Dynamic Effects of Chronic Hedonic Goals on Spontaneous Affect and Impulsive Behavior

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### Dynamic Effects of Chronic Hedonic Goals on Spontaneous Affect and Impulsive Behavior

Marketers and academic scholars have long been interested in understanding what drives impulsive behavior. One key issue that has not yet been examined in extant literature is the dynamics of the mental processes that drive impulsive behavior. In this paper, we distinguish dispositional tendencies represented by trait measures from motives that drive such tendencies. We propose a model of impulsive behavior that traces the goal-driven properties of such actions. We demonstrate that impulsivity is characterized by chronic goals to seek pleasure in various domains (Experiment 1). We then show that the degree of chronicity of hedonic goals determines how people evaluate hedonic products and their affective responses over time (Experiment 2). Finally, we also show that the degree of chronicity of goals influences actual behavior over time (Experiment 3). These findings impact the theoretical underpinnings of impulsive behavior and suggest that impulsive behavior may be multiply determined in process terms, not just in terms of affecting whether or not an individual will behave impulsively in a given situation, but also how impulsively the individual will behave.

Most people believe that they are capable of controlling their impulses and desires. Yet, every now and then, the sweater in the window that shrieks out "buy me!" (Rook 1987) or the feeling "it was like I was on automatic" (O'Guinn and Faber 1989) challenges these beliefs. Even the most prudent among us have succumbed to one form of temptation at some time or the other. Theories on impulsivity have sought to differentiate between impulsive and non-impulsive people along trait characteristics such as Extraversion, defined as an increased sensitivity to rewards that manifests in sociability, assertiveness and impulsiveness (e.g., Zuckerman 1991). Others have described impulsivity in terms of behavioral tendencies, expressed in terms of a propensity to overvalue benefits or rewards and undervalue costs or punishments unless they are certain and salient (Gray 1987; Puri 1996).

Recent theories of personality adopt a social-cognitive perspective, linking traits to underlying variables such as encoding categories, expectancies, affect, goals and values, and competencies (cf. Mischel and Shoda 1995; Cervone 2004). The social-cognitive view of personality emphasizes the need to identify key cognitive and affective mechanisms underlying overt patterns of behavior. A critical aspect of this view is that personality and behavior are dynamically linked through complex interconnected processes that can potentially explain why people may exhibit a particular behavior in one situation and not in another (Shoda and Mischel 1998).

In this paper, we adopt a similar view in arguing that impulsive behavior is a function of the degree of chronicity of hedonic goals, that is, how deeply rooted the need to seek pleasure in various domains is for people. Central to our argument is the idea that impulsivity as a general trait measure captures only a part of the variance in behavior across individuals. Instead, one needs to understand how features in the environment may activate and indeed suppress specific constructs and goals related to pleasure derived from various activities or products. We show that impulsive people are more likely to have chronic goals to seek pleasure in various domains. Such goals interact with situational cues that may prime affective reactions and behavioral paths in distinctive patterns over time. Our unique contribution lies in showing the dynamic nature of impulsive behavior. Specifically, we show that the degree of chronicity of hedonic goals has an effect not just on whether a person acts impulsively or not, but also on how much the person likes products related to that goal over time and hence how impulsively he or she behaves. This time component of impulsive behavior has hitherto not been examined in extant literature. We thus elaborate on the theoretical implications of our findings and build on previous literature by suggesting that there is more to impulsive behavior than spontaneous affect or absence of planning. We integrate our findings in a goal-based framework of behavior. We also provide a dynamic view of behavior rather than a static snapshot, arguing that time plays an important role in determining how behavior might unfold.

From a practical standpoint, our findings show that impulsive behavior can be influenced in subtle ways by priming specific sources of pleasure. Further, such behavior may increase in its intensity over time resulting in greater quantities being purchased or consumed. At the level of public policy, our findings could shed some light on how behaviors such as binge-eating may be triggered. The most prevalent explanation for behaviors such as binge-eating is that they are a form of affect regulation where people overeat to manage distress or negative affect. Our results provide some support for the idea that pleasure-seeking goals may also gather momentum over time such that they drive excess consumption.

Next, we begin the derivation of our conceptual model, followed by the studies that were conducted to test our hypotheses.

### CONCEPTUAL MODEL OF CONSUMER IMPULSIVENESS

Impulsive behavior has been studied at great length in a variety of domains such as shopping, gambling, eating, drinking and sex (see Baumeister, Heatherton and Tice 1994 for a review). There are many views on the definition of impulsive behavior. They center around two key dimensions – first, the experience of immediate affect or urges upon encountering a specific stimulus coupled with a countervailing resisting force, and second, an element of spontaneity or absence of planning. For example, one definition in the context of shopping has been derived from the Greek word akrasia, or "weakness of will" (Wood 1998). Wood defines akratic impulses as unplanned purchases, undertaken with little or no deliberation, accompanied by affective mood states that furthermore are not compelled, and that, finally, are against a buyer's better judgment. Similarly, impulses have also been defined as "desires" that compete with an individual's "willpower" (Hoch and Loewenstein 1991). Rook (1987) emphasizes the affective aspect of impulsive behavior, documenting how consumers experience "a sudden, often powerful and persistent urge to buy something immediately." In a similar vein, Shiv and Fedorikhin (1999) show that impulsive behavior is driven by the experience of immediate affect. Metcalfe and Mischel (1999) posited that impulses are guided by "hot" or affect-laden cognitions. If the hot system is dominant, and the cool, reflective system that defines willpower is not well developed or it is temporally or chronically dysfunctional, salient exposure to a hot stimulus would evoke the spontaneous response of yielding to the temptation. We thus define impulsive behavior as any action that is guided by spontaneous, affective reactions to stimuli that may override willpower.

At a second level, trait theorists and other researchers interested in studying individual differences in behavior have looked at impulsivity as a personality variable. Thus, Puri (1996)

characterizes impulsivity as a general tendency to overvalue all benefits, and undervalue all costs except those that are certain and salient. Such individuals are likely to have an underdeveloped Behavioral Inhibition System that guides willpower and an overactive Behavioral Activation System that is pleasure-seeking (Gray 1987). Some trait theorists link impulsivity to Extraversion, one of the five identified dimensions of personality (Cloninger, Przybeck and Svrakic 1991) and define impulsivity as the tendency to seek excitement or novelty and avoid boredom or monotony. Others link impulsivity to the Conscientiousness/Psychotism dimension, which defines constraint and will-power or the lack thereof (Tellegen 1982).

These models of personality describe impulsivity in dispositional terms. They use scales that measure respondents' self-reports of behavior. For example, the Multidimensional Personality Questionnaire (Tellegen 1982) uses items such as "buy something without thinking" and "do first thing that comes to mind." These coherent patterns of action represent stable individual differences. However, there is more value to these measures if they are linked to some underlying constructs, goals or other cognitive/affective dimensions (Cervone 1997).

Social-cognitive models of personality such as the Cognitive-Affective Personality System (CAPS; Mischel and Shoda 1995) or the Knowledge and Appraisal Personality Architecture (KAPA; Cervone 2004) are based on the principle that personality is a complex system featuring several dynamic interactions among multiple cognitive and affective processes. Of particular interest is the fact that these models posit that behavior is a set of "if-then" contingencies depending on which aspects of the cognitive-affective system the situational features activate. Thus, one might behave in a certain manner in one situation while not doing so in another.

One central feature in these models is the role of goals or motives as determinants of personality. There is a considerable body of literature that focuses on the motivational aspects of

traits (e.g., Read, Jones and Miller 1990; Read and Miller 2002). According to this approach, traits can be conceptualized along two dimensions – the general level of activation of the approach-avoidance system, and the specific chronicity of individual goals associated with the trait. Read and Miller (2002) differentiate these two dimensions by modeling the former as a gain or sensitivity parameter and the latter as a bias or difference in the resting level of activation. In other words, people may be generally more or less sensitive to reward or punishment and also have very specific biases towards individual goals.

We conceptualize impulsivity along the same lines as both a generalized sensitivity to rewards (and a reduced sensitivity to punishment or costs), and a specific bias towards different types of hedonic goals. The first idea mirrors the definition advanced by Puri (1996) and Rook and Fisher (1995) whereby impulsive people are seen as more sensitive to benefits and not as capable of taking normative considerations into account. Similarly, Grav (1987) distinguished people along two orthogonal dimensions measuring the tendency to seek pleasure and the tendency to take costs of one's actions into account and concluded that impulsive people tended to be over-active on the first dimension or under-active on the second. Most of the literature on impulsive behavior has focused on only the latter aspect of impulsivity, namely poor self-control or weak inhibition. Thus, impulsivity has generally been framed as a failure to avoid temptations (e.g., Ainslie 1975; Baumeister and Mick 2002). On the other hand, recent work in neurobiology has found that impulsivity is characterized by increased dopamine activity, which is linked to pleasure-seeking (Depue and Collins 1999). Metcalfe and Mischel (1999) argue for a similar interpretation, suggesting that if the hot or affective system is dominant, it will guide behavior automatically in line with the affect aroused by a hot stimulus.

