

# The Effect of Credit on Spending Decisions: The Role of the Credit Limit and Credibility

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## Abstract

The objective of the present research is to study consumer decisions to utilize a line of credit. The life-cycle hypothesis from economics argues that consumers should intertemporally reallocate their incomes over their life stream to maximize lifetime utility. One form of intertemporal allocation is to use past income (in the form of savings) in the future. A second form is the use of future income in the present. This can only be done if consumers have access to a temporary pool of money that they can draw from and replenish in the future—a function performed by consumer credit. However, our research reinforces prior findings that consumers are unable to correctly value their future incomes, and that they lack the cognitive capability to solve the intertemporal optimization problem required by the life-cycle hypothesis. Instead, we argue that consumers use information such as the credit limit as a signal of their future earnings potential. Specifically, if consumers have access to large amounts of credit, they are likely to infer that their lifetime income will be high and hence their willingness to use credit (and their spending) will also be high. Conversely, consumers who are granted lower amounts of credit are likely to infer that their lifetime income will be low and hence their spending will be lower.

However, based on research in the area of consumer skepticism and inference making, we also argue for a moderating role of the credibility associated with the credit limit. Specifically, we argue that the above effect of credit availability would be particularly strong for consumers who believe that the credit limit credibly signals their future earnings potential (i.e., a naïve consumer who has limited experience with consumer credit). However, as consumers gain experience with credit, they start discounting credit availability as a predictor of their future and start questioning the validity of the process used to set the credit limit. Hence, with experience the effect of credit limit on the willingness to use credit should be attenuated.

We test these predictions in five separate studies. In the first experimental study, we manipulate credit limit and credibility and pose subjects with a hypothetical purchase opportunity. Consistent with our prediction, credit limit impacted the propensity to spend, but only when the credibility was high. In the second experimental study, we rep-

licate these findings even when subjects were given information about their expected future salaries, and also show that the credit limit influences their expectation of future earnings potential. In the third study, we show that the mere availability (and increase) of current liquidity cannot explain our findings. In the fourth study, we conduct a survey of consumers in which we measure a number of demographic characteristics and also ask them for their propensity to spend in a given purchase situation. In the fifth study we use the Survey of Consumer Finances (SCF) dataset, a triennial survey of U.S. families that is designed to provide detailed information on the use of financial services, spending behaviors, and selected demographic characteristics. Results from both studies 4 and 5 provide further support for our proposed framework—credit limits influence spending to a greater extent for consumers with lower credibility: younger consumers and less-educated consumers. Across all studies we achieved triangulation by using a variety of approaches (surveys and experiments), subjects types (young students and older consumers), nature of predictor variables (manipulated and measured), dependent measures (purchase likelihood, credit card balance, new charges), and methods of analysis (ANOVA and regression), and consistently found that increasing credit limits on a credit card increases spending, especially when the credibility of the limit is high.

This paper joins a growing body of literature in marketing and behavioral decision theory that goes beyond the traditional domains of inquiry (e.g., product choice, effects of marketing mix variables) and focuses on consumer decisions relating to the appropriate use of income to finance consumption. Our framework differs from prior research on the effect of payment mechanisms on spending in two significant ways. First, we are interested in the effects of the availability of credit on spending, and not necessarily in the effect of the transaction format that is associated with each payment mechanism. Second, while prior research has studied the point-of-purchase and historic (i.e., prepurchase) effects of credit, the present research is concerned with the availability of credit in the future. Specifically, our framework is invariant to the current and prior usage of credit by the consumer.

*(Consumer Credit; Credit Cards; Intertemporal Choice; Mental Accounting; Self-Control)*

## Introduction

The provision of consumer financing has become a pervasive tool for many marketers worldwide (Glassman 1996). Simultaneously, consumer debt has soared to record levels and an alarming number of households are finding themselves in financial difficulties (Andelman 1998, *Monthly Review* 2000). Given these trends in the consumer marketplace, a surprisingly sparse amount of research has attempted to study a consumer's decision to use credit.

Why should consumers use credit to finance purchases? The life-cycle hypothesis (Modigliani and Brumberg 1954) posits that consumers attempt to maintain their lifestyle and consumption baskets over their lifetime even though their income and wealth may fluctuate over time. Specifically, older consumers can borrow from their past savings and consume at levels beyond their current incomes. Conversely, young consumers who expect future incomes to be higher than their present income can "borrow from their future income" to support their present lifestyle. These processes have been referred to as consumption smoothing (Shefrin and Thaler 1988). The availability of credit facilitates consumption smoothing and hence a rational consumer can use credit to intertemporally maximize lifetime utility. However, an economically rational intertemporal reallocation of income requires a fair degree of cognitive complexity on the part of the consumer, an assumption that has been shown to be unrealistic (cf. Johnson et al. 1987, Kotlikoff et al. 1988). Given this cognitive handicap, how do consumers intertemporally allocate incomes? What factors influence this decision?

In the present research, we focus on the decision to borrow from future income. We agree with prior behavioral research that consumers are unable to correctly value their present and future resources, and that they lack the cognitive capability to solve the intertemporal optimization problem required by the life-cycle hypothesis. Furthermore, we argue that consumers use external information such as the availability of credit to infer their future earnings. Specifically, if consumers have easy access to large amounts of credit, they are likely to infer that their lifetime income is high and hence their willingness to use

credit will also be high. Conversely, consumers who are granted lower amounts of credit are likely to infer that their lifetime income will be low, and hence be less likely to use credit.

However, we also argue for a moderating role of the credibility associated with the credit limit. Specifically, we argue that the above effect of credit availability would be particularly strong for consumers who believe that the credit limit credibly represents their future earnings potential (such as a naïve consumer who has limited experience with consumer credit). However, as consumers gain experience with credit, they start discounting credit availability as a predictor of their future income. Hence, with experience the effect of credit limit on the willingness to use credit is attenuated.

The rest of this paper is divided into three sections. First, we review relevant research in the area of behavioral decision theory, economics, and marketing and articulate our hypotheses about the effects of credit limits and credibility on the propensity to spend. Second, we describe a series of studies using experiments as well as survey data to test our hypotheses and rule out alternative explanations. Third, we conclude with a general discussion and propose avenues for future research.

## The Effect of Payment Mechanisms on Spending

Some research in marketing has studied the effects of using various payment mechanisms on consumers' spending behavior. Hirschman (1979) and Feinberg (1986) used actual consumer transactions to compare the spending of consumers who paid by credit cards with those who used cash or checks, and found that the former spend more in otherwise identical purchasing situations. Prelec and Simester (2001) conducted an auction in which subjects bid for tickets to a sporting event that were to be purchased by the winner on the following day by using either cash or credit card (random assignment). They replicate the finding that willingness-to-pay is significantly greater in the credit card condition as compared to the cash

condition, and argued that liquidity constraints cannot completely explain these effects. All these articles showed a point-of-purchase effect—namely, the use of a particular payment mechanism at the time of purchasing influences spending behavior.

In a recent paper, Soman (2001) took a different approach to studying the effects of payment mechanisms. He argued that past payments influence spending decisions through their retrospective evaluation (i.e., the “pain” of past payments, Prelec and Loewenstein 1998) but that the past usage of a particular payment mechanism moderated this effect. In particular, payments by cash and check are both memorable and painful, while those by charge cards are more easily forgotten and painless, as a result of which people who predominantly use cards overspend relative to those who use cash or checks (Soman 2001).

The present research differs from this prior research in two significant ways. First, we are interested in the effects of the availability of credit on spending, and not necessarily in the effect of the transaction format that is associated with each payment mechanism. The research cited above was more concerned with the effects of the nature of the transaction format (e.g., salience, convenience, whether it involved writing down the final price) while the framework proposed in this paper is expected to be invariant to transaction formats. Second, while the prior research has studied the point-of-purchase and historic (i.e., prepurchase) effects of credit, the present research is concerned with the availability of credit in the future. Specifically, our framework is invariant to the current and prior usage of credit by the consumer.

