consideration of offerings. In the complex world where the homo oeconomicus model is hardly a realistic concept, emotions offer a handy shortcut. It should be noted that according to an accepted model of human perception and sequential processing, early reality checks (novelty and intrinsic pleasantness) occur in an automatic, unconscious mode of processing. It is the later evaluation of the goal conduciveness which involves a more extensive, effortful, and controlled processing to verify whether the experienced pleasure is/is not compatible with one's objectives (Grandjean and Scherer 2008).

Before looking into how the heart and the mind shape consumer decisions, it is important to consider the circumstances producing emotional states, including moods.

2.9 Moods

The terms "mood" and "emotion" are sometimes used interchangeably but they are not supposed to mean exactly the same thing. Moods are transient affectionate states generally not tied to a specific event or object and are longer lasting and less intense than emotions. Like the latter, and as a part of the situational influences they have an effect on the consumers' *disposition* to buy or use the product.

People often say: "I am/am not in a mood for…" Importantly, people are **aware** of their changing moods even if not always sure about the cause. For the simplicity sake, it is prudent to assume that most of the time an average individual is in a

"normal" mood. Yet, from the perspective of neuroscience mood changes may be thought of rather a rule than exception. As mentioned in the previous chapter, the **absolute** firing rates of the neurons that represent the mood states can hardly be set at the appropriate rate for long periods of time due to the complexity of the hormonal and transmitter systems involved. The fluctuations exert an impact on subsequent individual intensity and speed of reaction as a consumer.

In the context of consumer behavior studies, the following generalizations have been made:

1. Negative (positive) mood discourages (encourages) action (Andrade and Cohen 2007).
2. When feeling down, people no longer care to improve themselves or pursue meaningful long-term goals.
3. Negative moods are not all alike. Interestingly, sad as opposed to anxious people pursue different goals. The former tend to focus on mood repair whereas the worried subjects pursue uncertainty reduction. Sad people thus perceive the high risk-high payoff option as more attractive, whereas anxious subjects prefer the low risk-low payoff alternative which is safer (Raghunathan and Pham 2006). Similarly, being sad is different from feeling anger when it comes to purchasing decisions. Individuals in an angry mood are more inclined to preserve the status quo and they are less likely to see the advantages or benefits of a new product or services. Sadness in turn is conducive to reflection and a willingness to consider a variety of choices (Garg et al. 2005). In the social contexts, DeSteno et al. (2000) found that angry people estimated the odds of being cheated by a car dealer as higher than the sad people did, whereas the sad people were more likely than the angry ones to expect that a dear friend would move out of town.
4. Moods may produce an impulse purchase or consumption of some easily available items. For example, being in "bad" shape can precipitate consumer's interest in the mood enhancers: chocolate, alcohol, cigarettes, perfume or focus on such activities as going to the movies, gym or listening to the music. Alternatively, they can delay reaching of a contemplated decision due to the lack of motivation to act (procrastination).
5. Mood changes are induced by planned or unplanned events, including the act of buying itself.
6. Being in a positive mood stimulates individuals to seek a greater variety among food products (Roehm and Roehm 2005).
7. People currently in positive moods report a higher subjective probability of future positive events compared to subjects in a negative mood (Johnson and Tversky 1983).
8. Individuals are likely to evaluate any target more positively when they are in happy rather than in a sad mood (Schwarz 2000). One practical implication is to offer new product samples to vacationers to create a mental association between the product and having fun. Yet, people make less judgmental errors when in a bad mood (Forgas 2007).