The second idea takes into account the fact that people derive pleasure from multiple sources. For instance, Duncker (1941) defined three types of pleasure: *sensory pleasures*, where

different senses may be engaged (e.g., the flavor of wine, the smell of a freshly baked bread, the feel of silk), *aesthetic pleasures*, derived from sensations offered by nature or expressive of something (e.g., music, sunsets) and *accomplishment pleasures*, derived from the consciousness that something valued has been realized (e.g., mastery of a game or skill). More recently, Dubé and Le Bel (2003) showed that people represent pleasure as a hierarchical concept where differentiated sources of pleasure (physical, intellectual, emotional and social) are subsumed under a higher level unitary form of pleasure. Thus, some people may get pleasure from foods such as chocolate or ice-cream, from sex, or even from sleeping. Others may derive pleasure from shopping or traveling or even donating to charity. We thus define hedonic goals as the need to seek pleasure in any of these domains, and hedonic products as those that are consumed/bought primarily for their ability to provide feeling or pleasure rather than utilitarian value (Dhar and Wertenbroch 2000).

These sources of pleasure thus represent idiosyncratic paths to the realization of the overarching reward motivation. Frequent pursuit of the same paths is a source of chronic activation of specific hedonic goals related to those paths. Thus, people who derive a lot of pleasure from shopping are likely to be especially responsive to cues in the environment that trigger this goal, and hence frequently engage in impulse purchases. It is this frequent activation of the same goal and the associated behavioral paths that leads to a goal becoming chronic. Goal theory also holds that there may be multiple paths to realization of the same goal. Kruglanski et al. (2002) argue that goal systems display several different architectures where the number of means to a goal and the extent of substitutability of one means for another may vary significantly. Competing goals or means may inhibit one another, so that the activation of one goal reduces the activation of another just as one means to a goal inhibits another.

In sum, our model of impulsive behavior makes the following propositions: 1) Trait impulsivity is characterized by a general sensitivity to pleasure or rewards; 2) Impulsivity is also characterized by biases towards specific types of pleasure that are chronically accessible; 3) An individual type of pleasure may be realized in multiple ways; 4) Situational features may activate one or more paths and correspondingly inhibit others; and 5) Such paths, once activated, will drive affective reactions and behavior. Figure 1 presents a schematic view of our basic model. Experiment 1 establishes that impulsivity is linked to chronic goals for specific sources of pleasure through a variety of products (propositions 1, 2 and 3). Experiment 2 examines the effect of situational primes and time since priming to show that situational primes interact with these chronic goals over time to influence affective reactions (proposition 5). It also provides support for proposition 4 above by showing facilitatory effects for some products and inhibitory effects for others. Experiment 3 examines the effect of moderating effect of delay on actual behavior among impulsives and non-impulsives primed with a hedonic goal.

Insert figure 1 about here

## **EXPERIMENT 1: THE ROLE OF CHRONIC HEDONIC GOALS**

Based on the model above, our first proposition is that impulsivity is characterized by chronic activation of hedonic goals related to different sources of pleasure. While there is considerable evidence that impulsivity is associated with other manifestations such as sensation seeking (Zuckerman, et al. 1993), it is not clear whether such manifestations are merely behavioral tendencies rather than goals or motivations. In order to examine this issue, we focused

on one key property of goal-directed behavior – such behaviors tend to be persisted on even in the face of obstacles (Lewin 1935)

Theories on ironic processes (Wegner 1994) suggest that people may be unable to suppress thoughts or influences even while actively trying to do so. Thus, when participants were instructed not to think of white bears, they reported a greater intrusion of thoughts related to white bears. Goal theories similarly suggest that forcing people to respond in a manner counter to their current goals will lead to overcompensation. A classic study by Zeigarnik (1939) showed that people subsequently tended to recall more goal-relevant cues when interrupted in their pursuit of a goal. Moskowitz et al. (1999) similarly showed that forcing people with chronic egalitarian goals to respond stereotypically to a set of situations caused them to evaluate stereotyped targets more positively, because their egalitarian goals were disrupted by the manipulation. They argued that people think of themselves as possessing certain attributes and as committed to the pursuit of self-defining goals. Failure causes people to use subsequent behavior to compensate, because experiencing failure strengthens the tension to attain the goal.

If impulsivity is associated with chronic hedonic goals, as we hypothesize, we should see a similar effect among impulsive people. Specifically, impulsive people compelled to give prudent responses to a set of tempting situations should overcompensate on a subsequent product evaluation task. A cognitive explanation consistent with a construct activation story would suggest that evaluations of the hedonic products would be prime-consistent and thus lower after the prudence manipulation. We hypothesize that impulsive people will actually evaluate the hedonic products higher after the manipulation. This would indicate the operation of a chronic hedonic goal. In contrast, if people do not possess such goals at a chronic level of activation, their evaluations should be consistent with the constructs being activated by the prudence manipulation. This could be due to the fact that any hedonic goals they may possess are weak enough to be over-ridden by the prudence manipulation. Hence,

**H1:** Impulsive people will evaluate hedonic products more positively after a prudent response compared to non-impulsive people.

A key proposition of our model is that impulsive people have different sources of pleasure at a chronic level. In other words, there may be some impulsive people who derive pleasure from sensory or gustatory sources such as indulging their sweet tooth or snacking on chips, while others may pursue pleasure in social contexts such as shopping or travel. Hence, suppressing one source should cause the sub-goals or means associated with it to get activated, thereby causing over-compensation to a greater extent relative to the other sources. We do not formally hypothesize these effects due to the absence of previous research in this area, but we address this again in the General Discussion.

#### Method

*Pretest for Stimuli.* Our goal was to identify a set of products that could be classified as hedonic. Following Dhar and Wertenbroch (2000), we defined hedonic products as those that are bought or consumed primarily for fun or enjoyment, or if they gave the respondent pleasure, whether sensory, emotional or mental, out of purchase or consumption. Forty one respondents from the same student population as the main study classified fifty products, pictures of which appeared on the screen, as "primarily functional," "primarily hedonic," "both hedonic and functional" and "neither hedonic nor functional." We chose fifteen products that were all rated by over 50% of participants as "primarily hedonic," thus indicating a greater than chance

perception of their hedonic nature (p-values for all chi-squares were less than .05). There were five pictures that could be classified as sweet foods (ice-cream, assorted fruit-filled danishes, strawberry cake, chocolate truffles and tarts ), five that were savory foods (chips, pizza, burger, steak and nachos) and five that were non-foods (diamond ring, perfume, MP3 player, sports car and music CDs).

*Procedure.* One hundred forty one undergraduate students from a large mid-western university participated in this experiment, for which they received a compensation of \$2. We used a procedure followed by Moskowitz et al. (1999) in order to determine the chronicity of hedonic goals among impulsives and non-impulsives. The original procedure was used to identify people with chronic egalitarian goals, by forcing them to give stereotypical responses to a set of situations. People with chronic goals are committed to the pursuit of such goals and try to hold on to these goals even in the face of barriers or obstacles. If these barriers prevent them from pursuing these goals, a sense of incompleteness is induced, leading them to try to compensate for having violated the goal. Moskowitz et al. (1999) found that those with chronic egalitarian goals gave less stereotypical evaluations of women as a group after being forced to respond stereotypically to a set of descriptions about women, while those without such chronic goals gave more stereotypical evaluations.

In our procedure, we forced participants to respond prudently to a set of three different tempting situations (see Appendix A) related to one of three domains: sweet foods, savory foods or other non-food indulgences. Sweet foods and savory foods may be deemed as alternative means to the same underlying gustatory goal, and thus needs for such products would form subgoals, while non-food indulgences may be related to emotional, social or intellectual goals. If respondents possess chronic hedonic goals related to each of these domains, this should be reflected in compensatory behavior in terms of increased liking for hedonic products in each of those domains. If, on the other hand, these goals are not chronic or strong enough, the prudence task should activate constructs or thoughts related to self-control or prime prudence goals, so that the hedonic products are liked less.

The experiment was conducted in two phases. In the first phase, participants, in groups of 3-7, first rated the set of fifteen pictures of various hedonic objects chosen from the pretest. Participants responded to each picture by indicating how much they liked the product featured in the picture on a nine-point semantic differential scale anchored on "1 = dislike very much" to "9 = like very much." They next completed a distraction task that required them to find the names of various car-models in a word puzzle. Following this, participants completed one of three prudence-induction tasks that were meant to induce a feeling of goal violation among those who were committed to the pursuit of hedonic goals. In each of these tasks, participants read three situations they were asked to imagine themselves being in. Each of these situations featured a common temptation (e.g., "You go to Nordstrom's and see a very attractive sweater on display"). Across the three tasks, the situations thus corresponded to temptations in the domains of sweet foods, savory foods and other non-food indulgences respectively. Participants were asked to respond by clicking on the button that best described how they would feel in that situation. Each of the three options was designed to be a prudent response. In the example for sweaters above, the three responses were: (a) It is important to save for a rainy day (b) It is important to prioritize spending and you just don't want to spend money on indulgences such as sweaters when there are more important things to buy; and (c) It is important not to yield to temptation. Appendix A details the various situations and responses for each of the prudence tasks.