Despite these differences, one result from Soman (2001) is relevant for the present research. In one experiment, he finds that the propensity to spend increases as a function of the credit limit, specifically that as the credit limit increases, subjects using a credit card report a higher likelihood of making a purchase *ceteris paribus*. While he notes that this result is orthogonal to the main thesis of his paper and that credit limit was being manipulated only to test for the robustness of his effects (Soman 2001, p. 464), we find a similar suggestion from the popular press

(Keenan 1998, Punch 1992). For instance, the realization that “to the extent you raise the credit line on the account, you can keep the cardholder in the fold and get greater usage” (Punch 1992, p. 48) seems to be accepted in the industry. Why does access to greater amounts of consumer credit drive the consumer to spend more? No academic research in marketing has documented this phenomenon (except the one by-product of Soman’s 2001 article) and none has attempted to explain why it occurs, hence the present research is a first step in this direction.

## The Intertemporal Allocation of Income

In the face of a mismatch between their income stream and their desired consumption stream, the life-cycle hypothesis postulates that consumers should allocate their lifetime income over time in order to smooth their consumption (Ando and Modigliani 1963, Modigliani and Bromberg 1954; see also Friedman 1957). More formally, the hypothesis states that under certainty, an individual will choose his consumption spending over his lifetime (up to age  $d$ ) to maximize a concave utility function  $U$

$$[U = U(C_1, C_2, \dots, C_d)$$

subject to

$$\sum_{j=1}^d C_j \prod_{s=2}^j R_s = \frac{A_1}{R_1} + H_1,$$

where  $C_j$  represents consumption in period  $j$ ,  $R_s = 1/(1 + r_s)$ ,  $r_s$  is the interest rate at time  $s$ ,  $A_1$  represents initial assets, and  $H_1$  is the present value of human wealth at age 1. This formulation specifies that the cumulative discounted consumption stream over an individual’s lifetime is exactly equal to the sum of the cumulative discounted income stream and all assets. In several empirical tests, support has been found for the simpler implications of the hypothesis that the propensity to spend (a) increases as a function of initial assets, (b) decreases as a function of expected lifetime, and (c) increases as a function of human wealth (cf. Courant et al. 1986, Johnson et al. 1987, Kotlikoff et al. 1988).

Practically, it is easy for consumers to use past income in the future because it can be stored in the form of savings and investments to be used later. However, it is practically impossible for a consumer to use his own future income in the present since the future income has not yet been realized and hence does not physically exist. To do this, a consumer needs to have access to an account that can act as an intertemporal intermediary between the future lender and the present borrower. Consumer credit plays exactly this role—it provides the consumer with additional spending power in the present in exchange for repayment (of the loan and interest) in the future.

Consumption behavior in accordance with the life-cycle model should therefore be practically feasible given the availability of consumer credit. Is it psychologically feasible and observed, however? In order to behave in an intertemporally rational manner, individuals need to correctly value their present and future resources and interest rates, perform complicated net present value calculations to compute their lifetime income, and apportion its appropriately interest-adjusted value throughout their lifetime. Basically, this involves the setting up and solution of a complex optimization problem that clearly requires a significant degree of cognitive capability and willingness to participate in this complex processing. Consequently, research attempting to test the intertemporal optimization aspect of the hypothesis has met with limited success. In an experiment in which subjects were asked to make preferred consumption choices under hypothetical life-cycle economic conditions, Johnson et al. (1987) found that individuals repeatedly made substantial computational errors (see also Kotlikoff et al. 1988). Their experiment led them to conclude that their results “raise serious questions about the life-cycle model’s ability to describe consumption choice” (Johnson et al. 1987, p. 42). In a summary paper, Courant et al. (1986) similarly conclude that despite its elegance and rationality “the life-cycle model has not tested very well” (p. 279). An additional complication in the real world is the fact that the future is never certain for most individuals. Therefore, prior to setting up the optimization problem, the individual also needs to compute

alternative income scenarios, assign probabilities to each scenario and compute a most likely income stream. Thus, while it appears that consumers may have the right intuitions about intertemporal allocations (Shefrin and Thaler 1988), the life-cycle hypothesis is not an accurate descriptor of their behavior.

In the midst of a number of seemingly ad hoc modifications proposed to account for anomalous data, a psychologically enriched version of the life-cycle model was proposed by Shefrin and Thaler (1988). The behavioral life-cycle hypothesis highlights the role of one of the individual characteristics described in Fisher’s (1930) *Theory of Interest*: self-control. Given that the future is uncertain and that consumers do not have the cognitive apparatus to perform the complex optimization problem, it becomes important for consumers to ensure that they do not excessively borrow from the future. Two observations make this an especially difficult problem. First, prior research shows that immediate consumption always seems to be an attractive alternative to future consumption (cf. Ainslie and Haslam 1992, Benzion et al. 1989, Kirby 1997). Second, in the absence of certainty, “consumers are prone to magnify the importance of goods in the present and at the same time, they underestimate the importance of cash in the future” (Zelenak 1999, p. 154).

How do consumers exert self-control? Psychologists have written about the fact that exerting self-control is an effortful process and requires the individual to construct and adhere to a set of well-defined rules or precommitment devices (Elster 1979, Schelling 1984). In the case of spending, individuals can construct a number of different types of rules to constrain expenditure. For instance, individuals can use a “matching rule” in which the consumption in any period  $t$  is constrained by the income available in  $t$ . Similarly, consumers may adopt a rule whereby they allow themselves to have credit balances up to a specified limit (Weber and Booream 1996). For instance, the web page for Mastercard tells consumers that it is important to budget wisely, but also reminds them that “You may use credit cards to pay for many of your expenses. They allow you to have the flexibility of paying credit card bills over

time.” (Mastercard-A 2000). This website further recommends that outstanding credit balances should not exceed 20% of total income (Mastercard-B 2000).

One method of exerting self-control is to use mental accounts (Heath and Soll 1996, Shefrin and Thaler 1988, Thaler 1985, 1999). Budgets ensure that consumers do not overspend on tempting products that they may otherwise want to buy (but that they should not). The reason that such precommitment devices are effective in exerting self-control is that people do not arbitrarily choose tempting alternatives just because they are attractive (Hsee 1995). Specifically, precommitment changes the incentives under which people will make their future choice such that giving in to temptation will be costly (cf. Wertenbroch 1998). However, recent research also shows that if there is any degree of ambiguity in the structure of the mental accounts, consumers can exploit this to justify choosing a tempting course of action (Soman and Gourville 2001, Soman and Cheema 2001). For instance, Soman and Cheema (2001) showed that subjects were willing to use an unbudgeted windfall gain to purchase a tempting product by using the windfall money to augment the spending budget. In the present research, we propose that a line of available credit plays a role similar to the windfall gain in Soman and Cheema’s (2001) experiments.

## The Credit Limit, Consumer Inferences, and Skepticism

Previous research suggests that consumers understand the intuition behind intertemporal allocation of income but do not have the cognitive sophistication to follow the life-cycle hypothesis predictions. Furthermore, consumers employ self-control mechanisms (like mental accounts), but if they can find rational ways of succumbing to tempting purchases, they will do so. And consumers seem to use their own personal rules of thumb—heuristics—to determine the extent to which they can utilize available credit.

In the present section, we suggest that consumers may also use the size of the available credit (i.e., the credit limit) as a heuristic in determining their future

income potential and, consequently, their propensity to use credit. Specifically, we propose that consumers with access to larger amounts of credit will infer that they will have a larger future income and will display a larger propensity to spend than consumers with smaller credit limits. The rationale behind this expectation is relatively straightforward. The credit limit in most consumer credit situations (e.g., credit cards, overdraft loans) is exogenously set by the lender. Ideally, the lender should utilize all available information to determine the future earnings potential of the consumer (Garcia 1980), and hence we speculate that in the absence of all contrary evidence, consumers do expect the credit limit to represent the future well. Norton (1993) notes that credit is seen as a credible source of alternate income—typically by younger consumers and novice users of credit—and that such consumers tend to integrate available credit with their spendable income. We use the term “credibility of the limit” (or simply “credibility”) to represent the degree to which consumers expect their credit limit to truly capture their future earnings potential. Since borrowing from the future is rational if the credit amount represents a true reflection of future income potential, we argue that consumers will readily integrate the available credit with their “spending money” if the credibility is high. Consequently, their propensity to spend will be greater (Ferber 1973, Tobin 1972) with larger credit limits conditional on high credibility.

