

## **Choice under Restrictions**

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### **ABSTRACT**

Nearly every decision a person makes is restricted in some way. While we are painfully aware of some of these restrictions, others go largely undetected. This paper presents a conceptual framework for understanding how restrictions interact with situational and individual characteristics as well as goals to influence behavior. Implications for overlooked research opportunities in choice modeling are presented and discussed.

## **INTRODUCTION**

Restrictions surround us. Speed limits, social mores, medical conditions, store inventory, and recommendations all impose limits of different types on our choices. Moreover, many restrictions are “soft” in the sense that compliance is not absolutely required. We can still choose to speed, break a social more, or ignore a salesperson’s recommendations. Further, while some restrictions are externally imposed, others such as budgets, time schedules, and access to information are at least partly internally generated. Despite their ubiquity and importance, however, there has been little effort to categorize restrictions or link individual and situational factors to psychological, physiological, and behavioral reactions to them. The purpose of this paper is to focus on reactions to restrictions as a general phenomenon rather than reactions to a particular restriction or class of restrictions.

A considerable amount of prior work has addressed key types and aspects of restrictions. Economic work on budget constraints, studies of poverty and scarcity (e.g., Lynn, 1992), the literature on reactance (Brehm 1966), helplessness (Seligman 1975), and illusion of control (Langer 1975), studies of prisoners, and much of the work in public policy focus on reactions to various types of restrictions. Here we attempt to look across these areas to construct a general framework of choice under restriction that provides an understanding of the antecedents and consequences of restrictions.

## **A BASIC FRAMEWORK OF RESTRICTIONS AND BEHAVIOR**

Figure 1 presents the basic components of a model designed to explain how people react to restrictions. The model has four main components. The first is the nature of the restriction.

This includes its source, object, characteristics, and presentation. The second component contains factors that impact response to a restriction. These include characteristics of the situation and individual involved as well as the goals that are affected by a restriction. The third and fourth components are the cognitive, emotional and psychological reactions generated in response to a restriction and the resulting behavior respectively. For simplicity, the model is portrayed as “forward-flow,” i.e., it leaves out feedback loops. Clearly, feedback loops exist – most critically from reactions to restrictions to goals, i.e., adaptation, and represent some of the most interesting aspects of the model to explore.

**[Insert Figure 1 Here]**

### **TYPES OF RESTRICTIONS**

Restrictions come in all sizes and shapes. Table 1 provides some examples of restrictions. Some are specific, firmly enforced, and consequential (e.g., taxes), while others are vague, unevenly, if at all, enforced, and relatively trivial (e.g., etiquette for clothing attire). For instance, research on topics such as “consumer vulnerability” has noted significant restrictions in the ability of certain subpopulations to consume including impoverished consumers (see Andreasen 1975, Hill and Stamey 1990) and people with disabilities (Baker and Kaufman-Scarborough 2001).

**[Insert Table 1 Here]**

We define restriction of choice broadly. Figure 2 presents a general typology of choice restrictions focused on their source, object, characteristics, and presentation.

**[Insert Figure 2 Here]**

In terms of *source*, restrictions can be externally or internally-imposed.

Externally-imposed restrictions can be classified as physiological, legal, social, or economic. External physiological restrictions result from physical or mental disabilities such as congenital abnormalities, diseases, injuries, or aging (see Baker, Gentry, and Rittenburg 2005). Legal restrictions limit both consumer choice (e.g., prohibition, smoking laws, drug restrictions, or recycling regulations) and managerial activity (e.g., redlining laws or Sarbanes Oxley rulings). In extreme cases, restrictions manifest themselves in punishments resulting in incarceration (e.g., Ozanne, Hill, and Wright 1998). Social restrictions include racial and sexual discrimination practices as well as social taboos and norms that define acceptable thoughts and behaviors (Harris, Henderson, and Williams 2005).