In the second phase, participants were again presented with the set of fifteen pictures with the order rotated randomly and asked to indicate once again how much they liked or disliked each product. The cover story was that we were interested in knowing whether their gutresponses are stable. After another distraction task, we then elicited participants' self-reports of impulsivity using Puri's (1996) Consumer Impulsiveness Scale (CIS). The CIS has two subscales, hedonic and prudent, that are orthogonal to each other (where 1 = usually describes me and 7 = seldom describes me). The hedonic scale consists of five items while the prudent scale consists of seven items. Puri (1996) classified participants as impulsive if their scores fell below the median on the hedonic scale and above the median on the prudent scale; as prudent if their scores fall above the median on the hedonic scale and below the median on the prudent scale, and the rest as moderates. In our paper, for the purpose of carrying out analyses of variance, we adhered to Puri's (1996) classification of impulsives. However, we classified moderates and prudents together as non-impulsives. We did this because our fundamental interest was in examining whether or not impulsive people possessed chronic hedonic goals. Chronicity is usually determined by frequent instantiation of constructs and pursuit of the same goal. Since moderates high on reward seeking but also high on inhibition are not likely to engage in impulsive behavior as reliably or frequently as impulsive people, they are also less likely to have chronic hedonic goals. However, in order to capture the notion that the differences in chronicity are a matter of degree rather than dichotomous, we also report our results on the continuous scale measures of impulsivity (see endnote 1).

Finally, participants were also asked to indicate how health-conscious and how hungry they were on seven-point scales ("1 = not at all" and "7=very much"). After other background measures were collected, participants were dismissed.

### Results

In order for hypothesis 1 to be supported, those with chronic hedonic goals should demonstrate compensatory behavior by rating hedonic products higher after the incompleteness task. Those without such chronic goals would not experience a sense of incompleteness. Rather, they would act in a manner consistent with what was being semantically primed, namely, prudence. Compensatory behavior would be reflected in higher Time 2 evaluations for the relevant product types.

Participants were categorized into impulsives and non-impulsives based on their scores on the two impulsiveness sub-scales, after reverse scoring the prudence scale so that low scores on both scales reflected a greater level of disinhibition or impulsivity. Since there was a possibility that some products might appeal differentially according to gender, we included gender as a factor in our analyses. A mixed, doubly multivariate MANCOVA was run with the time as a repeated-measure of three different product types, while prudence task, impulsivity, and gender were the between-subjects factors.<sup>1</sup> Concern for health and state of hunger were included as covariates. Our analysis showed a significant main effect of gender (multivariate F(3,125) = 2.79, p<.05). Gender did not however interact with any of the other variables. Males had a higher evaluation of savory products compared to females ( $\overline{X}_{male} = 6.38$ ,  $\overline{X}_{female} = 5.91$ , F(1,127) = 3.27, p=.07), while females had a directionally higher evaluation of sweet products compared to males ( $\overline{X}_{male} = 5.83$ ,  $\overline{X}_{female} = 6.22$ , p=.11). There was no difference in the evaluations of non-food indulgences across gender, presumably because the differences evened out across the different products chosen in this category.

Consistent with H1, there was a significant interaction between time and impulsiveness (multivariate F(3,125) = 5.93, p < .01). Univariate tests confirmed that these interactions were significant for all three types of hedonic products (Sweet foods: F(1,127) = 6.21, p < .05; Savory foods: F(1,127) = 8.48, p < .01; Non-foods: F(1,127) = 6.21, p < .05). More interestingly, there was

a significant three-way interaction between prudence task, impulsivity and time (multivariate Wilks' Lambda F(6, 250) = 4.21, p<.01). Univariate tests were significant for two product types (Sweet foods: F(2,127) = 3.91, p<.05; Savory foods: F(2,127) = 5.12, p<.01) and marginally significant for non-foods (F(2,127) = 2.90, p = .06). Table 1 shows the pattern of results obtained for impulsives and non-impulsives. Simple comparisons were made between the Time 1 and Time 2 evaluations for all combinations of prudence task, impulsivity and product type. Impulsive people showed strong compensatory behavior for each of the product types when they were forced to be prudent in the corresponding domains. Thus, for example, suppressing sweetness caused impulsives to evaluate sweet foods higher at Time 2 (difference = .37, F (1,135) = 5.77, p<.05). The same prudence task caused non-impulsives to evaluate sweet foods lower at Time 2 (difference = -.29, F(1,135) = 8.61, p<.01). Interestingly, the prudence task for sweetness also caused lower evaluations of savory products at Time 2 among non-impulsives (difference = -.31, F(1,135) = 11.39, p<.01) and a directionally lower evaluation of savory products among impulsives (difference = -.28, F(1,135) = 3.02, p=.09). In general, nonimpulsives reported lower Time 2 evaluations across all product types.

Insert table 1 about here

#### Discussion

The results obtained in this experiment indicate that there is a significant link between impulsiveness as a trait and chronicity of hedonic goals. Impulsive people, particularly those with a strong drive to seek pleasure (as evidenced by their scores on the hedonic sub-scale), are likely to be committed to specific hedonic goals in various domains and therefore experience a feeling of incompleteness when these goals are violated. The prudence task may have activated goals to be prudent, but these would have conflicted sharply with the chronic pleasure-seeking goal. This leads to compensatory behavior in terms of higher evaluations of hedonic products. This is particularly striking because a simple knowledge activation or semantic priming mechanism would actually dictate the opposite effect to occur since all participants were asked to respond prudently. Interestingly, however, we find that non-impulsives report a lower liking for hedonic products after being asked to respond prudently to the set of situations. This indicates that such individuals do not possess chronically accessible hedonic goals, and that they are susceptible to the effects of the prudence goal that was activated by the task.

We also found some directional evidence to suggest that activating one sub-goal to a gustatory hedonic goal tends to cause suppression of an alternative sub-goal among impulsive people. Thus, imposing a prudence goal on sweet products not only caused sweet products to be valued higher, but also caused savory products to be evaluated lower, while forcing prudence on savory products caused such products to be valued higher and simultaneously devaluing sweet products. In contrast, among non-impulsive people, the prudence task for sweet products devalued not only sweet products, but also savory products. We suggest that this is because the prudence task induces a general prudence mindset among non-impulsive people since it acts in concert with their natural tendencies. However, the prudence task comes into conflict with the chronic goal among impulsives, causing them to compensate for this violation. The activation of one specific hedonic sub-goal also seems to suppress the alternative sub-goal. This is an issue that we probe further in Experiment 2.

An alternative explanation for our findings for impulsive people could be that the prudence task created a contrast effect either by way of comparison to an exemplar or through correctional adjustment. The comparison theory holds that primes may activate either moderate or extreme exemplars of a category, and if the target object is less extreme compared to the exemplar being primed, a contrast effect may ensue (Herr 1986). In other words, if the behaviors that were described in the prudence task were seen by the respondent to be extreme examples of temptation while the products evaluated were perceived to be less so, the respondent could evaluate the product higher. Given that the behaviors in our prudence task were commonplace examples of exercising self-control and also that they referred to the participant's own exercise of such self-control rather than that of someone else, it is not likely that any extreme exemplars were activated by the task.

The correctional adjustment theory holds that people may perceive a prime as a biasing influence and hence correct their judgments by subtracting the bias (Martin 1986). This process is however effortful and requires cognitive resources (Moskowitz and Skurnik 1999). Hence, respondents must take a greater amount of time to make the second evaluation compared to the first one. However, we found no such evidence for any of the product categories. Response times were in fact marginally faster on the second trial, as is to be expected on any repeated trial experiment.

Having established that impulsivity is characterized by chronic hedonic goals in various domains that map on to a clearly organized knowledge structure of potential behaviors that can satisfy the relevant goals, the next step in our model is to show that these hedonic goals influence spontaneous affective reactions to stimuli. Of critical interest is the role of time in influencing such reactions. The difference between an affective reaction and a desire lies in the time varying properties of the latter. We investigate this in Experiment 2.

#### **EXPERIMENT 2: DYNAMICS OF SPONTANEOUS AFFECT**

Most accounts of impulsive behavior describe the experience of immediate affect (Rook 1987; Shiv and Fedorikhin 1999). Our interest in this experiment was to show how any immediate affect elicited by a stimulus is influenced by the motivational system. In particular, does liking increase with time, reflecting the goal-strengthening effect (cf. Atkinson and Birch 1970)? Further, does the presence of a focal goal related to a particular source of pleasure devalue products unrelated to the goal over time (Brendl, Markman and Messner 2003)? Studies using physiological measures such as skin conductance and cardiac acceleration have shown that emotional reactions to stimuli are linked to underlying appetitive and defensive motivational states (Bradley, et al. 2001). The strength of a particular behavioral path depends on the accessibility of the individual processes influencing it and of their relative intensity.