We note that the credibility of the limit has two antecedents.<sup>1</sup> The first antecedent is the credibility of the process used to set the credit limit. As discussed above, a lender should utilize all available information to determine the future earnings potential of the consumer (Garcia 1980). A search of the banking literature as well as an interview with a consumer loan officer in a credit union revealed, however, that there exist no formal guidelines for banks to use in setting credit limits. In fact, banks and other lenders typically use histories of *past* credit as inputs (Tressler 1998) and there seems to be no explicit use of *future* income projections in making credit-limit decisions.

<sup>1</sup> We thank an anonymous reviewer for stimulating our thinking in this direction.

While it is reasonable and intuitive to expect that past earnings and credit usage might be a good predictor of the future, this expectation is neither consistent with the life-cycle hypothesis nor has been empirically validated by prior research.

A second antecedent of the credibility of the limit is based on the idea that the credit limit is a signal of future earnings potential and that differences in the perceived meaningfulness of this signal result in differences in the credibility of the limit. Note that this second antecedent of credibility is much broader in scope than the issue of whether the process of setting the limit is credible. In many cases, credibility can be low due to both a low credibility associated with the process used to determine the credit limit as well as a low meaningfulness associated with the signal. For instance, a consumer who is told that his bank considers "current wages and other credit indices in a simple formula that provides the credit limit" and that "this method is fast and convenient but probably not very scientific" could assign a low credibility for two reasons. First, he may cast doubts on the process used to determine credit limits and question whether it uses the appropriate variables and the right formulas. Second, he may simply believe that since the limit is calculated in a nonscientific manner, it is not a diagnostic signal of future earnings potential. In the present research, we do not aim to distinguish between these two antecedents of credibility. Our claim is simply that the credibility associated with the credit limit moderates the effect of the credit limit on the propensity to spend.

As a routine practice, many credit card issuers freely use credit limit as a tactical marketing tool—credit limits on most accounts have been steadily ratcheted up (Lunt 1992), and when credit card users with good payment records reach their limit, their credit line is typically increased (Punch 1992). As a result, the presumed rationality of the credit-limit-setting process is called into question. What implications does this have for consumer beliefs about the credibility? As consumers become more experienced with credit cards and start observing seeming irrationalities like frequent and rapid changes in their credit limits and large discrepancies between the credit lim-

its offered by different issuers, their beliefs about the credibility will reduce. Prior research in two streams is relevant here. First, research in the area of expertise shows that experienced individuals examine information at a deeper level (and not superficially), seek explanations for presented data and are more likely to question data that is presented to them (Chi et al. 1988). In this context, this suggests that experienced consumers are more likely to question the validity of the credit limit. Second, research in the area of consumer skepticism suggest that consumers are skeptical of claims made by marketers (e.g., advertising claims, Ford et al. 1990; or pricing, Licata et al. 1998) and, furthermore, that experience and age seem to increase the degree of skepticism (cf. Licata et al. 1998, Mangleburg and Bristol 1998). Again, experienced consumers seem to be more likely to discount the presented information. Both streams of literature therefore suggest that for experienced consumers, the credibility will be low as compared to that of novice consumers. In a related vein, experienced consumers are likely to be exposed to a greater number of credit card offers with greater variance and, hence, do not believe in the diagnosticity of credit limits any more. Consequently, as experienced consumers rely less on the available credit as a heuristic to determine their future earning potential and are less likely to integrate it with their "spending money," the effects of credit limit on the willingness to spend will be attenuated.

Our expectations are captured more formally in the following hypotheses:

*HYPOTHESIS 1 (H1). The propensity to spend when credit is available will depend on the size of the credit limit available to the consumer, but only when the credibility of the limit is high. When the credibility is low, the effect of credit limit will be weaker.*

*HYPOTHESIS 2 (H2). The credibility of limit will be lower for experienced consumers as compared to relatively novice users of credit.*

We next describe a series of five studies designed to test these hypotheses.

## Study 1

The first study was an experimental task in which subjects were endowed with a hypothetical financial profile and were asked to make a purchasing decision. The financial profile included a line of credit that was manipulated to be at one of two levels. The credibility of the limit was also manipulated to be high or low. The objective of the experiment was to test H1 through a predicted Credibility  $\times$  Credit Limit interaction effect.

**Subjects, Design, and Procedure.** Ninety students at a large state university served as subjects in this study. They were recruited from an undergraduate subject pool and participated in several unrelated studies in exchange for course credit. The present experiment was the first study and was presented on an experimental booklet entitled "*Buying a Computer*."

The experiment employed a 2 (Credit Limit)  $\times$  3 (Credibility) between-subjects full factorial design. Subjects were randomly assigned to one of the six experimental conditions. All subjects were told to imagine that they had recently graduated from college and had a job that paid \$3,000 per month (after taxes). They were told that they were paying off a college loan, of which they still needed to repay \$5,000 over the next seven months. Subjects were then told, "You spend approximately \$1,500 on essential expenses like rent, bills, and grocery expenses, and a further \$600 on other unavoidable expenses (car payments and expenses, clothes and equipment related to your job, etc.). Of the remaining, you typically spend a further \$300 on eating out, entertainment, and miscellaneous expenses."

All subjects were further told to imagine that they had three accounts with their local credit union—savings, checking (total balance = \$4,000), and credit card accounts. Two levels of the *Credit Limit* were used, \$2,000 and \$5,000.<sup>2</sup> The second factor, *Credibility*, had three levels. After reading the financial pro-

<sup>2</sup> These limits were selected in consultation with the manager of the credit card division of a bank as "low (appropriate)" and "high" limits for the indicated financial profile. In a pretest, a set of 18 MBA finance students indicated high levels of agreement with the statement "A credit limit of \$2,000 (\$5,000) might be considered to be a relatively low (high) credit limit given the financial profile."

file, some of the subjects were then provided with information about the process used by the credit union in determining their credit limits. Subjects in the "high credibility" condition read: "Your credit union uses a fairly detailed procedure in determining your credit limit. A panel of financial experts uses an extensive set of data (wages, several credit reports, investments, etc.) to forecast your future earnings potential, which is then used as a basis for setting the limit. This method is slow and elaborate, but is also very scientific." Subjects in the "low credibility" condition read: "Your credit union uses a simple rule to decide what the limit on your loan account will be. It considers your current wages and other credit indices in a simple formula that provides the credit limit. In general, this method is fast and convenient but probably not very scientific." Finally, subjects in the "control" condition were not provided with any information about the process used to determine credit limits.

All subjects then were presented with the following purchasing scenario:

A colleague at work tells you about a computer he recently bought at a local retailer. It is a top of the line Dell Pentium II, 333 MHz machine with interfaces for heavy computing applications, for editing graphics and photographs, for music editing as well as for other standard communication options (like FAX, world wide web applications, internet phone etc.). The computer will not only let you work more efficiently, but will allow you to enjoy the other applications that you have always wanted to possess. Additionally, the premium computer, which has a regular price of \$4,000, is currently on sale for \$3,000. While this seems like a great deal and you think that you would definitely have purchased the computer if money were not a problem, you think about whether you should purchase the computer given your current financial situation.

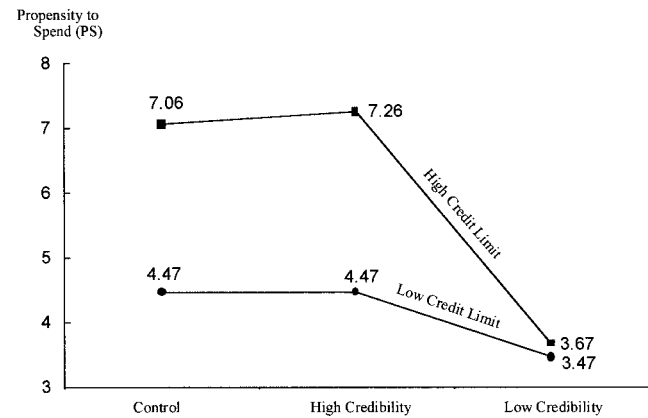
Subjects were finally asked to circle on a nine-point scale "the appropriate number to indicate how likely you are to purchase the computer" (1 = Definitely Will Not Buy, 9 = Definitely Will Buy). This variable measured their propensity to spend (PS). Note that since the current wealth was held constant across all subjects, any difference in PS across the experimental conditions was due to differences in credit availability.