Economic restrictions may be related to insufficient or reduced resources as well as to competitive activities or norms (Thomas and Soldow 1988). The former includes causes such as natural scarcity and socio-economic status, as well as strict (e.g., regulated utilities and other services) or de facto monopolies (e.g., Microsoft). The latter involves strategic behaviors on the side of both suppliers (e.g., loyalty or reward programs, inventory management of “out of stock” conditions and limited editions, sales assistance, product recommendations, and strategic pricing) and consumers (e.g., auctions in which consumers compete with each other for the opportunity to buy a product — see Fitzsimons 2000; Anderson et al. 2006; Häubl and Murray 2003, 2006; Häubl and Trifts 2000; Kivetz, Urminsky, and Zheng 2006; Klemperer 1987, 1995; Nunes and Drèze 2006; Peppers and Rogers 1997).

Internally (self) imposed restrictions can also be sub-classified based on whether they result from the desire to be beneficial to or punish either one’s self or others, or the

unwillingness to engage in extensive decision-making processes. Self-restrictions that are beneficial to the individual include restricting caloric intake; limiting the amount of time spent watching television; imposing a minimum time spent on health activities; limiting spending to increase savings; reducing shopping locations or websites visited; or using agents to either restrict the choice set or to delegate the final choice to (Andrews and Srinivasan 1995; Chandon and Wansink 2007; Häubl and Murray 2003, 2006; Häubl and Trifts 2000; Kahn and Baron 1995; Roberts and Lattin 1991; Wansink 2006; Wansink and Chandon 2006; Wertenbroch 1998).

Internal restrictions that benefit others include altruistic and charitable behaviors, such as saving money for a gift to needy children, water conservation and pollution reduction, or in the extreme, downsizing possessions to live a simpler life. Similarly one can punish a retail store by refusing to shop there regardless of their product price and quality. Self restrictions that instead occur because of consumers' unwillingness to engage in extensive information processing include those driven by information or opportunity overload, search costs, need for variety or satisfaction of cravings, and time limitations (Malhotra 1982; Ratner, Kahn, and Kahnemann 1999; Shugan 1980; Simon 1957).

The *object* of the restriction is another important dimension of choice restrictions. Restrictions can be targeted specifically at individuals (e.g., doctor's orders), groups (e.g., teenage curfews), or universally applied (e.g., mandatory seat belt use). For instance, a retailer can restrict a promotional price offer to a specific customer, the group of customers participating in a store loyalty program, or all store customers. Restrictions can also occur within groups, such as those clubs impose on members, families impose on their children, or organizations impose on employees.

*Characteristics* of restrictions include the nature of the option restricted, its stringency, and its timeframe. The nature of the option includes the option type, the variety or assortment of alternatives available, the quantity of a particular option available, and the information available regarding options. Restricted options may be hedonic (e.g., dress code restrictions for dining) or utilitarian (e.g., special equipment for participation in athletics); luxuries (dietary restrictions imposed by a personal trainer) or necessities (dietary restrictions imposed by insufficient income); and involve vices (restrictions to avoid unhealthy food) or virtues (requirements to eat healthy food). More generally, options can be classified as approach (most luxuries), avoidance (most necessities) or approach-avoidance (most utilitarian products, virtues and vices—see Wertenbroch 1998).

Assortment variety relates to whether there is real and/or perceived limited versus wide assortments available within a given category (Broniarczyk 2007; Broniarczyk, Hoyer, and McAlister 1998; Chernev 2003, 2005; Gourville and Soman 2005; Kahn and Lehmann 1991; Iyengar and Lepper 2000). For instance, a discount store offers fewer running shoe options than a sporting goods store or a shoe store. Option quantity refers to choice restrictions that vary in terms of whether the constraint is on the availability of a feature (e.g., organic milk) or a range of feature levels (e.g., nonfat, 2%, whole milk). Additionally, product quantity may be restricted by the retailer (e.g., limit two per customer) or by the consumer (e.g., one, not two, scoops of ice cream).

Finally, individual choices may also be restricted by the absence of information (e.g., Pratkanis and Farquhar 1992). Consumers are frequently unaware of where different products are available. Similarly, they may not know about either the relevance and importance or the level of certain attributes (e.g., trans-fat). Uncertainty surrounding a restriction increases when

full information is not available, limiting individuals' willingness to accept it. For example, Thaler's (1985) finding that people judge a price increase fair if it is cost-justified, but not otherwise, suggests that the more people understand about the restriction and the reasoning behind it, the more compliant they may be.