Several studies on accessibility have shown that temporary and chronic sources of accessibility influence judgments or evaluations independent of each other (e.g., Aaker and Lee 2001). Bargh et al. (1986) found that participants who possessed chronically accessible constructs for a given trait gave more extreme evaluations of an ambiguous behavior when they were also primed with the same construct. In other words, the chronic construct formed a baseline level of activation independent of context, while the situational prime served to activate the construct further, leading to an increase in activation over the baseline. Pitting chronic sources of accessibility *against* situational ones (i.e., contextual primes) in a study that also manipulated delay since the priming event, Bargh, Lombardi and Higgins (1988) found that chronics were progressively more likely to use their chronically accessible construct instead of the primed alternative construct to categorize an ambiguous behavior. While we are not aware of any studies that have looked at the dynamics of evaluation as a function of chronic or temporarily accessible goals, there is enough evidence in the literature to suggest that goals can

be treated as knowledge structures, exhibiting similar properties as construct accessibility (see, for example, Kruglanski 1996).

The purpose of the current experiment was to examine how people felt towards various hedonic products as a function of their chronic goals and contextually primed concepts. In particular, our focus was on the effect of time, not in a between-subjects design, but in a withinsubjects one, where we could examine the dynamic effects of the interaction between the chronic and situational sources of accessibility over time. The studies on accessibility cited earlier essentially found that priming caused evaluations among chronics to become more extreme. However, no study in the extant literature has examined the dynamics of such polarization across time. Do people's evaluations of objects get increasingly extreme as a function of delay? Alternatively, do they start high, and then decay to levels that are more neutral? If people just experience spontaneous affect upon seeing something hedonic, their affective reactions are not likely to change as a result of time. On the other hand, if the motivational system is also implicated, as we claim in Experiment 1, liking for an object should increase as a function of time, intensifying in response to the lack of satiation of the activated hedonic goals. This effect is likely to be particularly strong when a primed goal is jointly in operation, since chronic and temporary sources of accessibility operate additively. We expect a reverse pattern for nonimpulsives, for whom hedonic goals are not chronically accessible. Priming may facilitate temporary accessibility of hedonic goals and associated products. However, delay should cause their natural prudence goals to resurface and override the desires or spontaneous affective reactions to the products, consistent with the idea that chronic sources of accessibility override temporary ones after a delay (Bargh, Lombardi and Higgins 1988). Hence,

- **H2:** The effects of goal priming and delay on intensity of evaluations will be moderated by impulsivity such that:
  - (a) Impulsive people will experience a progressively higher degree of liking over time for hedonic products related to a primed hedonic goal as compared to a neutral condition.
  - (b) Non-impulsive people will experience an immediate increase in liking for hedonic products related to a primed hedonic goal but liking will diminish to baseline levels over time.

Our results in Experiment 1 suggest that activating a gustatory goal and sub-goals related to sweet foods among impulsive people might lead to a suppression of the alternative sub-goal related to savory foods. Brendl, Markman and Messner (2003) found that activating a focal goal leads to a devaluation of objects unrelated to the goal. Consistent with goal theory (Lewin 1935), we hypothesize that this devaluation effect is likely to intensify over time as the focal goal gains strength. We expect this effect to be particularly strong for objects that are alternative sub-goals linked to the same hedonic goal, based on our findings in Experiment 1. Further, given our findings in Experiment 1 about the relatively lower degree of chronicity of hedonic goals among non-impulsive people, we expect that the devaluation effect will not be seen among this group of people. Hence:

**H3:** Impulsivity will moderate the effects of priming and time on liking for unrelated products such that:

- (a) Impulsive people will report a progressively lower liking over time for unrelated products when a hedonic goal is primed as compared to when no such goal is in operation.
- (b) This effect will not be observed among non-impulsive people.

#### Method

Pretest for Stimulus Development. Data from our pretest in Experiment 1 were used to identify products that could be classified as "primarily hedonic" or "both functional and hedonic." Thirty products met this criterion, whereby the proportion of respondents classifying them accordingly was significantly greater than would be expected by chance. Product categories included were desserts, pastries, chocolates, cookies, pizza, chips, tacos, nachos, steak, burgers, jewelry, sports cars, MP3 players, perfume, music CDs and PDAs. A group of 65 respondents (30 female, 35 male) then provided ratings on sliding 101-point scales as to how much they liked each product. Stimuli were shown one at a time for three seconds on a computer monitor and ratings were elicited for each picture immediately after the picture was shown. Based on the results of the pretest, 18 pictures were chosen for the main experiment: six pictures that could broadly be categorized as sweet foods (e.g., desserts, chocolates), six that were of savory foods (e.g., pizza, steak, chips) and six that were of non-foods (e.g., MP3 players, cars, CDs). Three blocks of six pictures each were constructed of two sweet foods, two savory foods and two non-foods, matching the average rating of each of the blocks as well as the average ratings of each of the component categories across the three blocks. We ensured that the ratings were also matched across gender.

*Pretest for Priming Manipulation.* Two criteria were used in developing the priming manipulation. First, rather than use a pure manipulation of pleasure, we decided to capture the inherent ambivalence associated with benefits and costs so as to show how such benefits might dominate costs. Puri (1996) argued that impulsive people take costs into account only when they are salient and certain while prudent people take all costs into account. However, Metcalfe and Mischel (1999) argued that even seemingly cold and rational attributes may be associated with hot or affective cognitions and in fact strengthen the need for immediate gratification. Thus, what might ordinarily seem like a cost when considered on its own might in fact operate in the opposite manner when associated with pleasure-related cues.

The second criterion was that the priming manipulation would need to activate a specific source of pleasure rather than a general pleasure-seeking tendency. We decided to manipulate pleasure through sweet indulgences since a lot of people have such cravings. The U.S. Food and Drug Administration estimate that the average American eats the equivalent of 20 teaspoons of sugar every day.

We therefore asked respondents to evaluate and choose from among three brands of cereals rated on attributes that were either sweetness-related or neutral, that is, not related to sweetness. Two attributes, namely, cost per ounce and sodium content, were held constant across the two conditions. In the hedonic prime condition, taste and calories were the two additional attributes of interest, while crispiness and texture were used in the neutral condition. Our hypothesis was that evaluating different brands of cereals on attributes relating to taste and calories (described in terms of the sugar content and presence of nuts and dried fruit) would activate hot or affect-laden cognitions related to sweetness (Metcalfe and Mischel 1999) while evaluating cereals on attributes relating to neutral attributes such as crispiness or texture would not do so.<sup>2</sup> A pretest of the two conditions run among 45 students confirmed our hypothesis.

Respondents in the primed condition reported a greater use of their emotional side ( $\overline{X}_{\text{prime}}$ = 4.92,  $\overline{X}_{\text{neutral}} = 3.08$ , F(1,41) = 12.7, p <.01) and a greater need for something sweet ( $\overline{X}_{\text{prime}} =$ 5.14,  $\overline{X}_{neutral} = 3.71$ , F(1,41) = 7.15, p<.05) compared to those in the neutral condition. Respondents also reported a lower use of their rational side when primed ( $\overline{X}_{\text{prime}} = 4.5, \overline{X}_{\text{neutral}}$ = 5.53, F(1,41) = 4.49, p<.05). Another computer-mediated pre-test among 75 students from the same population was run to further test our proposition. Half the subjects completed the cereal rating task based on the hedonic attributes and the other half based on the neutral attributes. All of them then provided their evaluations of all six attributes on a thermometer measure of feelings evoked, including the four that were part of the actual choice task. Respondents indicated how cold or warm they felt towards each attribute as a measure of how affect-laden each attribute was. The higher the temperature on the 101-point scale, the more affect-laden was the attribute. We ran a MANCOVA on the ratings for the six attributes with priming condition as the independent variable and health consciousness and state of hunger as covariates. Supporting our hypothesis, we found that calories were rated warmer in the hedonic condition than in the neutral condition ( $\overline{X}_{hedonic} = 61.1$ ,  $\overline{X}_{neutral} = 49.8$ , F(1,69) = 5.73, p<.05). Taste was however rated similarly in both conditions as is to be expected ( $\overline{X}_{hedonic} = 77.2, \overline{X}_{neutral} = 76.2, F < 1$ ). Both crispiness and texture were also rated similarly and somewhat neutral across the two conditions (Crispiness:  $\overline{X}_{hedonic} = 56.4$ ,  $\overline{X}_{neutral} = 55.3$ , F<1; Texture:  $\overline{X}_{hedonic} = 55.6$ ,  $\overline{X}_{neutral} = 55.6$ 54.9, F<1). Finally, both sodium content and cost per ounce were also rated similarly across the two conditions (Cost per ounce:  $\overline{X}_{hedonic} = 47.4$ ,  $\overline{X}_{neutral} = 45.5$ , F<1; Sodium:  $\overline{X}_{hedonic} = 37.8$ ,  $X_{\text{neutral}} = 37.2, \text{ F} < 1$ ).