9. What concerns risk-taking, a prevalent theory posits that bad mood leads to a subjective evaluation of a situation as riskier (Slovic and Peters 2006). Likewise, the good mood produces the assessment of the environment as safer. Assuming that people act "rationally", a person who feels bad would show aversion toward risk-taking. By the same token, individuals in good mood would be more prone to risk-taking. Yet, the impact of affect on risk-taking does not follow the predicted "rational" pattern. Indeed, negative affective states have been shown to *increase* risk-taking. In a gambling scenario, Gehring and Willoughby (2002) showed that choices made after losses were riskier and were correlated with a greater event-related brain potential in or close to the ACC. The latter changes themselves were stronger for losses than gains regardless of the prediction errors by the participants. These findings prove consistent with the affective regulation models which prescribe that at the positive and desirable end of the mood spectrum, people have more to lose than those in a neutral affective state. It follows that in a high-risk condition people in a good mood anticipate negative emotional reactions and tend to limit the risky behavior. In contrast, consumers will spontaneously try to improve their current affective state when feeling bad and the sheer perspective of the potential benefit dominates the risk concerns.
10. In a still different context, it was determined that a positive as opposed to a negative mood inclines people to pay higher prices. Such was the finding by Winkielman et al. (2005) who asked their study participants to drink and rate various juice concoctions after a subliminal exposure to happy vs. angry faces.

However, moods do not have a single effect on decision making. Depending on whether affect alters judgment or the manner in which the information is processed, different conclusions may be drawn from the same information.

Buying and mood
Suppose a person has just bought the brand new ski equipment. Wouldn't one expect her to be upbeat and willing to get to the slopes to see if she can now better handle the moguls? And if the skis delivered on the promise, would not she be likely to end the day enjoying the après-ski atmosphere socializing in the resort? What if the outcome was rather disappointing – would the person be less inclined to buy the all-season pass?

Finally, in the extreme but not so rare cases, the concept of mood helps to understand why people act against the self-interest including buying and consuming various products/services while being aware that what they are doing is not beneficial.

2.9.1 Situational Impact on the Mood Onsets

Moods are affected by weather, change of seasons, food we eat, amount of sleep, physical effort, interaction with other people and many aspects of daily life.

Considering these factors is crucial to marketing managers. A vast literature on the impact of the *atmospherics* of the shopping environment (in store or on the web) upon the duration of the visit to the store and the structure of purchases provides evidence how the pleasantness of smell, nature of the background music, perception of "playfulness" and décor, all positively influence the propensity to spend. In view of what is known about the agreeableness of various sensory experiences (as discussed earlier in this chapter), it is not surprising how much marketers' attention and behavioral research is devoted to such issues. A huge number of publications address the connection between the various components of the in-store and on-line environment which warrants a separate book coverage detailing a plethora of findings and best practices applicable to various retail formats. Here, we wish to highlight a less explored yet intriguing subject, namely, the role of the physical constraint in consumers' seeking a greater selection of items in a store/supermarket context. Interpreted as a defensive reaction in attempt to regain personal freedom, such an observation recently confirmed by Levav and Zhu (2009), pertains to space limitation or crowding inside a store. How the chain of neural events leads to seeking comfort in more diversified buying pattern is a great topic to research. On the one hand, the fear- and anger-like claustrophobic reactions play a role. On the other, they seem to alter the valuation of choices available and perhaps induce undecidedness.

2.9.2 Weather and Seasonal Factors

Mood variations follow the yearly seasons and tend to reoccur at about the same time every year. In medical terms, they are called the seasonal affective disorder (SAD). The most common variety – the winter "blues" – typically starts in the late fall or early winter after which the normal mood is restored in summer. However, another less frequent type of SAD sets on in the late spring or early summer. Forty to sixty per cent of people may suffer from winter depression which is four times more widespread in women than in men. SAD is more common the farther north people live (in the Northern hemisphere) – in the US, it is seven times more prevalent in the Washington State than in Florida. Also, the probability of SAD increases with age (Rosenthal 2006). The symptoms of the winter variety include, among others, a change in appetite like craving for sweet or starchy foods resulting in the weight gain, lower energy level and tendency to oversleep, irritability and difficulty concentrating, and shunning social encounters. In turn, the summer version manifests itself through poor appetite, weight loss, sleeplessness, agitation and anxiety.