**Manipulation Check Pretests.** Two separate tests were done to check the manipulation of credibility of the limit. First, 38 student subjects were asked to read the above descriptions and to rate their agreement with two statements: “The credit limit assigned by banks accurately reflects my future earning potential” and “Banks follow a rigorous scientific process in determining credit limits.” Second, 29 shoppers read the descriptions and responded to a five-item scale to measure credibility (of the process used to determine the credit limit) (Bruner II and Hensel 1992). The correlations between the various items of the scale were high ( $r = 0.89$  in the first test and Cronbach Alpha = 0.88 in the second), and hence we used the mean as a measure of credibility of the limit. In both tests, the “high credibility” description was indeed perceived to be more credible (First test:  $X_{\text{high-credibility}} = 6.18$ ,  $X_{\text{low-credibility}} = 3.24$ ; Second test:  $X_{\text{high-credibility}} = 5.98$ ,  $X_{\text{low-credibility}} = 3.94$ , all  $ps < 0.01$ ). As discussed earlier, our manipulations could have influenced credibility either because subjects in the “low credibility” condition thought that the formula used to determine the credit limit was inappropriately specified, or because they believed that the credit limit was no longer a valid signal of future earnings potential (i.e., it was not perceived to be a meaningful signal).

**Results and Analysis.** We first ran a series of planned contrasts in which we compared the “control” credibility condition to each of the “high” and “low” credibility conditions for both levels of the *credit limit*. Our objective in running this analysis was to see what implicit inferences were made by consumers who were given no information about how the credit limit was set. There were no differences between the “control” and “high-credibility” conditions (all  $ps > 0.25$ ) while there were significant differences between the “control” and the “low-credibility” conditions (all  $ps < 0.05$ ). Given the fact that our subjects were relatively inexperienced in credit usage, this finding is consistent with our expectation that the credibility would be high in the absence of contrary information.

A 2 (*Credit Limit*)  $\times$  3 (*Credibility*) ANOVA results indicate significant main effects of *credibility* ( $F_{2,84} =$

**Figure 1** Mean Propensity to Spend as a Function of Process Credibility and Credit Limit: Study 1



15.87,  $p < 0.001$ ) and *credit limit* ( $F_{1,84} = 24.54$ ,  $p < 0.001$ ), as well as a significant *credibility by credit limit* interaction ( $F_{2,84} = 4.91$ ,  $p < 0.01$ ). The mean PS scores are plotted in Figure 1. The main effect of credibility results from the fact that the propensity to spend is greater in the control and high-credibility conditions ( $X = 5.82$ ) than in the low-credibility conditions ( $X = 3.57$ ). As Figure 1 suggests, however, the main effect of credit limit is qualified by the *credibility  $\times$  credit limit* interaction. Specifically, we see that the credit limit significantly influences PS when the credibility is high and in the control conditions (both  $ps < 0.01$ ) but not when the credibility is low ( $p > 0.75$ ).

**Discussion.** The results from Study 1 are consistent with H1. Specifically, we found that the propensity to spend was greater for the \$5,000 credit limit as compared to the \$2,000 credit limit, but only when the credibility was manipulated to be high. In the low-credibility conditions, the propensity to spend was significantly lower than in the high-credibility conditions, and there was no effect of credit limit. These results suggest that the willingness to integrate the available credit (and hence the propensity to spend) increases with credibility, and consequently when the credibility is high the propensity to spend increases with an increase in the credit limit.

Two discussion points are in order. First, in this study we used student subjects (naïve users of credit) and experimentally manipulated credibility. Results suggested that subjects in the control condition (in



which there was no credibility manipulation) behaved as if their inferred credibility was high, a result that we would have expected to be different if we used more experienced users of consumer credit. An alternate test of the effect of credibility would involve measuring the perceptions of credibility of the limit. Second, while the present experiment controlled the present financial profile, it is still vulnerable to the argument that in the absence of any information about future income, the credit limit information became artificially salient. The next study was conducted to overcome these limitations.

## Study 2

The second experimental study differed from the first in a number of ways. First, we used undergraduate students as well as older subjects (both graduate students and nonstudents). Second, instead of manipulating credibility of the limit, we measured it using a two-item scale. Third, all subjects were given a projected future earning profile in a procedure similar to that of Johnson et al. (1987), but unlike the previous study they were also reminded that their actual earnings could be greater or lesser than the projections. Our goals were to replicate the results of Study 1 (namely the credibility  $\times$  credit limit interaction), to show that subjects used a larger credit limit to infer a larger future income, and to show that the credit limit consequently influences the propensity to spend.

**Subjects, Design, and Procedure.** Eighty undergraduate students and 80 older individuals served as subjects in this study.<sup>3</sup> All 160 subjects were intercepted near a dining hall at two U.S. universities and were requested to participate in a research study. Fac-

<sup>3</sup> We use the term "older consumers" to include graduate students, staff members, and visitors to the universities (average age = 35.34). All these individuals were significantly past their undergraduate education, had earned regular incomes, and, unlike the undergraduate students (average age = 19.29), were financially "on their own." Other marketing articles sometimes refer to such a sample as "real consumers"—we refrain from this usage. We also avoid the term "nonstudents" as this group clearly included some students.

ulty members were excluded from the study, but staff members, older graduate students, and visitors were included. Those individuals who agreed were handed a three-page questionnaire entitled "*Purchasing Decision*" and were compensated for their time with a souvenir gift.

Within each subject sample, the experiment employed a 2 (Credit Limit)  $\times$  2 (Level of Future Income) between-subjects design. All subjects were asked to imagine that they were 35 years old and lived in a foreign country where the local currency was L\$ (1.3 L\$ = 1 US\$). They were asked to assume the following facts with certainty: (a) the interest rate in this country was 3% and would stay unchanged, (b) the retirement age was 70, (c) beyond the age of 70 the residents of this country were not allowed to work for a living and could only rely on their savings, (d) they would die at the age of 75, and (e) there was no inflation or deflation, no dependents to support, no current or potential health problems and no uncertainty about the future (see Johnson et al. 1987). They were told that their present salary was L\$ 5,000 per month and were also told that their salary would, with certainty, increase after every seven years over the remaining 35 years of their career. However, they were told that "the exact amount of the increase is, however, uncertain. Based on historic data from people with your educational background, training, and demographic characteristics, the following table shows you the most likely levels of your monthly salary over the course of your life."

In a between-subjects manipulation, the projected monthly increase after every seven years was either L\$ 2,000 (Lower Future Income condition) or L\$ 4,000 (Higher Future Income), resulting in a net present income of L\$ 3.02M (or L\$ 6,294 per month till death) and L\$ 2.17M (or L\$ 4,530 per month till death), respectively. This information was presented to subjects in a tabular form (as seen in Table 1), and the net present income information was *not* included.

All subjects were also told that they had a credit card with a credit limit of either L\$ 20,000 (lower credit limit) or L\$ 40,000 (higher credit limit). They were told that "banks and credit card issuers in this country are almost identical in their operations to

**Table 1 Manipulation of Level of Future Income: Study 2**

Age (Including Both Years)	Monthly Income (in L\$)	
	Lower Future Income Condition	Higher Future Income Condition
36-42	5,000	5,000
43-49	7,000	9,000
50-56	9,000	13,000
57-63	11,000	17,000
64-70	13,000	21,000

those in the U.S." The two levels of the credit limit were chosen to be lower than the annual salary but significantly higher than the purchase price of the item that they would decide on (this would eliminate floor effects). In a pretest, 30 subjects were given the above financial profile and asked to rate whether a credit limit of L\$ 20,000 (L\$ 30,000, L\$ 40,000) was too low or too high (1 = Too Low, 5 = Just Right, 9 = Too High). L\$ 20,000 was rated low ( $X = 3.47$ ) while L\$ 40,000 was rated high ( $X = 6.13$ ,  $t = 5.10$ ,  $p < 0.001$ ).