*Stringency* of choice restriction has several components including immediacy, magnitude, rigidity, explicitness, detection odds, and costs of compliance and violation. Strict restrictions can result from an immediate need (e.g., a book for a school project due tomorrow), limited inventory ("only one remaining!"), or cash only purchase requirements. A strict restriction is also rigidly enforced (e.g., when a single life insurance option is offered by an employer). Consumers' prior choices may also constrain subsequent choices explicitly (e.g., cellular plan lock-in) or implicitly (e.g., habitual purchase—see Murray and Häubl 2007). Finally, strict processes that increase the odds of detection (e.g., frequent, random drug-testing) and severe penalties increase the perceived stringency of the restriction.

*Presentation* of the restriction includes whether the restriction is framed as a gain or loss, is presented in a promotion frame (e.g., "do these prescribed behaviors") as opposed to a prevention frame (e.g., "don't do these prescribed behaviors"), or, similarly, whether the restriction refers to something people are supposed to "do" ("do pay taxes") or "not do" ("do not drive drunk"). Research (e.g., Tversky and Kahneman 1979) suggests that restrictions presented in a loss frame will produce more risk seeking behavior and loss aversion than gain framing. Research has also shown that the presence of a restriction may focus consumers' attention on options that cannot be experienced (Carmon, Wertenbroch, and Zeelenberg 2003), for instance, possessions one cannot retain when downsizing.

Finally, the *timeframe* of a restriction can vary in duration and immediacy. A restriction can be temporary (e.g., out of stock product; no alcohol during pregnancy), intermittent (e.g., low cash resources at the end of each month), or permanent (e.g., discontinued product). Furthermore, a restriction can apply immediately or in the future.

## CONTEXT OF THE RESTRICTION

Reactions to restrictions depend on at least three major categories of variables: the general situation, individual factors, and the goal(s) involved/threatened.

### **The General Situation**

Social norms have a major impact on reactions to restrictions, in particular whether compliance is widespread and expected. Similarly, whether a restriction applies to public or private behavior may influence reactions. Public behavior presents a greater threat to one's self-presentation and hence may lead to a stronger reaction (either positive or negative) to a restriction. On the other hand, it is easier to ignore many restrictions in private.

### **Individual Differences**

Unsurprisingly, individual factors influence response to restrictions. As suggested by work on helplessness (Seligman 1975), a history of living under restrictions (e.g., the poor, those living under a totalitarian government) may make one more prone to cope with restrictions, at least until they become so intolerable that open rejection becomes the response (Taylor 1979). Other characteristics, such as autonomous vs. controlled motivational orientation (Deci and Ryan 1985), locus of control, and adaptability also play a role. Perhaps the most obvious characteristic which influences response is reactance (Brehm 1966). This can lead to behavior opposite to the action suggested by an expert (Fitzsimons and Lehmann 2004).

## **Goals Invoked or Threatened**

In order to understand how restrictions influence behavior, the relation of the restriction to individual goals that are invoked or threatened is critical. In general, consumers react negatively to restrictions and may seek ways to avoid compliance. For example, negative reactions usually occur simply because a restriction is imposed regardless of whether it actually influences behavior or not (e.g., Brehm 1966; Fitzsimons 2000); further, people appear to like the illusion of control and choice regardless of whether the resulting behavior is different (e.g., Brown and Feinberg 2002; Iyengar and Lepper 2002; Langer 1975; Langer and Rodin 1976; Szrek and Baron 2007). Similarly, research suggests that imposing restrictions in the form of values statements or codes of conduct have little influence on employees who do not see them as personally relevant (Healy and Iles, 2002; Urbany 2005). Nevertheless, research has also identified situations in which restrictions lead to compliant responses (Boatwright and Nunes 2001, 2004; Botti and McGill 2006; Broniarczyk, Hoyer, and McAlister 1998; Dreze et al. 1994; Fitzsimons 2000; Fitzsimons and Lehmann 2004).