The secret of the SAD may be associated with the amount of melatonin in the body. The secretion of this hormone by the pineal gland is suppressed in the presence of the daylight – less is produced during the summer, more in the winter. Inasmuch as the exact mechanism responsible for the above-quoted symptom is not well known, it is hypothesized that melatonin reduces the body temperature what in turn is linked to insomnia.

Serotonin is still another possible important factor at play. Its turnover by the brain slows down in winter and in addition the pace of serotonin production is

related to the prevailing luminosity of the air (Lambert et al. 2002). But then again the hot temperatures associated with the warm season breed their own negative consequences as the heat stress contributes to a deterioration of performance on a central executive task (McMorris et al. 2006). Perceptions of vigor decrease and of fatigue increase following exposure to heat stress. The increased plasma concentrations of cortisol and 5-hydroxytryptamine upon the impact heat serve as markers of poorer neural performance and mood deterioration.

While marketers have dedicated many efforts to studying the effect of seasonality on buyer behavior, the main focus was on the cyclical nature of sales. By adding new knowledge, neuroscience can assist in this task. For example, following lower secretion of serotonin and dopamine one's optimum stimulation level can be harder to reach in winter and may thus encourage seasonal increase in consumption of stimulants (caffeine, tobacco, alcohol) as well as sensation-, variety- and novelty seeking (Parker and Tavassoli 2000). Also, colder ambient temperature increases the physiological requirement for caloric and protein intake. Knowing that people objectively need more enriching food and long for more variety in winter suggests more efficient seasonal product strategies to provide greater satisfaction.

The aspects of seasonality described above suggest the necessity of yet another stream of investigation. It should center on the nature and "bipolarity" of buyer behavior **processes** as a function of seasons. Moreover, researching seasonality will help understand the differences between the behaviors of otherwise similar consumers in different geographic areas of a country (not to mention the international differences).

Formula for Sadness and Happiness

British health psychologist Clifford Arnall developed a formula to predict the saddest day of the year. It reads:

$$[\mathrm{W} + (\mathrm{D} - \mathrm{d})] \times \mathrm{TQ},\ \mathrm{M} \times \mathrm{NA}$$

where (W) stands for weather, (D) debt, (d) monthly salary, (T) time since Christmas, (Q) time since New Year resolution failed, (M) low motivational levels and (NA) the need to take action. The so called "Blue Monday" took place on the last Monday of the last full week in January – in the year 2010 it was January 18th.

The modern astrologist has also a formula for the happiest day as well.

$$\mathrm{O} + (\mathrm{N} \times \mathrm{S}) + \mathrm{Cpm}/(\mathrm{T} + \mathrm{He})$$

(O) is time spent outdoors, (N) time spent in nature, (S) summer socialization, (Cpm) factors in the positive memories of childhood summers, (T) reflects the outside temperature, and (He) anticipation of vacation.

(continued)

The next happiest day in the UK falls on Friday June 18, 2010. However, if used for other countries with different cultures, like Russia or China, both formulae would require significant adjustments and with respect to Southern Hemisphere countries the calendar works in the opposite direction.

Mood can apparently be "read" straight from the brain. Various studies point to the fact that the elevated activity in the **right** PFC accompanies stressful moods. Positive, upbeat feelings on the other hand account for activity in the **left** PFC. Hence, the ratio of the left/right activity in a person's brain when measured in the resting condition is a good predictor of her mood extent (Jackson et al. 2003).