All subjects read the following.

Assume that your monthly expenses on essentials like rent, food, clothes and transportation to work is L\$ 3,000. As you have just finished off paying an education loan, you have no savings at present. You are thinking about buying a used sports car that is in great condition and will cost L\$ 10,000. Relative to other models you have considered, the features that attract you the most are:

- Sun roof (power operated)
- Hand stitched leather seats
- Changeable CD player with 6-way surround-sound speakers
- Power operated seat adjustments (recline, position, height)
- Spacious trunk, fuel efficiency, antilock brakes, dual air bags

You don't really need the car and it will be a luxury. However, you will really appreciate the convenience and mobility, and have always longed to own a sleek, sporty car. You realize that you don't have the money to pay for the car, but the dealer will accept a credit card (unlike the U.S., there are no installment plans) and so it is feasible to purchase the car.

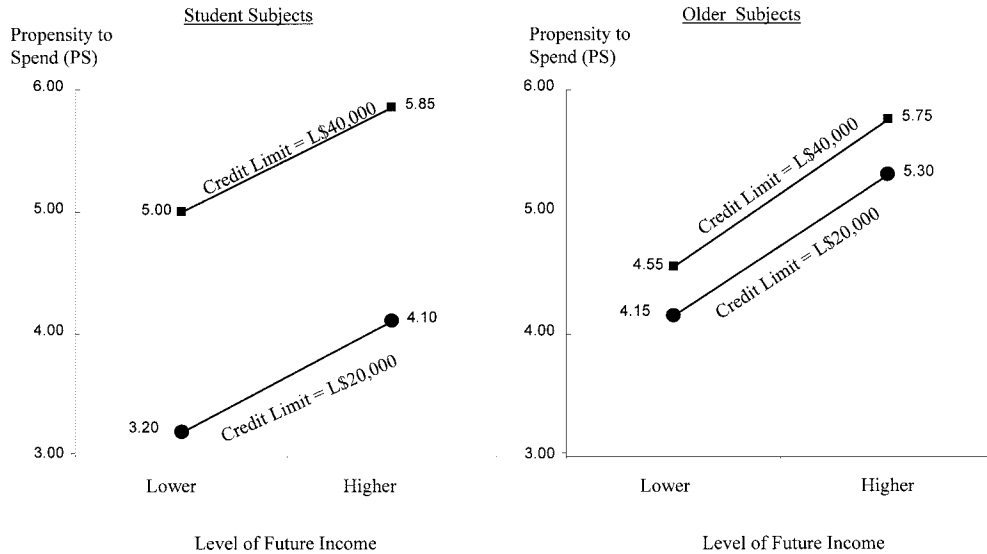
Subjects then answered a number of questions. First, to measure the propensity to spend (PS), they were asked, "Keeping in mind your financial situation, how likely are you to purchase the car?" (1 = Definitely Not Purchase, 9 = Definitely Purchase).

Second, they were asked to write down a "number to indicate how larger or smaller you expect your own future salary to be as compared to the projections. For instance, an answer of 20% means that you expect your salary to be 20% more than the projection, -30% means that you expect it to be 30% lower." We refer to this measure as FSALARY. On the reverse side, subjects were also asked to rate their agreement with the statements "The credit limit assigned by banks accurately reflects my future earning potential" and "Banks follow a rigorous scientific process in determining credit limits" (1 = Disagree, 9 = Agree). The responses to these two questions were highly correlated ( $r = 0.89$ ), and hence we refer to their mean as credibility of the limit (CRED). They also indicated their agreement with the statement "I am an experienced user of credit cards" (EXP).

**Results and Analysis.** One of our goals was to show that the effect of credit limit holds when credibility is high but not when it is low. A priori, we expected the student subjects to have high credibility and the older subjects to have a lower credibility. If we did indeed find a large and significant difference here, we could treat the two subsamples as a third factor in the analysis.

A preliminary 2 (Subject Type)  $\times$  2 (Credit Limit)  $\times$  2 (Level of Future Income) ANOVA showed that the mean CRED and EXP scores for the student sample (CRED = 6.24, EXP = 3.44) were significantly different from the mean for the older subjects (CRED = 3.98;  $F_{1,152} = 171.71$ ,  $p < 0.001$ ; EXP = 5.69;  $F_{1,152} = 101.00$ ,  $p < 0.001$ ). Specifically, only the main effect of *Subject Type* was significant (all other  $ps > 0.35$ ) and showed that the students rated themselves as low on expertise and also expected a greater level of credibility than the older consumers. Therefore, we analyzed the propensity to spend (PS) using a 2 (Credit Limit)  $\times$  2 (Level of Future Income)  $\times$  2 (Subject Type) ANOVA. Results indicated a significant *subject type*  $\times$  *credit limit* interaction ( $F_{1,152} = 7.76$ ,  $p < 0.01$ ), as well as significant main effects of *credit limit* ( $F_{1,152} = 20.61$ ,  $p < 0.001$ ) and level of future income ( $F_{1,152} = 17.89$ ,  $p < 0.001$ ). All other main and interaction effects did not approach significance. The mean PS

**Figure 2** Propensity to Spend as a Function of Subject Type, Level of Future Income, and Credit Limit: Study 2



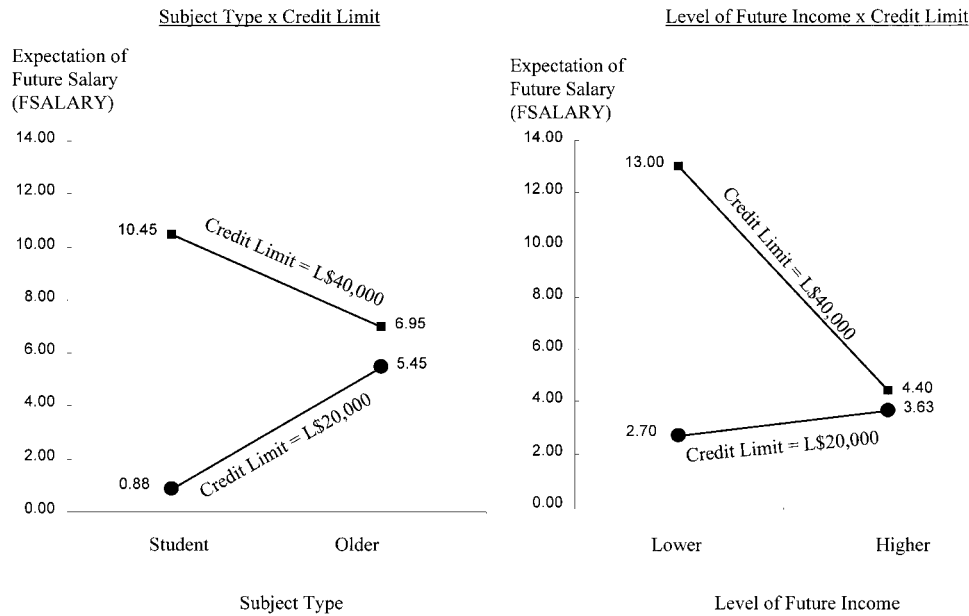
scores in each experimental condition are plotted in Figure 2.

The left panel in the figure shows the data from the student subjects who had high credibility of the limit. A 2 (Credit Limit) × 2 (Level of Future Income) ANOVA on these data reveals a significant main effect of *credit limit* ( $F_{1,76} = 30.79, p < 0.001$ ) and a smaller but significant effect of *level of future income* ( $F_{1,76} = 7.48, p < 0.01$ ) such that the PS increases with an increase in both the credit limit and the level of future income. The right panel in Figure 2 plots the data from the older consumers that had low credibility of the limit and shows a main effect of *level of future income* ( $F_{1,76} = 10.42, p < 0.002$ ), while the main effect of credit limit and the interaction do not approach significance ( $ps > 0.24$ ). A glance at the figure shows that the relative strength of the two effects is different for the two samples—for the students, the effect of *credit limit* is larger while for the older consumers, only the effect of *level of future income* is significant.