A key factor predicting the valence of an individual's reaction to a restriction is the extent to which the restriction is consistent with the consumer's goals. Specifically, if a restriction is consistent with goals, subsequent cognitive and emotional reactions should be positive and followed by compliant behaviors, while if the imposed restrictions are at odds with important goals, negative reactions and a lack of compliance may occur.

## **COGNITIVE, EMOTIONAL, AND BEHAVIORAL RESPONSES**

Restrictions, in combination with goals, lead to psychological, physiological, and behavioral reactions. Psychological reactions can be divided into two main types: cognitive and

emotional. Cognitive responses include awareness (detection), attribution of the reason for the restriction, evaluation of the severity of the restriction, decisions about what to do, which may involve identifying alternatives (substitutes for the restricted behavior), and the subjective appraisal of choices made under restrictions (e.g., Häubl, Dellaert, and Usta 2007). Emotional responses include basic affect, anger, resentment, depression, etc.; these reactions are both driven by and influence cognitive responses (e.g., when restrictions are perceived to be severe). Restrictions can also manifest themselves physiologically, e.g., in stress when a “perfect gift” is unavailable or when resources for basic needs are lacking.

As an extreme example, individuals in concentration camps during WWII suffered enormous mental anguish as a result of their incarceration and resulting restrictions, and subsequently engaged in very risky noncompliant behaviors through trading activities in an underground economy that sometimes resulted in punishment by death (Hirschman and Hill 2000). Another extreme example is juvenile felons from impoverished communities who risk capture and imprisonment when stealing cars in order to cope with their anger over their lack of material abundance (Ozanne, Hill, and Wright 1998).

Direct behavioral responses can be described on a continuum from compliance and adaptation to rejection and even rebellion (e.g., the Boston Tea Party). A particularly interesting behavioral response involves “bending” the rules. This includes focusing on the exact wording of a restriction rather than the spirit behind it or alternatively treating the spirit behind it (rather than specifics) as guidelines, whichever allows for more flexibility in behavior. Such creative bending is common among individual consumers as well as managers and lawyers. Bower and Gilbert (2007) cite the example of a remote management team who built an entire factory in small pieces so that it did not require corporate approval. Corporate headquarters found out

about the project only when it received a curious work order to build a chimney, the last remaining piece! Behavioral responses can also either be short-run (myopic), i.e., in response to requirements for less pollution one can add on a pollution control device (e.g., catalytic converters) or, under the assumption that further restrictions will arise, one could strategically begin working on a fundamental redesign of the technology employed (e.g., a new type of engine or fuel).

Response to a restriction may also involve communication. Complaining (voice) is common as is negative word-of-mouth, aided by improved communication devices (Internet, blogs). Political action is another possible response, e.g., campaigning to overturn a restriction or remove/replace supporters of it.

As with goals and restrictions, cognitive, emotional and behavioral reactions impact each other. A required behavior that proves to be easier to perform than expected (or even desirable after the fact) will lead to more positive psychological reactions while one which turns out to be more onerous (e.g., over time) will produce the opposite effect.

### **INTERPLAY BETWEEN RESTRICTIONS AND GOALS**

A particularly interest aspect of restrictions is how they interact with personal goals. As examples we present hypotheses concerning the interactions between: (a) the stringency of the restriction and its malleability vis-à-vis consumer goals; (b) the timeframe of restriction and the extent to which there is synchronicity between restriction and goals; and (c) the presentation of the restriction and its regulatory fit with a consumer's goal frame

## **The Stringency of a Restriction and Its Goal Malleability**

If consumers perceive a restriction to be less stringent, it is more likely they will see some consistency between that restriction and their own goals. For example, if a specific investment plan is suggested by a company, employees may enroll in the plan because they consider it consistent with their goal of maximizing savings; in contrast, if the same plan is imposed by the company, employees may resist enrolling because it is inconsistent with their goal of deciding autonomously how to best allocate their finances (Thaler and Sunstein 2003). Similarly, Tyler and Blader (2006) find that the "self-enforcing" characteristics of restrictions are a more powerful determinant of rule-following than are command-and-control characteristics, suggesting the people value a sense of freedom and control over their own destinies.