It turns out that both positive and negative states can influence perception and in a varying yet beneficial way as confirmed by the experiments conducted at the University of Toronto. In the linguistic solving task, the happy group of participants did better. However, in the visual selective attention task, the happy participants became distracted more easily and significantly slower than the sad group. Thus, as a consequence of positive emotions people's creativity and "out of the box" thinking is amplified. At the same time, though, positive mood weakens the ability to selectively focus on a target and distracts the person (Rowe et al. 2007). In contrast, the negative mood is conducive to controlling the focus of attention and tackling the specific tasks. This is consistent with a recent review by Schwarz and Clore (2007) who concluded that negative emotions favor a detail-oriented processing, whereas the positive ones focus on generalities. This pattern seems to be appropriate in the context of managing our day-to-day activities. Negative emotions presumably follow bad outcomes such as failures and the person is well advised to identify those things that were done wrong to avoid same errors in the future. Consequently, attention to details gains strongly in importance. However, a beneficial experience does not call for the examination of minute elements. In that latter context, just internalizing the model of the total event may serve as the most useful guideline.

The above findings lead to some far reaching speculations. Namely, if the relationship between a positive mood and creativity is reciprocal, then creative activities might help lift a person's sad spirit person (Rowe et al. 2007). Artistic expression would appear then as a far more important consumer desire than just a sheer hobby for some. For example, taking on painting by senior citizens could have far more beneficial results than assumed.

Both the longer enduring states – moods – and more instantaneous and faster extinguishing emotions affect behavior (i.e. decisions people make) and color the experiences derived from consumption. Direct impact of negative emotions on spontaneous behavior has been often invoked. Fear makes one run away; anger makes one fight; not to mention, as we shall, a whole range of emotions which in the context of the everyday's life influence the conduct of the buyer. Interestingly, in psychology the impact of the pleasant, positive emotions has been far less studied than that of the negative ones as just the latter are deemed to relate to pathology.

And yet, from the social behavioral perspective positive emotions are an important matter. Happy people not only want to preserve their mood but are known to respond by singing, telling jokes, calling other people etc. These are not just manifestations of "feeling good" but behaviors induced by it.

The importance of behavior as prompted by affective states lies in that it can be simultaneously accompanied by a form of consumption (even as minimal as listening to the music) or lead to a subsequent consumption. Hence, behavior is influenced through a feedback system. Automatic affects induce approach and avoid tendencies, and conscious emotions stimulate reflection and learning.

2.10 Anticipating Emotions

Behavior and its effects breed emotion and for the individual to know the repertory of her emotional outcomes to one's own behaviors (as well as to the outcomes produced by the outside factors), is fundamental for an accurate anticipation of the pleasure/pain to follow. In that context, Damasio's idea that emotional outcomes leave affective residues in the body – the somatic markers – suggests how the decision makers are hinted in the process (for application, see Bechara and Damasio 2005). Importantly, the markers fall into two categories. The "primary inducers" correspond to the learned states that cause pleasurable or aversive sensations. The "secondary inducers" emerge from the reflection on the actual or even a hypothesized situation. The above hypothesis further posits that different brain areas participate in somatic states pertaining to decision-making: amygdala plays a critical role in retrieving somatic states from primary inducers, whereas the VMPFC is involved in creating somatic states from secondary inducers. The corresponding signal from amygdala is swift and attenuates fast. In contrast, the responses of the VMPFC are slower and of extended duration.

Conscious realization of one's own positive affects in response to stimuli is not indispensable for registering a person's "liking/disliking" (Berridge 2003). Significantly, however, people who are more aware of their bodily responses, for example the heartbeat, to the emotionally arousing pictures do experience more intense feelings as measured through self-assessment. This is further related to the greater activity in the right insula in response to the unpleasant pictures, and in the ACC to both pleasant and unpleasant slides (Pollatos et al. 2007). The role of the latter proves the more so important that it is deemed to control attention to and conscious processing of emotional stimuli.

When considering how to act, forecasting emotional outcomes helps a normal person make a better decision, whereas making the decision without planning in the midst of a strong emotional state may produce a suboptimal choice. One may illustrate the emotion-cognition-behavior triad by showing that bad moods do not inherently stimulate an alcohol-specific thirst. Rather, the unhappy people choose alcohol hoping that it will make them feel better. Hence, the habit of drinking

alcohol is guided by the anticipation of emotional outcomes (Cooper et al. 2003) when other alternatives are ignored.