Procedure. Eighty-three undergraduate students at a large northeastern university participated in the main experiment for partial course credit. Participants were seated in front of an IBM-compatible personal computer that randomly assigned them to either the neutral or the hedonic condition. The experiment was introduced as a study on consumer decision-making and product evaluation and participants were informed that they would be performing three separate decision tasks and evaluating multiple sets of products. There were two neutral decision tasks (refrigerators and lawn mowers) common to both priming conditions. On the third task, half the respondents evaluated and chose from brands of cereal on the neutral attributes, while the other half evaluated and chose cereal based on hedonic attributes related to sweetness. Participants were asked to indicate which brand of cereal they would buy. Each of the three decision tasks was followed by three blocks of pictures presented at different intervals of delay. The purpose of the two decision tasks preceding the final task on cereal was to ensure that response times were stable on the final task. Participants were told that the second part of the experiment pertained to how product evaluations could be influenced by their mathematical skills. Immediately before each block of pictures was presented, an interference task designed to clear working memory after the priming was presented to each participant (Bargh, Lombardi and Higgins 1988). This consisted of counting backwards from a given number (e.g., count backwards from the number 357 by 3s, 484 by 4s and 980 by 5s) till they were told to stop; we used a different starting number and subtracting amount in each series to ensure that task difficulty would remain the same across all blocks. The stop instruction appeared after five seconds in the no-delay condition, 60 seconds in the medium-delay condition and 150 seconds in the long-delay condition. We estimated that the task of rating each block of pictures would take approximately one minute. Thus, the actual delay intervals before each block of pictures was presented are 5 seconds, 120 seconds and 210 seconds respectively. For each participant, the computer picked a

random starting order of blocks, ensuring that every combination of orders was equally represented across the set of participants. Within each block, the position of the six images was rotated at random for each participant.

Participants were instructed to look at each picture and then give their immediate gut feel reaction to it by pressing the key "1" if they liked it and "0" if they disliked it. They were told to give their reaction as quickly as possible by keeping their fingers on the respective keys as they saw the picture. Reaction times were measured by the computer. On the following screen, they were asked to indicate how much they liked the product in the picture by moving a slider along a scale anchored on 0 to 100.

After each set of blocks was completed, participants completed the next decision task and then evaluated the next set of blocks of pictures. We then collected measures about covariates and ratings on the 12-item Impulsiveness Scale (Puri 1996; resulting in 33 out of 83 participants classified as impulsives and the rest as non-impulsives). Participants were then debriefed and thanked.

### Results

*Liking Score.* Based on the liking score on the 101-point scale, an average liking score was computed for each category of pictures within each block. We subjected the average liking scores for each product category to a repeated-measures mixed analysis of variance, with prime condition (hedonic versus neutral) and impulsivity (impulsive versus non-impulsive) as between-subjects variables and time of presentation for each category within a block (5 seconds versus 120 seconds) as a repeated-measure across the three blocks. We also included the order of the blocks (there were six possible orders) as a between-subjects factor, in

order to rule out any effects of the order in which the blocks were presented. Finally, we included state of hunger and health consciousness as covariates. For the purpose of the analysis, only the scores from the final decision task, namely the cereal rating task, were taken into account. We assumed that any familiarity effects because of multiple exposures across the other two decision tasks would accrue equally to both the hedonic and the neutral condition, as all pictures had been presented an equal number of times prior to the beginning of the third task. In order to avoid sphericity issues, we used the multivariate test statistic (Wilks's Lambda) for all our repeated measures analyses (Vasey and Thayer 1987). We now report the results separately for sweet foods, savory foods, and finally for non-foods in order to test H2 and H3.

(a) <u>Sweet Foods.</u> When we examine the data pertaining to sweet products, the overall repeated-measures ANCOVA showed a significant three-way between-subjects by within-subjects interaction for priming condition and impulsiveness by time interval for liking score (multivariate F(2,56) = 6.91, p < .01). This was qualified by a significant two-way interaction between impulsivity and time interval (F(2, 56) = 9.7, p < .01). None of the other effects was significant. The test of between-subjects effects showed that there was a main effect of impulsivity (F(1, 57) = 5.23, p < .05), such that impulsives reported a higher liking for the sweet products than did non-impulsives ( $\overline{X}_{imp} = 65.2$ ,  $\overline{X}_{non-imp} = 57.8$ ). None of the other effects, including order of presentation, was significant.

Consistent with H2a, impulsive people primed with a hedonic goal related to sweetness reported a progressively higher liking for sweet products ( $\overline{X}_{5sec} = 62.5$ ,  $\overline{X}_{120sec} = 66.2$ ,  $\overline{X}_{210sec} = 73.7$ ) compared to when they were in a neutral condition ( $\overline{X}_{5sec} = 61.2$ ,  $\overline{X}_{120sec} = 63.9$ ,  $\overline{X}_{210sec} = 63.8$ ). A test of within-subjects effects among impulsives revealed that there was a significant interaction between priming condition and time (multivariate F(2, 18) = 4.04, *p* <.05). The contrast was driven by the difference in evaluations at 210 seconds between the two

conditions (F(1,19) = 12.45, p<.01). The between-subjects main effect of priming condition was also significant (F(1,19) = 5.6, p<.05).

Consistent with H2b, non-impulsives showed an increase in liking immediately after being primed, but this liking declined after the delay ( $\overline{X}_{5sec} = 65.3$ ,  $\overline{X}_{120sec} = 57.9$ ,  $\overline{X}_{210sec} = 54.5$ ). On the other hand, in the neutral condition, liking scores remained stable throughout ( $\overline{X}_{5sec} = 56.6$ ,  $\overline{X}_{120sec} = 56.0$ ,  $\overline{X}_{210sec} = 56.2$ ). A test of within-subjects effects among nonimpulsives showed a significant interaction (F(2, 35) = 2.94, p = 0.06). The contrast was driven by the difference in evaluations at 5 seconds (F(1,36) = 6.58, p<.01).

(*b*) <u>Savory foods.</u> A similar set of analyses was run for savory foods such as steak, pizza, chips, etc. The repeated-measures mixed ANCOVA showed a significant three way between-subjects by within-subjects interaction between priming condition, impulsivity and time interval considering liking for savory foods (multivariate F(2,56) = 2.85, p=.06). This was qualified by a significant two way interaction between impulsivity and time interval (multivariate F(2,56) = 4.11, p<.05) and a significant two way interaction between priming condition and time interval (multivariate F(2,56) = 2.82, p=.06). Consistent with the devaluation hypothesis of Brendl et al. (2003), there was also a significant main effect of priming condition on overall liking scores such that subjects primed with the sweetness goal reported a lower liking for savory foods as opposed to those in the neutral condition ( $\overline{X}_{primed} = 61.9$ ,  $\overline{X}_{neutral} = 56.1$ ; F(1, 57) = 3.9, p<.05). Order of presentation did not have any significant effect either directly or in interaction with other variables.

Further analyses among those categorized as impulsive showed that there was a significant interaction between priming condition and time interval for savory foods (multivariate F(2,18) = 4.90, p<.05). Impulsive people who were primed with the sweetness goal reported a progressively lower liking for savory foods with time ( $\overline{X}_{5sec} = 68.4$ ,  $\overline{X}_{120sec} = 52.1$ ,

 $\overline{X}_{210sec} = 44.1$ ) while those who were in the neutral condition reported no such decrement in liking ( $\overline{X}_{5sec} = 63.0$ ,  $\overline{X}_{120sec} = 63.6$ ,  $\overline{X}_{210sec} = 62.1$ ). The contrast was driven by the difference in evaluations at 210 seconds (F(1,19) = 7.48, p<.01). Order of presentation was not significant and did not interact with any of the other variables.

There was no effect of priming the sweetness goal on liking for savory foods among nonimpulsive people (all Fs <1). Non-impulsive people primed with the sweetness goal reported liking scores for savory foods ( $\overline{X}_{5sec} = 56.9$ ,  $\overline{X}_{120sec} = 59.3$ ,  $\overline{X}_{210sec} = 58.5$ ) that were no different from those in the neutral condition ( $\overline{X}_{5sec} = 60.0$ ,  $\overline{X}_{120sec} = 60.8$ ,  $\overline{X}_{210sec} = 61.7$ ).

(c) <u>Non-foods.</u> The repeated-measures ANCOVA showed that priming the sweetness goal had no effect on reported liking for non-food hedonic items among either impulsive or non-impulsive people. None of the effects was significant (multivariate Fs <1, except for interaction between priming and time interval where F(2,56) = 1.36, p=.27). We thus note that there was no devaluation effect observed for products completely unrelated to the primed goal, while there was such an effect for products that satisfied an alternative sub-goal, consistent with what we found in Experiment 1. Thus, hypothesis 3a is only partially confirmed. Table 2 shows the pattern of results obtained for all product categories.