More negative responses to more stringent restrictions may be explained by attribution theory (Kelley 1967; Wong and Weiner 1981). As previously noted, individuals tend to dislike restrictions and attribute them to malevolent intentions which prevent them from reaching their goals.

The malleability of consumers' existing goals is also important in shaping responses to a given restriction. If goals are not well defined, then consumers may satisfy their desire for consistency by changing their goals so that they are aligned with the restriction (Festinger 1957; Bem 1967). For example, if a restriction is imposed that reduces allowable options within a choice set, a consumer may post-hoc construct a goal of minimizing effort and the effort-accuracy trade-off with the restrictions. Alternatively, they may select a goal consistent with the restriction. For example, a child, when faced with the punishment of having to stay at home for the day, might respond, "That's what I wanted to do today anyway!"

We therefore propose that:

- H1a:** The smaller the perceived gap between the restriction and consumers' initial goals, the more positive their affective and cognitive responses to that restriction will be.
- H1b:** Consumers will be motivated to interpret restrictions and goals such that the gap between one's initial goals and one's subsequent reactions to a restriction is as small as possible.

### **Synchronicity between a Restriction and Goal Timeframe**

Another factor that may influence subsequent reactions to restriction is the timing of the restricted choice and the subsequent goal-directed behavior. Restrictions influencing choice can be put into place in the present or in the future and similarly the goal related to the restriction can be more or less immediate. For example, one could make a decision today from a restricted choice set about current or future behavior. An example of a current decision made from restricted choice sets that affects future outcomes is employees choosing health care plans, whereas an example of decisions made with more immediate impact is consumers purchasing from limited supermarket assortments.

Construal theory (Liberman and Trope 1998) suggests that, relative to decisions that are made at the same time as the anticipated outcomes, decisions that are made today about behavior forecasted for the future will focus more on abstract features, for example on the desirability instead of feasibility of the outcome. Consequently, choices made from restricted sets may differ according to how distant in the future the goal is. For example, consumers may respond more negatively to a restriction on their choice of healthcare plans if the negative aspect of expending effort making a choice (the feasibility of the choice process) is played down versus the positive aspect of healthcare quality in the future (Chernev 2003, 2005; Gourville and Soman 2005;

Iyengar and Lepper 2000; Schwartz 2004). Conversely, consumers may respond more positively to a restriction to their immediate consumption choice if they focus more on the feasibility of making a quick, easy choice among few options.

One can also anticipate future restrictions and/or their removal. For example, one might decide to buy a product today because of anticipated stock outs or supply restrictions in the future; on the other hand, one might postpone buying a product today to take advantage of improved future availability. In general, we anticipate that predicted future restrictions will promote an increased valuation of the restricted behavior in the present (Brock 1968; Lynn 1991, 1992; Verhallen 1982; Verhallen and Robben 1995). Anticipated future restrictions, such as scarcity of a product, will generate a positive reaction if it helps justify a more liberal current behavior (Kivetz and Simonson 2002; Strahilevitz and Myers 1998), e.g., gorging the night before beginning a diet. In contrast, temporal construal theory predicts that anticipated future restrictions would cause consumers to react negatively to behaviors that will be exercised in the future because the salient desirability of that behavior will maximize reactance (Brehm 1966; Liberman and Trope 1998).

In general, we predict the following:

- H2a:** Current restrictions that affect future behavior will cause consumers to focus on the abstract features of the goal-directed behavior, and lead to less compliance with the restrictions.
- H2b:** Current behavior resulting from anticipated future restrictions will cause consumers to focus on immediate opportunities to indulge and lead to more compliance with the restrictions.