In order for expectations to be seductive they need not just derive from positive memories but at the same time prove sufficiently attractive relative to current rewards. The future scenarios need not be accurate. Rather, according to Ainslie (2007) they ought to be unique to provoke a strongly motivating emotion. This links at least some of the prospects with the natural predilection for novelty.

An average person is not necessarily skilled in predicting her emotions – the degree of pleasure or punishment – resulting from consumption or from refraining from it. It is particularly true with respect to new unfamiliar contexts. The discrepancy between what we predict and what is ultimately experienced is referred to as the "impact bias" and pertains to the assessment of the intensity and duration of our emotions. It appears that usually the expectations tend to be overstated rather than too low. For example, Dunn et al. (2003) describe how college students predicted they would be much happier if assigned to live in a coveted dorm rather than to an undesirable one. However, a year later the privileged students proved subjectively no happier than the other group. Correspondingly, what consumers buy is not as rewarding as forecasted. The original magnification of the anticipated positive emotions strengthens their guiding impact on decisions. In contrast, the subsequent reality check which makes the emotions subside quickly can prove beneficial – calming down helps to concentrate on subsequent decisions (Wilson and Gilbert 2003). This line of thinking spawned various experiments examining the underlying neurological substrates.

Two parallel tracks co-exist in addressing emotion and behavior:

1. A meta-need of "feeling good" (preserving or improving psychological well being through behavior or the lack thereof, i.e. "do nothing").
2. Viewing emotions as *accompanying* behavior (emerging while we are involved voluntarily or not in an activity).

Analyzing or even anticipating one's own future feelings as a function of undertaken behavior recruits a substantial cognitive component into decision making. Trying to find a justification or a method for prediction of a specific emotional outcome requires some knowledge about oneself as well as some generalized information about a particular consumption event. Resorting to cognition in reviewing potential consumption-related emotions comes across as a logical pleasure-optimizing principle. However, what to expect is often subject to persuasion. As Nitschke et al. (2006) showed, people can be led to believe that a very unpleasant taste is less so if convinced in advance. In addition, their actual fMRI readings of the insula and operculum (primary component of the taste cortex) were lower than for the control group of subjects who were not manipulated by experimenters. Certainly, this study confirmed what practitioners have known all along – a credible and skilled salesperson can sway the customer's perception of the product trial or the full-fledged consumption. Neuroscientific studies prove also helpful in uncovering what actually convinces consumers no matter the nature of the views presented. Falk et al. (2010) examined how the brain processing of the arguments which ultimately proved valid to the subjects differed from handling the

statements which participants found unpersuasive. That study showed that apart from the areas typically involved in the memory processes, the DMPFC, posterior superior temporal sulci (bilaterally), and the bilateral temporal pole were more active during the exposure to persuasive opinions. Interestingly, the same regions are implicated when people guess the mental states such as intentions and attitudes of other people. The connection between the neural expressions of the "theory-of-mind" and the acceptance of the statements one is presented with makes logical sense and hints at the implied social context of the assertions made even in the impersonal setting. The above finding is further more pronounced because the results were confirmed regardless of the presentation format (reading the text only vs. watching the commercial) and also with respect to two different ethnic and cultural groups: Koreans as opposed to Americans of European extraction (some other differences are discussed in the following part of the book). However, as will be demonstrated later when it comes to celebrity endorsement, additional neural mechanisms come to play.