Insert table 2 about here

### Discussion

The results of Experiment 2 indicate that impulsive people primed with a hedonic goal related to the need for something sweet (via the cereal rating task) reported an increase in liking

over time for sweet products such as desserts or candy. Concurrent with this increase in liking for sweet products, they also reported a decrease in liking for savory foods over time. However, there was no such devaluation for non-food items such as MP3 players or CDs. This increase in liking for sweet products cannot be explained by a purely cognitive account that would predict a decrease in the effect of a temporary prime over time, an effect that was obtained only among non-impulsives. On the other hand, if impulsive behavior were only driven by spontaneous affect without implicating hedonic goals, we would again not see an increase with time, since no theory on affect predicts such increases. We thus hypothesize that there is interplay between the affective and motivational systems, such that an ongoing goal feeds back into the affective system and thus creates a liking for objects directly related to the current goal/sub-goal, while simultaneously devaluing objects that may represent competing sub-goals.

Priming created temporary desires or liking for hedonic products among non-impulsive people, but only for products directly related to the primed constructs/goal. However, such increases in liking decayed quite fast so that by 210 seconds, non-impulsive people reverted to their baseline levels. Such a phenomenon could occur in two ways. First, there might have been semantic activation of constructs related to sweetness as a result of the prime and that may have facilitated a temporary affective response. Second, the prime may have activated a temporary goal to indulge, but since prudence goals are stronger for this group, the hedonic goal may have been overridden over time. Our results do not unequivocally provide support for one route over another, and we leave this issue to be resolved in future research.

We failed to observe an increase in liking for sweet products over time when impulsives were in the neutral condition. We expected that chronic hedonic goals related to sweetness would get activated by the repeated exposure to pictures of sweet products, but failed to find such an effect at the levels of delay studied. One possibility is that the delay interval was too short, in particular because the task involved pictorial rather than real stimuli. Another possibility is that the neutral task may have led to greater focus on cognitions related to crispiness which were therefore not as relevant to the products under evaluation.

We also failed to observe a devaluation effect for non-food indulgences, as might have been predicted by Brendl, Markman and Messner (2003). We attribute this to the fact that these products are still related to hedonic goals at a more overarching level, and hence remain positively valued. It is likely that products that do not serve such hedonic needs might indeed be devalued.

A final test of the goal-priming hypothesis lies in its manifestation in driving actual behavior. A key property of goal-driven processes is that such goals strengthen over time. Experiment 2 showed that this strengthening effect manifests in greater liking for products related to the goal. Experiment 3 investigates whether such goals might also go on to influence actual behavior.

#### **EXPERIMENT 3: DYNAMICS OF IMPULSIVE BEHAVIOR**

In this experiment, we once again use one key property of a goal, namely, its tendency to strengthen over time (Atkinson and Birch 1970) to tease cognitive and motivational processes apart. If the prime activated a chronic goal among impulsive people, we should see an increase in tendency to act impulsively over time because the goal had not been satiated. In contrast, since non-impulsive people do not have hedonic motives at a chronic level of activation, we expect that the effect of the temporary prime will wear off and that they will revert to being non-impulsive after a delay. Thus:

**H4:** The effect of a delay after priming will be such that there is a greater tendency towards impulsive behavior among impulsive people, while there is a decrease among non-impulsive people.

### Method

Eighty-four undergraduate students at a large northeastern university participated in this experiment for partial course credit. All participants were primed with hedonic goals/constructs. Each participant completed a cereal choice task based on hedonic attributes, after which they were assigned randomly to a delay or a no-delay condition. Specifically, once participants in the delay condition completed the cereal evaluation task and the associated measures relating to task difficulty and current mood states, they had to complete a second unrelated task (embedded in the same questionnaire) that required them to find the names of eight cars from a word puzzle. A pretest among 25 participants indicated that this task took about 10 minutes to complete, and was rated moderately easy ( $\overline{X} = 3.2$  on a 7-point scale anchored on "very easy" and "very difficult"). After the first task, the participant went to a second room. Placed on a table inside the room was a tray of cookies. As the experimenter ushered in the participant, he remarked that the cookies were from a departmental meeting that had just got over. The participant was left alone in the room for up to two minutes, while the experimenter pretended to get the questionnaire. Unknown to the participant, a Logitech Quickcam Pro<sup>TM</sup> videocam, with a motion detector that allows the recording of any motion that is beyond a set sensitivity limit was attached to an IBM PC with its monitor turned off. The videocam was focused on the tray of cookies so that it could record whether the participant picked up a cookie and how many. After an interval of about two minutes, the experimenter returned to the room with a questionnaire. We elicited confound check measures related to current moods, measures on impulsiveness using the Consumer Impulsiveness Scale (Puri 1996) and covariate measures on liking for cookies, extent of healthconsciousness and present state of hunger.

### Results

*Impulsivity*. Following the same procedure as in the previous studies, 37 of the 84 participants were classified as impulsive and the remainder as non-impulsive. A test-retest procedure was carried out four weeks subsequent to the main experiment where the same participants were asked to provide their self-ratings on the impulsiveness scale while participating in a completely unrelated experiment. The correlation between the two measures was 0.88, indicating stability of the trait measures.

*Confound Check.* While there were no mood manipulations, it is likely that the delay condition may have induced some marginal mood effects. We used a mood inventory adapted from the PANAS scale (Watson, Clark and Tellegen 1988) and the pleasant-unpleasant scale (Watson 1988). Participants indicated how their current mood state was on eight seven-point items anchored on "definitely do not feel" (1) to "definitely feel" (7). We subjected *Posmood* (sub-scale of four items: happy, contented, pleased and peppy, Cronbach's  $\alpha = 0.81$ ) and *Negmood* (sub-scale of four items: irritated, downhearted, sad and upset, Cronbach's  $\alpha = 0.79$ ) to a two-way MANOVA, crossing delay and impulsiveness. None of the effects were significant (Fs <1). Thus, we can reasonably conclude that the delay condition did not induce any mood changes that could potentially confound the results.

*Choice*. Two measures of choice were used in this experiment. The first measure was coded as a binary variable (1 = picked up cookie; 0 = did not pick up a cookie). The second measure was the number of cookies picked up, determined from the motion video.

A binary logistic regression on choice incidence with hunger, health consciousness and love for cookies as covariates revealed a significant main effect of impulsivity. While 57% of the impulsives picked up a cookie, only 30% of the non-impulsives did so ( $\beta$  = -2.17, odds ratio = .11, p<.01). More interestingly, there was an interaction between delay and impulsivity ( $\beta$  = 1.87, odds ratio = 6.47, p=.06). There was a non-significant increase in the percentage of impulsive people picking up cookies in the delay condition compared to the no-delay condition (62% vs. 52%,  $\chi^2(1)$  = .38, p = .54). The introduction of a delay however caused a sharp decrease for non-impulsives compared to the no-delay condition (18% vs. 48%,  $\chi^2(1)$  = 5.25, p < .05). None of the covariates were significant.

Since there was inherent skewness in the distribution of the number of cookies (greater number of zeroes relative to a normal distribution) we ran a Poisson regression on the number of cookies picked up, with impulsivity (via scores on the two sub-scales), delay condition, hunger and health consciousness and interaction terms for delay and impulsivity as independent variables. The model did not fit the data well (Deviance  $\chi^2$  (76) = 96.26, p=.057) and was over-dispersed (Deviance/df = 1.27). We therefore modeled the data using a negative binomial distribution. The revised model fit the data very well (Deviance  $\chi^2$  (76) = 76.18, p=.47) and had little or no overdispersion (Deviance/df = 1.002). The analysis showed that there was a significant interaction between delay and scores on the hedonic sub-scale ( $\beta = 1.20, \chi^2(1) = 6.57, p<.05$ ). These effects were qualified by two significant main effects for delay ( $\beta = 6.90, \chi^2(1) = 9.04, p<.01$ ) and for impulsivity on the hedonic sub-scale ( $\beta = -.73, \chi^2(1) = 11.82, p<.01$ ) such that both delay and impulsivity were associated with increases in impulsive behavior. Further

analysis using median splits on the impulsivity scales showed, as hypothesized in H4, that delay caused a significant increase in the average number of cookies picked up by impulsives ( $\overline{X}_{No}$  $_{delay}$ = .74,  $\overline{X}_{delay}$ = 1.79,  $\chi^2(1)$  = 4.25, p<.05). However, delay did not cause a significant decrease in the number of cookies picked up by non-impulsives ( $\overline{X}_{No \ delay}$ = .61,  $\overline{X}_{delay}$ = .38,  $\chi^2(1)$  = 1.03, p=.31). Neither health nor health consciousness had significant effects in the model. Figure 2 shows both the incidence and intensity of behavior.