### **Regulatory Fit between Restriction Presentation and Goal Frame**

An important factor affecting consumer reaction to a restriction is the match between the presentation format of the restriction and a consumer's goal frame. Research on assortments has

shown that presentation format such as the amount of shelf space (Broniarczyk, Hoyer, and McAlister 1998) and assortment organization (Kahn and Wansink 2004) affect assortment perceptions. Moreover, satisfaction with a product offering depends on the availability of a consumer's favorite product (Broniarczyk, Hoyer, and McAlister 1998) and the match between consumers' mental representations and shopping goals and shelf organization (Morales et al. 2005).

Similarly, in terms of promotion versus prevention restriction framing, we expect several presentation format interactions with consumer goals. For instance, consumers pursuing promotion-related "ideal" goals have been shown to be more reliant on a persuasive message's affective appeal whereas consumers pursuing prevention-related "ought" goals have been shown to be more reliant on a persuasive message's substantive appeal (Pham and Avnet 2004). Thus, one would expect restrictions making an affective (substantive) appeal in their presentation format to be more persuasive for promotion (prevention) goal orientation.

Additionally, prior research has found that consumers react more positively to a restriction when it is imposed on a set of all undesirable options than on a set of all desirable options (Botti and McGill 2006). We therefore hypothesize that if a restriction is presented in a promotion frame involving "approach-approach" (or "do") types of decisions, it will create a more negative response than if it is presented in a prevention frame involving "avoidance-avoidance" (or "do not do") decision types.

However, regulatory focus theory (Higgins 1998) suggests that regulatory fit between the goal frame and the restriction frame will lead to greater motivation in goal pursuit, and higher utility ascribed to the choice outcome. For example, if the goal is framed as a gain (number of years gained if one has a healthier lifestyle), a promotion-framed restriction (engage in activities

such as quit smoking, exercise, eat healthy food) would probably generate a more positive response than a prevention-framed restriction (do not engage in activities such as smoking, being lazy, and eating fast food). However, if the goal is framed as a loss (number of years lost if one's lifestyle is not healthy), the opposite is true. Similarly, if the goal is framed in terms of promotion (increase physical fitness), gain-oriented restrictions (exercises that should be performed) would generate a more positive response than loss-oriented restrictions (unhealthy activities that should be avoided) and vice versa. Therefore,

**H3:** Regulatory fit between the goal frame and the restriction frame will lead to more positive responses than regulatory misfit.

## **DISCUSSION**

Research in marketing has not widely investigated the antecedents and consequences of restricted – but often still possible – behavior. This paper provides a framework for understanding restrictions, a taxonomy of restrictions, and some hypotheses about them.

### **Research Questions**

Thinking about restrictions raises a number of general questions, including: What happens when restrictions are not enforced, either externally or by positive reinforcement? Does this make other restrictions less powerful? What is the optimum way to present restrictions? What is the role of phantom restrictions (e.g., Farquhar and Pratkanis 1987; Pratkanis and Farquhar 1992)? How do people respond to future (looming) restrictions (i.e., do they adopt them early or overdo what is about to be restricted)? Do “should be” restrictions have an impact (i.e., “\_\_\_\_\_ should be required/not allowed”)? How do restrictions on one aspect of

behavior influence behavior on other aspects? And finally, what happens when people act as though a restriction exists and subsequently find it does not or vice-versa?

### **Implications for Regulations**

Many restrictions imposed in good faith end up having unfortunate consequences. Some of this is inevitable from high reactance individuals. Others may have perverse consequences. These include eating more sugar and calories in response to the availability of low fat cookies (e.g., Snackwells), driving faster when required to wear seat belts (Adams 1985), or engaging in risky behavior when the way to cure a disease and/or requirements to test for or vaccinate against it are easier. What this suggests is that before a restriction is imposed, a “restriction impact statement” (similar to an environmental impact statement) should be completed. (Ironically, if such a statement is imposed by law, this restriction itself will have impact and unintended consequences.)

### **Implications for Choice Models**

Regarding the impact of restrictions on modeling consumer choices, consider an obvious restriction, i.e., a temporary “stock out” situation where a particular alternative is unavailable to a consumer. Socioeconomic characteristics, attitudes, and preferences change over time, and therefore corresponding choice sets also change. This requires a dynamic model of choice where the choice sets themselves vary over time. Siddarth, Bucklin, and Morrison (1995) provide an elegant approach toward the modeling of dynamic choice sets.