We next turn to the FSALARY response, which indicated how much their personal salary expectations would deviate from the provided projections. An ANOVA with FSALARY as the dependent variable yielded significant two-way interactions of *credit limit* with *level of future income* ( $F_{1,152} = 6.40, p < 0.02$ ) and

of *subject type* with *credit limit* ( $F_{1,152} = 4.60, p < 0.05$ ); as well as significant main effects of *credit limit* ( $F_{1,152} = 8.66, p < 0.005$ ) and *level of future income* ( $F_{1,152} = 4.16, p < 0.05$ ). All other effects were not significant ( $ps > 0.09$ ). This pattern of results can be interpreted by looking at Figure 3, which is a plot of the two interaction effects. The panel on the left shows differences between the two subject types—the student subjects reported that their actual earnings would be higher than the projected earnings by a greater degree in the high-credit-limit condition (10.45%) than in the low-credit-limit condition (0.88%). However, this difference was much smaller for the older individuals. Basically, the credit limit influenced FSALARY strongly for the student subjects but not for the older subjects. The right panel in the figure shows that the effect of credit limit on the belief that actual earnings would be higher than projected earnings is larger in the lower future income conditions than in the higher future income conditions. This is not surprising—it suggests that subjects used a high credit limit to infer a higher level of income, but in the condition where this expectation was disconfirmed (i.e., high credit limit—lower future income), they reported that their actual salary would be higher than the projection.

**Figure 3** Expectation of Future Salary as a Function of Subject Type, Level of Future Income, and Credit Limit (Interaction Effects): Study 2



**Discussion.** Results from Study 2 replicated the results from Study 1 and provided further support to H1. Instead of manipulating credibility, we measured it and found essentially the same effect—a credibility (operationalized as subject type)  $\times$  credit limit interaction. Subjects who were relatively inexperienced with credit use had high credibility and showed a strong effect of credit limit on the propensity to spend, while the actual future income did not have any effect. Interestingly, student subjects in the high future income—low-credit-limit condition (PS = 4.10) showed a lower propensity to spend than subjects in the low future income—high-credit-limit condition (PS = 5.00), clearly suggesting that credit limit played a larger role on their decision making than the provided forecasts of future income. However, experienced users of credit were not significantly influenced by the credit limit.

Furthermore, this experiment allowed us to understand exactly how the credit limit influenced decision making. Specifically, we found that subjects who faced a high credit limit (as opposed to the lower credit limit) but lower projected income levels believed that their actual salary would be greater than the provided projection by a significantly greater per-

centage. While we did not study the exact sequence of inferences that subjects made about the relationship of future income and credit limit, we gained some insights from a separate exploratory study with a small number of subjects. That study suggested that the annual income is a very salient and readily used reference for many financial decisions relating to spending and savings (see also Weber and Booream 1996, Mastercard-B 2000). In this study, the annual income was L\$ 60,000. Framed against this, a credit limit of L\$ 40,000 ( $\frac{2}{3}$ ) might appear large while L\$ 20,000 ( $\frac{1}{3}$ ) might appear small. The exploratory study also suggested that consumers may have some heuristics about a monotonic relationship between credit limit and future annual salaries, and hence a greater credit limit might lead to an inference about larger future incomes.

In the present experiment, we only collected information about subjects' age and saw that the older subjects showed lower credibility as compared to the student subjects. In this case, credibility of the limit could be lower for older subjects because they had a lower life expectancy and hence discounted the degree to which their credit limit signals their ability to pay back the loan. In a future study (Study 4), our

goal is to identify additional variables that may influence credibility and to test for their relationship with the propensity to spend.

While the first two experiments provided support to our proposed theoretical framework, one potential alternative explanation remained. Namely, in both Studies 1 and 2, subjects in the higher-credit-limit condition also had a greater access to liquidity in total. Since prior research has shown that the presence of additional liquidity in the present could spur purchases (Soman 2001), one alternative explanation to the finding that higher credit limits result in higher spending is the fact that consumers with larger credit limits have access to larger levels of liquidity, which in turn spurs spending. Hence, rather than being a forward-looking inference explanation, credit limits influence spending by enhancing the currently available liquidity. While we acknowledge that this explanation is certainly plausible and perhaps even plays a role in the real world, we also believe that it does not explain our results due to two specific reasons:

a) It does not explain any of the observed interaction effects. For instance, if a rise in liquidity is the sole explanation, the liquidity rise should affect all subjects and hence we should not see a subject type  $\times$  credit limit interaction.

b) It does not explain the pattern of results seen for the expectation of future salary (FSALARY) variable. These data provide clear evidence to support our prediction that consumers use the credit limit as a signal of their own future potential, and these data cannot be explained by the liquidity explanation.

Hence, we believe that while the liquidity explanation is plausible, it is orthogonal to the framework proposed in the present paper. However, in order to ensure that our proposed explanation also has an effect even when controlling for liquidity effects, we conducted an additional experiment which is described next.

### Study 3

In this experiment, we asked subjects to make a purchase decision after placing them in a financial situation. All subjects were given an identical finan-

cial profile in terms of salary, expenses and savings. However, the liquidity of the savings was different across the two experimental conditions. Additionally, the credit limit was manipulated such that the total liquidity was greater in the *low credit limit* condition while the total liquidity was lower in the *high-credit-limit* condition. Hence, this experiment pits the "liquidity" explanation against the "inference about future earnings potential" explanation. If liquidity alone drove the effects of credit limits, we expected propensity to spend to be greater in the low-credit-limit (high liquidity) situation. However, if subjects looked beyond the present liquidity and used the credit limit as a signal of their future earnings potential, we expected PS to be greater for the high-credit-limit (lower liquidity condition).

**Subjects, Design, and Procedure.** One hundred students and staff members of a U.S. university served as subjects in this study. Each subject received a single-page questionnaire entitled "*What Will You Do?*" and was given a souvenir in exchange for participation. Subjects were randomly assigned to one of two experimental conditions. All subjects in the *Low Credit Limit* condition read the following scenario, with the numbers in parenthesis indicating differences for the *High Credit Limit* condition:

*Imagine the following:*

- About a year ago, you graduated and now have a job where your monthly salary (after taxes) is \$4,000.
- Your monthly expense on essentials like rent, bills and grocery is \$1,400. In addition, you spend \$600 per month on other unavoidable expenses (car payments and expenses, clothes and equipment) and a further \$500 on eating out, entertainment and miscellaneous expenses.
- Since you started working, you repaid a \$10,000 college loan and additionally managed to save a total of \$8,000. Of this \$8,000, you had put \$3,000 [\$7,000] in a 10-year fixed deposit account which you cannot utilize now, while the remaining \$5,000 [\$1,000] is in your savings and checking account and is readily accessible.
- In addition, you also have a credit card issued by your bank with a credit limit of \$4,000 [\$7,000].

Subjects next read about the following purchase opportunity:

Recently you saw an advertisement for a new home theater system. The system includes a 21" TV, a state of the art receiver,

CD player with 40-rack jukebox, a DVD and video player and the latest system of surround sound speakers. In addition, there are network ports to connect a computer for recording and exchanging music digitally, a port for connecting other equipment like a digital camera, and finally a MIDI port for connecting electronic musical instruments. You went to the store to test the system and are amazed at the sound and visual quality as well as the versatility, adaptability and connectivity. If cost were not an issue, you—as a music enthusiast—would like to own the system without any hesitation. The regular price of the system is \$9,000. However, the store is offering a special price of \$7,000 for a limited period of time. This sounds like an extremely attractive deal. You realize that you don't have the cash at hand to purchase it, but you can finance the purchase by using both your credit card and savings.

They finally indicated their intention to purchase the theater system (PS) on a nine-point scale (1 = Definitely not buy, 9 = Definitely buy).