Insert figure 2 about here

### Discussion

Experiment 3 shows that there is an increase in the intensity of the behavior for people with chronically accessible motives. While there is no increase with delay in the percent of impulsive people picking up cookies, there is an increase in the number of cookies picked up, thereby showing that the same set of impulsive people act even more impulsively after a delay. Thus, there is a strengthening of the urge manifesting in increased behavior. This finding is in line with Atkinson and Birch (1970) who proposed that the influence of cues in the environment could have a dynamic effect on the inertial tendency to engage in a given behavior. Interestingly, it is the scores on the hedonic sub-scale that predict this behavior best, suggesting once again that the reward-seeking aspect of impulsivity drives such impulses, particularly when they are not satisfied immediately. In the absence of a countervailing force, there is not only an increase in a tendency, but also an increase in the magnitude of the activity itself.

In the case of non-impulsive people, on the other hand, we see that there is no significant decrease in the number of cookies picked up. Rather, delay causes fewer people to act impulsively, presumably because being prudent is a binary choice. In other words, for this group of people, being prudent seems to imply not acting impulsively at all rather than merely reducing the intensity of indulgence. Thus, interestingly, we see two different effects of delay on behavior, one where the intensity of behavior is affected and the other where the incidence of behavior is affected.

An alternative explanation for our results is that the choice task for cereals induced an ego depletion effect (Baumeister and Mick 2002) so that subsequent behavior was affected. This can be ruled out on two counts. First, the ego depletion explanation cannot account for differences across the two priming conditions, as both choice tasks should have led to equal amounts of ego depletion. Second, even if one were to expect such differences, the ego depletion account would posit that the priming condition must have led to more severe depletion. In a pretest among 115 students, we subjected this hypothesis to a one-tailed t-test with the entire tail in the direction of the resource availability explanation. In other words, we tested the hypothesis that the preceived difficulty in the goal-prime condition was greater than that in the neutral condition. While there was a difference in perceived difficulty across the two task conditions ( $M_{goal-prime} = 3.08$ ,  $M_{neutral} = 3.77$ ), it is important to note that the difference is in the direction opposite to that predicted (t (113) = -3.57, n.s.). We can thus rule out the ego depletion explanation.

#### **GENERAL DISCUSSION**

The results from the three studies demonstrate that impulsive behavior is a function of the extent to which goals to seek pleasure in various domains are chronically accessible. We provide the first empirical model of impulsive behavior that systematically tests the affective and motivational antecedents of impulsive behavior over time. Experiment 1 shows that trait impulsivity is associated with chronicity of hedonic goals such that inducing a feeling of incompleteness with respect to a specific hedonic sub-goal leads to a rebound or compensatory effect in terms of evaluations of products associated with the goal. It also shows that this effect does not generalize to evaluations of all hedonic products but rather only to those that are relevant to the goals that are activated, thereby implying the existence of a strong cognitive structure for hedonic products. Interestingly, Experiment 1 also showed that in the case of nonimpulsives, suppressing one sub-goal had the effect of suppressing the alternative sub-goal as well, thus implying that a generalized prudence mindset was activated by the suppression task with respect to all food items. Both groups of people experience spontaneous affective reactions immediately upon perception of hedonic stimuli, as shown in Experiment 2. The differences between the two groups are most apparent when time elapses between the activation of the constructs/goals and the perception of the relevant stimuli. The chronic hedonic goals associated with impulsive people cause an increase in affective reactions (Experiment 2) and a concomitant increase in the intensity of actual behavior over time (Experiment 3). In contrast, the temporary activation of hedonic goals/constructs via priming among non-impulsive people causes a temporary increase in liking for hedonic products that then decays to baseline levels (Experiment 2) and a similar increase in incidence of impulsive behavior that then declines over time to baseline levels (Experiment 3). We attribute this to the fact that the prime may temporarily activate hot cognitions even among non-impulsives (Metcalfe and Mischel 1999). However, inherent prudence mindsets may over-ride such temporary desires. Interestingly, the activation of one chronic sub-goal related to sweetness among impulsive people also leads to a devaluation of hedonic products associated with an alternative sub-goal, an effect that is not observed among non-impulsive people (Experiment 2).

### **Theoretical Contributions**

Together, these three studies present the argument that impulsive behaviors are primarily a function of the degree to which hedonic goals are chronically accessible. We suggest that trait impulsivity is characterized by the possession of chronic hedonic goals, the pursuit of which feeds back into the affective system and drives desires and resultant behavior.

Our proposition is that the overall reward motivation that underlies impulsivity is linked to multiple goals and sub-goals of pleasure in various domains, each of which might be chronically accessible. Activating a goal to seek pleasure in one domain via situational cues leads to an increasing desire for products or behaviors related to that goal, and a concomitant increase in the intensity of the behavioral tendency. Further, if there are alternative sub-goals, these get suppressed, at least so long as the activated goal is not satiated. On the other hand, those who are less impulsive are not as likely to have such goals at a chronic level of activation. Hence, while situational cues may temporarily activate these goals, they are not likely to persist, either due to extinction or due to being overridden by naturally existing prudence goals.

These results argue against a purely cognitive route to impulsive behavior. A cognitive model based on cost-benefit considerations is silent on the dynamics of impulsive behavior and would not account for increases in intensity of desires and behavior. Cognitive models based on construct activation would predict decay in the effects of accessibility with delay. Even if there is accompanying affect due to cognitive appraisal of the stimulus, no purely cognitive model would

predict an increase – at best, the affective reaction would remain constant. There is clearly a need to understand the interplay among cognitive, affective and motivational forces, a point that we underscore with these findings.

Our research thus contributes to the literature on impulsive behavior by demonstrating how hedonic goals may guide affective reactions and behavior over time. We demonstrate that currently operating hedonic goals may cause an increase in liking over time for hedonic products related to the goal that in turn leads to increased impulsive behavior.

Most accounts of impulsive behavior agree that it is characterized by an experience of immediate and spontaneous affect (e.g., Rook 1987). However, a given stimulus may activate several subsystems at the same time . When we encounter a stimulus, our perceptual, evaluative and motivational systems are all likely to be energized. Shiv and Fedorikhin (2002) argued that low-road affective reactions might lead to goal activation that in turn leads to hedonic behavior. We provide evidence that the reverse path is also likely - goal activation may lead to increased affect that, in turn, affects behavior. Future research on behavior would need to pit motivation and evaluation against each other to see which of these gains priority in the motorium.

#### **Practical Implications**

Marketers and public policy makers are both likely to find the results in this paper interesting. Marketers and retailers often try to influence in-store behavior by using stimuli such as ambient scents (Mitchell, Kahn and Knasko 1995), displays, coupons, etc. Our research suggests that there are dynamic effects of such activation on behavior and underscores the importance of delay as a strategic tool for manipulating behavior. If marketers could segment customers based on their levels of impulsiveness, targeted cues aimed at activating specific hedonic goals could be given to such consumers before they enter the store. We expect such cues to have a powerful influence in driving impulsive behavior. We show that it is possible to activate chronic hedonic goals among impulsive consumers and that such activation manifests in a greater liking for products related to the goal in question and a greater intensity of impulsive behavior.

#### **Areas for Future Research**

The three studies reported this research demonstrate consistently that impulsive behavior is driven by the activation of constructs and goals that then proceed to create affective reactions to stimuli. Nonetheless, the studies harbor a few limitations that future research can possibly address. First, our model proposes that impulsivity involves affective and motivational processes that interact with each other in driving behavior. While we provide evidence of the implication of each of these processes, a more complete investigation would show that behavior is mediated by these processes. Nonetheless, our results provide reasonable support for our process story, and we hope to address the issue in future research.

Second, we document an increase in impulsive behavior with delay of up to 5 minutes. We do not have any evidence regarding what could happen after longer periods of delay. In particular, the absence of any effects in Experiment 2 due to delay in the neutral condition among impulsive people needs to be investigated further. It is likely that the increase in behavior plateaus after some time. Future research could address this more explicitly.

It would also be interesting to examine what happens when currently operating hedonic goals are frustrated. Past work on goal frustration has shown that people are likely to ruminate extensively when they are prevented from attaining their goals (e.g., Martin and Tesser 1989).

Research has also shown that people with chronic goals find alternate routes to goal-attainment (Bargh 1990). Thus, would presenting impulsive people with alternative means of reaching a hedonic goal lead to a dampening of ruminations after frustrating the original goal?

Another question is whether non-impulsive people have similar chronic motives to be prudent and whether such motives would operate in the same way if primed, except to cause a greater tendency to favor a healthy good among both impulsive and non-impulsive people. Our findings on decreasing affect and behavior over time among non-impulsives could be attributed to semantic decay or to the re-assertion of chronic prudence goals. We do not have clear evidence on the possible processes underlying such behavior. It is also not clear whether healthand hedonic-related motives map onto each other orthogonally and whether non-impulsives are likely to behave automatically under such circumstances. However, we do expect a prudent choice to be possible under such a temporarily primed goal.

Finally, as we suggested earlier, it is likely that several processes may be simultaneously at play when a stimulus is encountered. Future research could examine interaction between multiple automatic processes such as evaluation and motivation to see which of these get precedence. For example, would people act impulsively if they have an active goal of gratification, but the stimulus object is automatically evaluated negatively (e.g., a less than appetizing display)? Manipulating the strength of the opposition of these two processes may enable us to decompose the processes.