In order to see how restrictions influence formal choice models, consider a multinomial logit model of choosing alternative  $i$  from a choice set  $C$  consisting of  $k$  similar alternatives (i.e. items in a product category). The model is:

$$P_{it} = \exp(U_{it}) / \sum_k \exp(U_{kt}) \quad (1)$$

where the deterministic component of a consumer's utility for alternative  $i$  at time  $t$  is given by:

$$U_i = \alpha_i + \sum_j \beta_j X_{ijt} + e_i \quad (2)$$

Parameter  $\alpha_i$  is an alternative specific intercept  $X_{ijt}$  indicates the  $j^{th}$  characteristics of alternative  $i$  including marketing spending, individual characteristics variables, and product attributes.

Consider the simple case where the  $X$  variables consist of two attributes ( $j = 1$  or  $2$ ),  $X_1$  and  $X_2$ , say, fat content and protein, with corresponding importance weights  $\beta_1$  and  $\beta_2$ .

Now assume a consumer is not allowed to consume more than  $\bar{X}_1^u$  amount of fat. (Ignore for now the important impact of choice of an item in this category on choices in other categories).

For an alternative  $i$  whose fat content is greater than  $\bar{X}_1^u$ , its utility will be zero. Also, in response to the restriction, consumers may alter the importance weights associated with the various attributes. Because restrictions alter consumer goals, a change in goals would imply a change in the importance weights for different attributes. Specifically, the importance weight on the fat content, i.e.,  $\beta_1$ , may be higher and the importance weight on the protein content,  $\beta_2$ , may be correspondingly lower due to the restriction. Thus, the revised utility for an alternative  $i$  would be

$$U_i = \alpha_i + \beta_1' X_{1i} + \beta_2' X_{2i} + e_i \quad (3)$$

For an alternative  $i$  whose fat content is far less than  $\bar{X}_1^u$ , the corresponding utility is given by Equation (2), i.e. essentially is unaffected by the constraint. On the other hand, as fat

content becomes a more significant portion of the maximum allowable, it begins to constrain other choices (e.g., French fries vs. desert). This makes fat a more important variable and also increases the value of the no-choice option in a set since some items in other choice sets are now more constraining or even infeasible if chosen.

A similar effect occurs as one approaches an overall budget constraint. Here the marginal value of a dollar saved (vs. a fat calorie consumed) becomes greater since what else is excluded when a product in one category is purchased becomes greater/higher in priority.

Alternatively, consider the impact of restrictions which make the choice task more difficult (e.g., time pressure, limited information processing capacity, missing information). Such situations may result in a smaller consideration/choice set (slanted toward easier to evaluate options), a focus on attributes that are easy to assess, and/or more random picking (i.e. a bigger error term/random component).

Essentially restrictions can formally impact a logit model by altering the consideration/choice set, the “algebra” of choice (i.e., whether the model is compensatory/monotonic in attributes and both the ideal level and importance weights of attributes), and the value of a no-choice option (i.e. the extent to which a choice constrains choices in other categories or over time). Table 2 presents a partial list of restrictions, how they may impact a choice model, and samples of relevant theories/research.

**[Insert Table 2 Here]**

## **Summary**

We have proposed a general framework for assessing choice under restrictions. We see it as a rich area for research, one which provides a different lens through which to explain

behavior. Our hope is that future research will explicitly address some of the issues raised and provide empirical generalizations so that in the future we can predict the impact of restrictions before they are imposed.