Gilbert and Wilson (2007) use the term "prospection" for the simulation of future events and point to the crucial role of memory – the mental representation of the past – in the hedonic expectations. The view is supported by the neurological research of Szpunar et al. (2007) who demonstrated that a set of regions in the prefrontal cortex (posterior cingulate; parahippocampal gyrus; left occipital cortex) exhibited identical activity during the past- and future-related experimental tasks. The very same areas are known for remembering the previously experienced visual-spatial contexts. Further, the same neural substrate is also involved in the self-reflective thought and in reasoning about other people's minds (Buckner and Carroll 2007), all of which require a high level of inferential and counterfactual thinking. It can be concluded, then, that people tend to develop the vision of the upcoming or even a hypothetical event using the well assimilated contexts as a reference and guidance. Where the difference between focusing on the past and the future appears more pronounced is in the regions known for controlling the body movements – imagining the future makes this part of the brain more active than reminiscing (Szpunar et al. 2007). It is as if the person is getting ready to physically approach the pleasant prospective setting or object, the observation confirmed in some studies on anticipatory emotions.

When the prefeelings about the future develop, structures like the NAcc and the anterior regions of the ventral striatum excite correspondingly with the anticipation of the pleasant events, whereas simulation of painful future events distinctively activates the amygdala and/or the posterior ventral striatum. Therefore, a homeostatic balance of both systems might be important for generating adequate expectations under uncertainty, i.e. for the outcomes comprising both the rewarding and punishing elements (Yacubian et al. 2006).

It follows from the previous comments that the simulations of the future may prove inaccurate not only due to the unknown/new facets of the impending scenarios. Another factor of relevance relates to the distorted memories of the past to be discussed later. Also, in simulating the things to happen people have a natural

tendency to consider a "big picture" with a limited attention to inessential details. The key elements are likewise retrieved from the memory. In reminiscing on past vacation it could be the image of the pristine palm beach, spacious hotel room with the ocean view, and rich buffet table. Following such a model, the secondary or tertiary features (getting beach towels, booking excursions) may be simply omitted. Yet, the inessential event components impact the hedonic sum total of the experience. Assuming that most events consist of a rather limited selection of the extremely positive or negative essential attributes and also comprise numerous moderately positive and moderately adverse inessential attributes, the event's overall hedonic value would emerge as a weighted average of all those elements. Because simulations omit inessential features, people tend to predict that good events will be better and bad events will be worse than they actually turn out to be. Indeed, from the neurological perspective Tom et al. (2007) showed that the degraded connectivity between the midbrain dopamine neurons and the brain stem serotonin system contributes to the increase of the emotionally influenced overvaluation of both gains and losses.

One other pertinent issue relates to the complexity and imprecision of information available to the decision maker. Consumers live in a world where not all the information is readily available (at least not instantaneously, despite the internet). Consequently, our cognition might agonize over the best strategy. When faced with uncertainty and ambiguity, logic and conscious deliberation can only help to an extent. Depending on the nature of the problem, dealing with doubt can be an emotional experience and it does not surprise that the somatic "hunches" are recruited to select the apparently optimal option. Indeed, it was shown (Bechara and Damasio 2005; Hsu et al. 2005) that the evaluation of ambiguous as opposed to risky choices involves different areas of the brain. Among the regions more active under conditions of ambiguity as opposed to risk are the amygdala, the OFC and the dorsomedial PFC. By contrast, the dorsal striatum is preferentially activated during the risky condition. As the dorsal striatum is implicated in reward prediction, the result indicates that ambiguity reduces the anticipated reward of decisions. In the words of Overskeid (2000), when facing doubt people opt for the solution which *feels* the best and reduces the fear of unknown – laying a foundation of the intuitive decision-making.

2.11 Behavior Breeds Emotion, Emotion Breeds Behavior, and Cognition Acts as Moderator

Andrade and Cohen (2007) proposed to integrate two mechanisms linking affect and behavior: (1) the affective evaluation (AE) which basically focuses on the informational aspects and (2) the affective regulation which is goal directed (AR). This model bears similarity to the appraisal theory accepted by psychologists (see, for example, Frijda 2007) and, to a degree, it emphasizes the conscious elements of processing. The AE component embodies the initial response to a stimulus and

alerts the decision maker regarding the congruency aspects of the information and the contemplated behavioral response. In their example, (Andrade and Cohen 2007), an appeal for a charitable donation illustrated by a graphic depiction of poverty creates a combination of the feeling of sadness and disliking in the viewer. Consequently, and paradoxically it can drift the individual away from extending the helping hand as her appraisal focuses on negative associations, i.e. "one gesture cannot reduce misery." Accordingly, a more negative affective state magnifies the negative aspects of the requested good deed. In contrast, before any behavior takes place the AR mechanism can reverse the early negative reaction if donating money is perceived as an opportunity to redress the person's initial negative mood.