**Results and Discussion.** We note that the total liquidity in the low-credit-limit condition is \$9,000 (\$5,000 in a liquid bank account and \$4,000 credit card) while the total liquidity in the high-credit-limit condition is \$8,000 (\$1,000 in a liquid bank account and \$7,000 credit card). If subjects made spending decisions on the basis of liquidity alone, there should be a slightly greater PS in the *low credit limit* condition.

However, results showed support for the contrary. Consistent with our theoretical framework (and inconsistent with the liquidity explanation), the average PS score in the *low credit limit* condition (PS = 4.12) was significantly lower than in the *high credit limit* condition (PS = 5.76,  $t(98) = 4.58$ ,  $p < 0.001$ ). Subjects who had the relatively lower liquidity still reported a higher propensity to spend because of their higher credit limit. While we did not measure subjects' inferences explicitly in this experiment, the results from Study 2 suggest that these subjects might have inferred that their future earning potential is greater than subjects in the low-credit-limit condition, and hence were more willing to purchase.

Across the first three experimental studies, we were able to demonstrate the effect of credit limit and credibility on spending behavior. We also found support for our proposed theoretical framework by showing that expectations about the future income varies systematically as a function of the credit limit,

and we were able to eliminate additional liquidity due to credit cards as an explanation for our results. In the next two studies, we move from controlled experiments to consumer surveys, look for additional variables that influence credibility, and study their effect on both intended and reported actual spending behavior.

## Study 4

Data for the present study came from a survey of a small sample of consumers. We collected information on a number of demographic variables and credit usage experience, measured credibility and presented participants with a hypothetical purchase scenario to measure willingness to use credit to finance current consumption.

**Participants and Procedure.** Sixty-seven visitors to a popular science museum served as survey respondents. After an initial screening, we only requested those visitors who told us they had had at least one credit card to participate. Participants were compensated with a token gift for answering a one-page survey. One part of the survey asked subjects their age and gender, and about their experience with consumer credit. First, they were asked for the number of credit cards they had (NUM) and the number of years they had been using credit cards (YRS). Next, they were asked to indicate on a nine-point scale their usage of credit cards in making payments (USE: 1 = Never use, 9 = Use most of the time) and their self-rated expertise in consumer credit (EXP: 1 = Novice, 9 = Expert). A second part of the survey asked participants to agree with two statements (identical to the ones used in Study 2) to measure credibility of the limit. Responses to these statements will be referred to as CRED1 and CRED2. All responses were on nine-point scales (1 = Strongly Disagree, 9 = Strongly Agree). Finally, participants were asked to imagine the following scenario with certainty:

You are 30 years old, have just finished paying off your college loans and hence have a total of \$3,000 in your bank account. Your present monthly salary is \$5,000. You also have a credit card with a limit of \$ [CLIMIT]. The tax rate is 24%, interest

**Table 2 Regression Results: Study 4**

Predictor Variable	Model I, DV = CRED Adjusted R <sup>2</sup> = 0.59 Model F <sub>5,61</sub> = 19.31, p < 0.001			Model II, DV = PS Adjusted R <sup>2</sup> = 0.88 Model F <sub>5,61</sub> = 176.9, p < 0.001		
	β	t-stat	p	β	t-stat	p
INTERCEPT	0.0000	0.00	NS	0.0166	0.25	NS
AGE	Age	-0.0941	-3.61	0.001		
YRS	Years using credit	0.0525	1.63	NS		
EXP	Self-rated expertise	-0.1864	-4.81	0.001		
NUM	Number of credit cards	-0.2517	-4.03	0.001		
USE	Extent of usage	-0.0138	-0.27	NS		
μ <sub>CRED</sub>	Predicted credibility of the limit			0.8405	12.43	0.001
CLIMIT	Cred limit			0.0009	20.14	0.001
μ <sub>CRED</sub> × CLIMIT				0.0001	2.92	0.005

Note: All variables are mean deviated (zero centered). Figures in boldface type indicate significant coefficients.

rate is 5% and your salary will grow each year by \$100/month till your retirement at age 65. You will die at the age of 75 years. Your monthly living expenses (including housing, food, and other necessities) are \$2,500, you have a car loan to repay (\$480/month for the next two years). Further, you also spend about \$900 each month on other expenses (e.g., eating out, theater tickets, cabs).

Recently, you came across two pieces of antique furniture that you think you would really like to own. The pieces are expensive—but the store was running a sale during which they would cost \$1,200 instead of the regular price of \$1,700. The store accepts credit cards, so you can easily charge the purchase and pay later if you like. You know that you don't really need the furniture; however it is beautiful and would be a nice luxury to have at home.

Respondents were randomly assigned to one of five different credit limits (CLIMIT): \$1,500, \$2,500, \$3,500, \$4,500, or \$5,500. After reading the scenario, they were asked, "keeping in mind your financial status, will you purchase the antique furniture?" (1 = Definitely No, 9 = Definitely Yes). The response to this question measures the propensity to spend (PS).

**Analysis.** Before reporting any analysis, we provide some summary descriptions of our data. The mean age of our respondents was 33.90 (range: 19–56), the average respondent had used credit cards for 11.98 years and carried an average of 3.52 credit cards. We had two objectives for the data analysis. First, we wanted to test H2 and show that credibility reduced as the age and experience with credit in-

creased. Second, we wanted to replicate results from the previous two studies showing that credit limits will influence spending decisions positively but only when credibility is high.

The correlation between the two measures of credibility (CRED1 and CRED2) was high ( $r = +0.79$ ), and hence we used their mean (CRED) as the measure of credibility of the limit. In order to prevent any spurious correlations<sup>4</sup> and to facilitate meaningful interpretation of the coefficients (especially the interaction terms), all the variables were zero centered (or mean deviated, by subtracting the mean from each observation; Irwin and McClelland 2001). All variables referred to subsequently are zero centered. The coefficients can now be interpreted in terms of the effect of a unit change in the independent variable from average on the dependent variable. To test H2, we estimated the following regression model using OLS:

$$\text{CRED} = \beta_0 + \beta_1(\text{AGE}) + \beta_2(\text{YRS}) + \beta_3(\text{EXP}) + \beta_4(\text{NUM}) + \beta_5(\text{USE}). \quad (1)$$

The regression results are reported in the left panel of Table 2. As the table shows, there were significant negative coefficients of AGE, EXP, and NUM, suggesting that consumers' beliefs about credibility de-

<sup>4</sup> We thank an anonymous reviewer for suggesting this analysis for Studies 4 and 5.

creased with age, self-reported experience with consumer credit, and the number of credit cards that they held. This result supports H2, and replicates a finding from Study 2 that older and more experienced consumers have a lower belief about credibility than naïve consumers do.

In order to test whether this reduced credibility resulted in a lower reliance on credit limits, we used a two-stage least square (2SLS) approach. In the first stage, we predicted the values of CRED for each respondent by substituting on the regression coefficients estimated in Table 2 and the actual values of the predictor variables and Equation (1). We refer to the predicted value as  $c$ RED. Next, we estimated the following regression equation using OLS:

$$\begin{aligned} PS = \beta_0 + \beta_1(\text{CLIMIT}) + \beta_2(c\text{RED}) \\ + \beta_3(\text{CLIMIT} * c\text{RED}). \end{aligned} \quad (2)$$

Regression results are reported in the right panel of Table 2. As the results show, the regression replicates the results from the previous two studies—namely, a significant positive coefficient for the *credit limit*  $\times$  *credibility* interaction in both regressions. The positive interaction effect suggests that the effect of credit limit on spending increases as the credibility of the limit increased. This further supports H1.

**Discussion.** In Study 4, we found support for H1 and H2. First, we demonstrated that the effect of credit limit on spending is stronger when the credibility is high by using a consumer survey and using two-step least square regressions (2SLS) to capture the effect of predicted credibility and credit limit on the propensity to spend. Further, we also showed that credibility is high for naïve consumers, but decreases with an increase in age, number of credit cards, and expertise in consumer credit.

Across Studies 1, 2, and 4, we consistently found a credit limit  $\times$  credibility interaction showing that credit limits influence the propensity to spend strongly when the credibility is high, but this effect is attenuated when the credibility is low. In all three studies, however, we used hypothetical spending situations and did not observe real consumer expenses. The purpose of the next study was to overcome

this deficiency by using survey data that gave us self-reported expenditures of a large sample of consumers.