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## **Table 1: Examples of Restrictions**

Social Taboos/Norms

Recommendations

Rewards Programs

Total Institution (Hospital, Incarceration)

Prohibition (Drinking, Voting Age)

Payment Options

Sarbanes-Oxley

Inventory, Assortment

Diet

Resources (Budget, Time)

Medical

Mental and Physical Constraints

Behavioral at a Buffet/Dinner Party

Incentives as Negative Restrictions

Parent/Child Family Rules

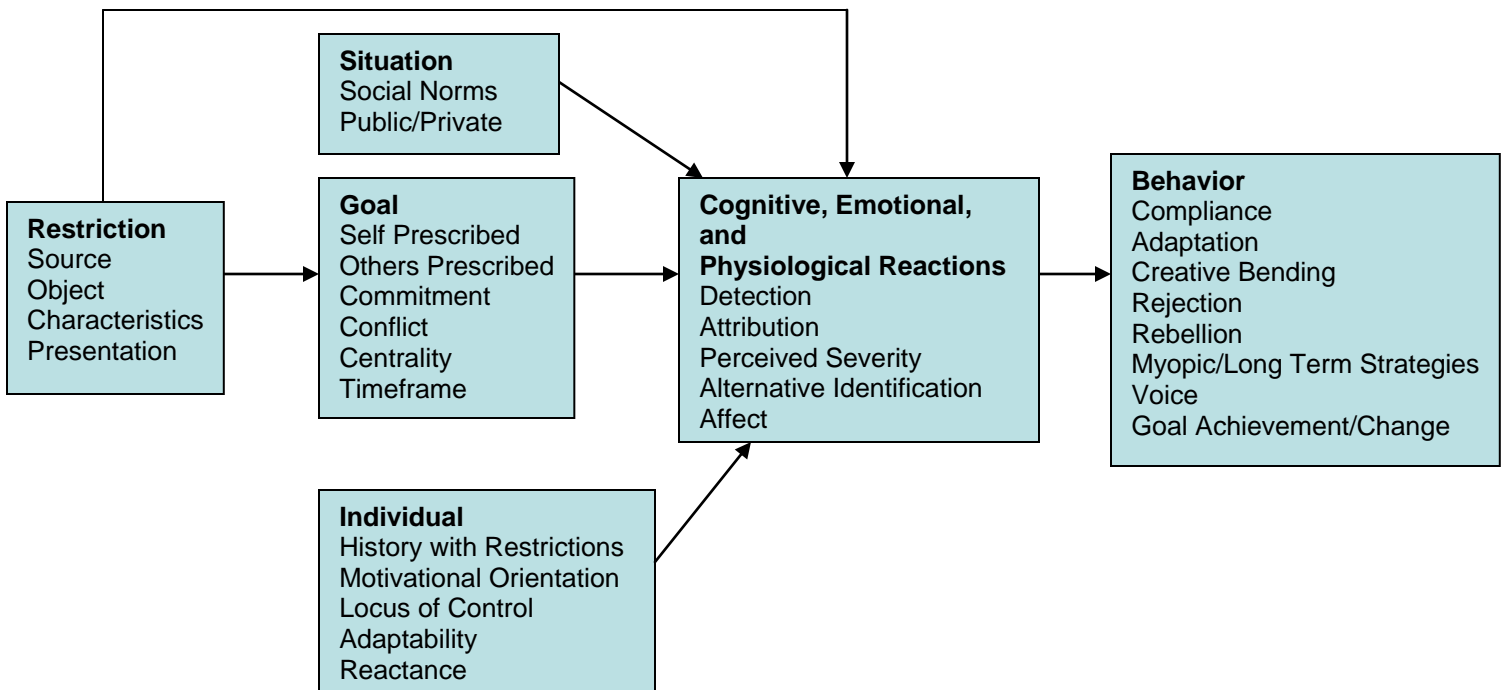
New Year's Resolutions

Pure Bundles

**Table 2: The Impact of Restrictions on Logit Choice Models**

<u>Sample Restrictions</u>	Choice Set	<u>Impact on Choice Model</u>		No Choice Option	Sample Relevant Theory/Research
		Choice Rule	Importance Weights		
Never Available	√	√			Adaptation Context Effects
Temporarily out of Stock	√	?			Substitutes Variety Seeking
Maximum/Minimum Requirements Items Attributes	√	√ √			
Budget (Income)	√	√		√	
Time	√	√		?	Fluency
Missing Information	√	√		√	
Limited Processing Capacity	√	√			Fluency
Binding Contract	√				

**Figure 1: Conceptual Framework**



**Figure 2: Types of Restrictions**