Following the same logic, a positive affect makes people see things in a positive light. For example, it might prove easier to convince a happy person to give to a charity ("it is a good thing to give back"). Yet, any emerging threatening cue related to the contemplated activity proves discouraging when negative mood consequences become noticeable (e.g. a risk of identity theft when contributing the donation online) so that the intention is reversed due to the impact of the AR mechanism. Ultimately, the decision-maker resolves the conflict in favor of protecting their current positive feelings. Consideration of both the AE and AR implications of mood helps explain the dual nature of emotion-induced changes in food consumption. On the one hand, pressure increases the consumption of snacks (perceived both as "quick energy" products and "treats"). On the other, it decreases the consumption of typical meal-type foods like fruits and vegetables, meat and fish (Oliver and Wardle 1999). Willner and Healy (1994) showed that following the negative affect induction, subjects lowered their own evaluation of cheese in terms of pleasantness and desirability suggesting that affective behavior toward food with no perceived mood-lifting attributes will be mostly directed by the affective evaluation (AE) mechanism.

In the light of the theory that people compare the present and the expected affective state resulting from the contemplated activity, it can be assumed that the impact of AR is reduced when no significant mood change is anticipated following an action. As for AE, it becomes less influential when people do not trust their feelings. Also, AE tends to have a stronger impact when people judge ambiguous (vs. unambiguous) stimuli (see for example, Gorn et al. 2001).

For the interpretation of consumer feelings, it is important to mention a complementary stream of thought adopted in the so called "Appraisal Tendency Framework" (Han et al. 2007). This concept together with the Affect Infusion Model (Forgas 2003) places emphasis on the so-called carryover effects. Accordingly, when a certain emotion is experienced, it activates particular nodes in the person's associative networks bringing related facts to mind. This activation takes place very rapidly and independently of reasoning. So much so that the mechanism invoked overshadows the more logical considerations. The brain of a person who happens to be in a fearful condition triggers the like elements of the associated networks to apply to anything under consumer's present consideration. If the purchase of a child's car seat were at stake at such a moment, it would have been dominated by

feelings of being afraid and influenced far less by other factors which could enter the decision maker's mind (Yates 2007). In such a sequence of events, the ambient emotions affect the task-oriented emotions following the distinction spelled out by Cavanaugh et al. (2007).

The carryover phenomenon further points to a sequence of effects: emotion related to one consumer choice impacts later choices. In a smartly designed behavioral experiment, Wadhwa et al. (2008) found support for basic predictions arising from the notion of reverse-alliesthesia which can occur in several ways. First, they noticed that sampling a food item high in incentive value (good-tasting chocolate) had an impact on broad reward-seeking behavior as revealed in the subsequent increase in the consumption of Pepsi. This was generalized further when it turned out that sampling a drink high in incentive value (Hawaiian Punch) not only led to a surge in the consumption of another drink (Pepsi) but also increased the desire for anything rewarding – hedonic food, hedonic non-food and even on-sale products (everyday non-hedonic). The work of Li (2008) advanced this proposition further across other domains. Her experiments showed that consumers exposed to appetitive stimuli were more present oriented, more likely to choose smaller but sooner rewards, and more predisposed to make unplanned purchase decisions.

The above line of thought also suggests the possibility that an aversive consumption cue such as an unattractive smell could suppress the motivation to engage in reward-seeking behaviors. This suggestion is corroborated by the so called "contamination effect."