### TABLE 1

<b>EXPERIMENT 1: EFFECTS OF SUPPRESSION ON EVALUATIONS OF HEDONIC PRODUCT</b>	S
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	Mean Liking Score		Mean Liking Score		Mean Liking Score				
Goal Suppressed	Swee	t Foods	Savory Foods (9-point scale)		Other Indulgences (9-point scale)				
-	(9-poi	nt scale)							
	T1	T2	T1	T2	T1	T2			
			Impulsives						
Gustatory-Sweet	6.17	6.54 *	6.33	6.05	6.12	6.06			
	(.36)	(.35)	(.38)	(.39)	(.43)	(.43)			
Gustatory-Savory/Salty	5.92	5.73	6.38	6.85**	6.1	6.08			
	(.33)	(.32)	(.35)	(.35)	(.39)	(.39)			
0.1									
(True tion of / Intellecture 1)	5.0	5.0	5.04	5.02	5 <b>7</b> 0	(1*			
(Emotional/Intellectual)	(28)	(27)	5.94	5.93	5.78	$0.1^{+}$			
	(.30) (.37) (.40) (.40) (.40) (.45) (.45)								
			Inon-impuisives						
Gustatory-Sweet	6.35	6.06**	5.70	5.39**	5.9	5.83			
	(.23)	(.23)	(.24)	(.25)	(.27)	(.27)			
Gustatory-Savory/Salty	6.18	6.01*	6.28	6.10*	5.79	5.63			
	(.23)	(.23)	(.25)	(.25)	(.28)	(.28)			
Other									
(Emotional/Intellectual)	6.05	5.83*	6.07	5.95	6.18	5.94**			
(	(.22)	(.21)	(.23)	(.23)	(.26)	(.26)			

\* Mean liking score between T1 and T2 significantly different, p < .05\*\* Mean liking score between T1 and T2 significantly different, p < .01

<u>Notes.</u> (1) Responses were elicited on nine-point scales anchored at "1=dislike very much" and "9=like very much." (2) Figures in parentheses are standard deviations.

#### TABLE 2

Impulsivity	Delay	Mean Liking Score Sweet (101-point scale)		Mean Liking Score Savory (101-point scale)		Mean Liking Score Non-foods (101-point scale)	
		Neutral	Primed	Neutral	Primed	Neutral	Primed
	5 sec	61.2 (3.94)	62.5 (3.90)	63.0 (4.19)	68.4 (4.15)	60.5 (5.47)	55.6 (5.42)
Impulsive	120 sec	63.9 (4.40)	66.2 (4.36)	63.6 (3.96)	52.1 (3.92)	52.1 (5.81)	57.3 (5.76)
	210 sec	63.8 (4.19)	73.7 (4.15)	62.1 (4.43)	44.1 (4.39)	57.4 (5.39)	58.4 (5.34)
Non-Impulsive	5 sec	56.6 (2.74)	65.3 (3.44)	60.0 (2.92)	56.9 (3.67)	64.2 (3.81)	60.7 (4.79)
	120 sec	56.0 (3.06)	57.9 (3.85)	60.8 (2.76)	59.3 (3.46)	65.5 (4.04)	66.3 (5.09)
	210 sec	56.2 (2.92)	54.5 (3.67	61.7 (3.09)	58.5 (3.88)	61.5 (3.75)	67.6 (4.72)

# **EXPERIMENT 2: AFFECTIVE REACTIONS TO HEDONIC STIMULI OVER TIME**

<u>Notes.</u> (1) Responses were elicited on a 101-point scale anchored at "0=dislike very much" and "100=like very much."(2) Figures in parentheses are standard deviations. (3) The lighter shaded boxes indicate an increase in liking over time (supporting H2a), whereas the darker shaded boxes indicate a decline in liking over time (supporting H2b and H3a).

# FIGURE 1

# **CONCEPTUAL MODEL OF CONSUMER IMPULSIVENESS**



### FIGURE 2

# **EXPERIMENT 3: INCIDENCE AND INTENSITY OF IMPULSIVE BEHAVIOR**





# **APPENDIX A**

# **EXPERIMENT 1: LISTS OF TEMPTING SITUATIONS**

# **Other Indulgences**

For each of the following situations, please indicate which answer is the most reasonable response to the situation by circling it. Circle only one answer even if you think more than one answer seems to be right.

Situation 1: You go to Nordstrom's and see a very attractive sweater on display.

- 1. It is important to save for a rainy day.
- 2. It is important to prioritize spending and you just don't want to spend money on indulgences like sweaters when they are other more important things to buy.
- 3. It is important not to yield to temptation.

Situation 2: You have \$1500 in savings and you see an ad for a cruise vacation for you and your significant other.

- 1. \$1500 is a lot of money to spend on an indulgence.
- 2. You can think of other, more frugal ways of spending that money with your significant other.
- 3. You have read about those strange outbreaks on cruises and don't want to take any risk.

Situation 3: You have an examination the next day, and your friends call you with tickets to the latest movie featuring your favorite star.

- 1. You value long-term rewards of doing well on an exam higher than the short-term rewards of being entertained.
- 2. You hate to procrastinate you want to get your work done right away rather than waste time.
- 3. You have a strong willpower you do not give in to urges easily.

## **Sweet Indulgences**

Situation 1: You are in the grocery store and see that your favorite brand of ice-cream is on sale.

- 1. You think about your need to keep fit.
- 2. You think about adding all those calories to your waistline or hips.
- 3. You do not want to yield to temptation.

Situation 2: You are standing in line at Starbucks and see those delicious muffins on display.

- 1. Muffins add calories and you want to be health-conscious.
- 2. You consider muffins an unnecessary temptation
- 3. Too much sugar is bad for the teeth and you do not want to go through the ordeal of visiting a dentist.

<u>Situation 3:</u> You are at home and Mom has baked a yummy apple pie for a dinner with guests. You are deciding whether to sneak a quick taste.

- 1. You think about what Mom would say and decide prudence is a better option.
- 2. You know you might feel guilty after the act and decide that it is not worth it.
- 3. You exert all your willpower because you do not want to give in to your urges so easily.

# **Savory Indulgences**

Situation 1: You are in the grocery store and that your favorite brand of potato chips is on sale.

- 1. You think about your need to keep fit.
- 2. You think about adding all those calories to your waistline or hips.
- 3. You do not want to yield to temptation.

Situation 2: You are at a restaurant and are tempted by the double cheeseburger on the menu.

- 1. Burgers add calories and you want to be health-conscious.
- 2. You consider cheeseburgers an unnecessary temptation.
- 3. Too much cheese is bad for the heart and you do not want to go through the ordeal of visiting a doctor.

Situation 3: You are at a bar and are tempted by the salty snacks they offer with the beer.

- 1. You would rather not combine two sources of carbs at the same time.
- 2. You know you might feel guilty and decide that it is not worth it.
- 3. You exert all your willpower because you do not want to give in to your urges so easily.

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#### **ENDNOTES**

- 1. A linear regression was run separately for each product type with the Time 2 evaluations as dependent variables, and prudence task, scores on the hedonic and prudence sub-scales, and interactions between prudence task and each of the impulsivity scores as independent variables. In addition, Time 1 evaluations were included as a covariate. Consistent with our findings above, we found a significant main effect for the hedonic sub-scale for each of the difference measures (Sweet:  $\beta = -.28$ , t(133) = -2.03, p<.05; Savory:  $\beta = -.14$ , t(133) = -2.68, p<.01; Other Indulgences:  $\beta$ = -.22, t(133) = -1.81, p<.05). We also found directional evidence for the prudence sub-scale (Sweet:  $\beta = -.15$ , t(133) = -1.19, p=.12; Savory:  $\beta = -.07$ , t(133) = -1.23, p=.11; Other Indulgences:  $\beta$ = -.17, t(133) = -1.49, p=.07). Finally, we found a significant to marginally significant interaction between the prudence task (1= Other Indulgences, 2 =Sweet, 3 = Savory) and the score on the hedonic scale for each of the difference scores (Other Indulgences:  $\beta$ = .12, t(134) = 2.03, p<.05; Sweet:  $\beta = .11$ , t(134) = 1.76, p = .08; Savory:  $\beta = ..11$ , t(134) = .1.69, p = .09), indicating that the prudence task actually influenced those who were high on reward-seeking. As is to be expected in a repeated design, Time 1 evaluations were significant predictors of Time 2 evaluations. Our results are net of this influence.
- 2. Note that crispiness or texture could also be deemed as hedonic attributes. However, since our specific task was to evoke sweetness-related goals, neither crispiness nor texture was relevant. We conjecture that crispiness might prime hot cognitions related to some savory snacks such as chips or pretzels, as was indeed found by Mischel and Baker (1975). However, our block of savory foods had other non-crispy items such as pizza and burgers that may have dampened this effect. In addition, our pretests showed that crispiness and texture were not as strongly affect-laden.