In their consumer survey, Morales and Fitzsimons (2007) found that six of the top-ten-selling nonfood supermarket items elicit feelings of disgust (for example, trash bags, cat litter, and diapers, women's hygiene products). When placed next to other items in the shopping cart, just due to the sheer contact via packaging these items "infected" other products whose subjective valuation then lowered. The idea of contagion certainly deserves further exploration, the more so that no study has addressed yet the potential impact of "delightful" products upon the valuation of other products as inducted via physical contact between the two. Interestingly, such an influence has been shown with respect to the product evaluation when consumers judge an item which has been physically touched by a highly attractive other person. Moreover, the gender proves a critical moderating variable in the realization of this positive contagion effect; the contact source and the observing consumer need to be of the opposite sex for the positive contagion to occur (Argo et al. 2008).

The input of emotions into decisions comprises yet another aspect. Mulling over the choice to make is not deprived of the emotional and often negative side effects (Luce et al. 2001). Especially for important decision, when consumers presumably engage their analytical skills and keep feelings at bay, the emotional stress-related trade-offs emerge.

Generalizations about emotions are difficult since they are so many and of different kind. As a first step, marketers can turn to the global evaluation of the single or repetitive experience.

A gallery of the most popular consumer emotions was uncovered in a satisfaction survey of 4,000 customers conducted by the Society of Consumer Affairs Professionals in Australia in 2003. Based on respondents' semantic characterizations of the self-described feelings towards the nine major Australian consumer goods companies and their products, top 10 emotions expressed by customers were:

1. satisfied, 2. secure, 3. impressed, 4. pleased, 5. contented, 6. indifferent, 7. happy, 8. good, 9. appreciative and 10. reassured. "Satisfied" was mentioned twice as often as the second most common emotion.

At the same time, only 5% of the customers expressed confidence in the sellers' companies and just 2.5% felt that the organization trusted them. That means that trust is a rare commodity, very hard to gain.

In the category of very satisfied consumers, committed loyalty was pronounced only at the highest levels of satisfaction. Very satisfied customers used such terms as being impressed, appreciative, reassured, and delighted.

At the other end of the spectrum, very dissatisfied customers quoted disappointment, anger, frustration and feeling neglected.

In agreement with the asymmetrical impact of the opposite emotions quoted earlier, the negative surprises did more harm to customer satisfaction and loyalty than positive surprises did good.

- 21% of customers had negative surprises – expectations that were not met. 61% of them contacted the organization about their most negative surprise.
- Only 14% of the contactors were completely satisfied with the organization's response and their satisfaction and loyalty were restored.
- The majority was not satisfied and expressed negative self-referent emotions that were powerfully destructive to the relationship–emotions like feeling cheated, disgusted and exasperated.

It is conceptually difficult to interpret the indifferent emotions and "emotionlessnes" reported in the middle range of the satisfaction scale as the logic suggests the emergence of some feelings as a result of the consumption experience. One plausible explanation of the weakness of sensations is that the level of interest in the outcome could have been mild to begin with.

(SOCAP Consumer Emotions Study 2003)

In addition to the global evaluations, one needs to focus on certain typical emotions manifested in numerous situations and tasks. For example, a slow performance (relative to the urgency of the need or a certain pace one is used to through experience) of the service provider – be it on occasion of having a dinner in the restaurant or working on a computer – can produce a blend of reactions. Annoyance/anger, anxiety (has the waiter forgotten, did the computer "freeze", will the file download/appetizers served?), feeling lack of respect ("I am neglected"), guilt ("I should have come earlier") are just some examples. However,

showing the movement and progress towards the expected outcome helps reduce **all** these negative emotions, albeit not to the same extent. Displaying a kitchen where the chef elaborately prepares our meal may not only reduce the negativity of previous sensation but actually reverse the valence of emotions into a "wow!-like" appreciation. In a certain way, the invention of the visible progress bar for various computer tasks indicates a greater attention to user-friendliness than the increase of the speed of processing alone.