## Study 5

The goal of Study 5 was to replicate the effects of credit limits on spending using behavioral data. The data for this study come from the latest available *Survey of Consumer Finances* (SCF) conducted in 1998 (Kennickell et al. 2000). The SCF is a triennial survey of U.S. families sponsored by the Board of Governors of the Federal Reserve System and is designed to provide detailed information on U.S. families' balance sheets and their use of financial services, as well as on their pensions, labor force participation, and selected demographic characteristics. The survey also collects information on other financial characteristics like home ownership, budgeting and planning, use of consumer credit and savings, and other investment behavior. A full description of the variables measured in the survey is available online (Kennickell 2000). For the purpose of the present study, we focussed on a small subset of all variables that looked at the use of consumer credit.

**Description of the Data.** The 1998 SCF was collected using computer-assisted personal interviews (CAPI) and there was no questionnaire in the usual sense. Most of the data in the survey are intended to represent the financial characteristics of a subset of the household unit that is referred to as the "primary economic unit" (PEU). In brief, the PEU consists of an economically dominant single individual or couple (married or living as partners) in a household and all other individuals in the household who are financially dependent on that individual or couple. The SCF is based on a dual-frame sample design (see Kennickell and Woodburn 1997 for more details). One set of the survey cases ( $n = 2,813$ ) was selected from a standard multistage area-probability design. The second sample ( $n = 1,496$  cases) was designed to disproportionately select families that were likely to be relatively wealthy.

In addition, the technique of multiple imputation



(Kennickell 1998, Montalto and Sung 1996) was used to generate five successive replicates of each record (this was done for imputing missing values, and more importantly for protecting the confidentiality and sensitive information of survey participants). Thus, the number of observations in the full dataset (21,545) is five times the actual number of respondents (4,309). The use of an ordinary regression program to analyze this data would be misleading, as the computer package would typically treat each of the implicates as an independent observation and hence inflate the significance of the results. Hence, we used a technique (and a series of SAS macros) prescribed by Montalto and Sung (1996) and Kennickell (2000) that involves a correction of the standard errors from multiply imputed data.

For the purpose of our analysis, we conducted two separate regressions. First, we considered all households ( $n = 4,295$ ) for which we had complete information on all predictor variables as listed below. Second, we repeated the same analysis for only single-person households ( $n = 911$ ). Presumably the individuals in the latter sample were responsible for paying for their own consumption (rather than the consumption decisions made by other family members) and hence would be a stronger test of our hypothesis.

We used the outstanding credit card balance (CCBAL) as the dependent variable in our analysis as a measure of the propensity to spend. We also used three main predictor variables:

**AGE:** We used age as a surrogate for credibility of the limit. We had no measure for credibility, but our results from the previous studies suggest that credibility decreases with age. Therefore, a significant negative coefficient was predicted for this variable.

**EDUCATE:** This variable measured the years of schooling completed by the respondent. A priori we expected that greater education would result in a lower credibility of the limit and hence we expected a negative coefficient for this second surrogate for credibility.

**CRDLT:** This measured the total credit limit across all credit card accounts.

In addition, we also used the following background

variables in the regression model to control for any variations due to them:

**INTRATE:** This measured the interest rate paid by respondents on their outstanding balances.

**GENDER:** This was a binary variable,  $-1$ : Female,  $+1$ : Male.

**WAGE:** This measured the reported wage of the respondent.

**TINC:** This variable measured total income from all sources.

**Analysis.** As recommended by Montalto and Sung (1996), we used logarithmic transformations of all variables that were measured using dollar values. As in Study 4, all the variables were zero centered (or mean deviated) by subtracting the mean from each observation. For variables with logarithmic transformations, the deviations were taken from the mean of the log values. We estimated the following model:

$$\begin{aligned}
 \text{LNCCBAL} &= \beta_0 + \beta_1(\text{AGE}) + \beta_2(\text{EDUCATE}) + \beta_3(\text{INTRATE}) \\
 &+ \beta_4(\text{GENDER}) + \beta_5(\text{LNWAGE}) + \beta_6(\text{LNTINC}) \\
 &+ \beta_7(\text{LNCRDLT}) + \beta_8(\text{AGE} * \text{LNCRDLT}) \\
 &+ \beta_9(\text{EDUCATE} * \text{LNCRDLT}). \tag{3}
 \end{aligned}$$

The results of the estimation are shown in Table 3. Note that instead of standard OLS coefficient estimates, we obtained an average coefficient point estimate over five implicates (referred to as QBAR in the table). We will continue to refer to these estimates as “coefficients” for the purpose of this discussion because they are essentially a coefficient estimated over the five implicates. As Table 3 shows, we found significant and negative coefficients for AGE and EDUCATE, and a significant and positive coefficient for the credit limit. The coefficient for AGE was negative, suggesting that older than average consumers in general had lower balances. Similarly, the negative coefficient for EDUCATE suggested that consumers who were more educated had lower balances. The coefficient for credit limit (LNCRDLT) was positive and significant—higher credit limits resulted in greater balances. More importantly, the coefficients for our variables of interest—the interactions of *credit limit*

**Table 3 Regression Results: Study 5**

Predictor Variable	DV = LNCCBAL (Log of Credit Card Balance) All Households ( <i>n</i> = 4,295) Model <i>p</i> < 0.001			DV = LNCCBAL (Log of Credit Card Balance) Single Person Households (= 911) Model <i>p</i> < 0.001		
	QBAR	<i>t</i> -stat	<i>p</i>	QBAR	<i>t</i> -stat	<i>p</i>
INTERCEPT	0.008	0.051	NS	-0.854	-2.790	0.005
AGE	-0.055	-15.826	0.000	-0.057	-8.438	0.000
EDUCATE	-0.187	-9.521	0.000	-0.157	-3.935	0.000
INTRATE	0.014	1.317	NS	0.030	1.293	NS
GENDER	0.243	2.005	0.045	0.724	3.579	0.000
LNWAGE	0.062	5.159	0.000	0.068	2.832	0.005
LNTINC	-0.415	-12.680	0.000	-0.211	-3.618	0.000
LNCRDLT	0.337	15.005	0.000	0.271	5.859	0.000
AGE*LNCRDLT	-0.010	-14.682	0.000	-0.009	-7.683	0.000
EDUCATE*LNCRDLT	-0.039	-9.321	0.000	-0.026	-3.260	0.001

Note: All variables are mean deviated (zero centered).

with *age* (AGE\*LNCRDLT) and *credit limit* with *edu-  
cate* (EDUCATE\*LNCRDLT) were significant and  
negative. This meant that for older consumers, the ef-  
fect of credit limit on spending was weaker than for  
younger consumers. Similarly, for more educated  
consumers, the effect of credit limit on spending was  
weaker than for less educated consumers. These re-  
sults held for the entire sample as well as for single-  
person households. We ran an additional set of re-  
gression models in which we included several  
measures of attitude towards credit as predictor var-  
iables, and the interaction effect remained robust  
across these runs.

**Discussion.** Using the SCF dataset, we were able  
to test H1 using actual spending and credit card in-  
formation from real consumers instead of testing  
their responses in hypothetical experimental settings.  
As with any other real dataset, we acknowledge that  
the effects we obtained here might not be “clean” and  
may be open to other explanations. Additionally, the  
predictor variables were obviously not orthogonal  
and there may have been some variation across re-  
spondents in how they interpreted the survey ques-  
tions. Nevertheless, we do find strong, robust, and  
highly significant credit limit × age and credit limit  
× education interactions across several regression  
runs. Given that the purpose of the present study was

not to serve as an independent test of the hypothesis,  
but rather to achieve triangulation in conjunction  
with three additional studies, we were satisfied that  
this purpose had been achieved.

## General Discussion and Conclusions

How do consumers decide to use credit and what  
effect does the credit limit have on their propensity  
to spend? The life-cycle hypothesis suggests that con-  
sumers should reallocate their income over time to  
match their income stream with their desired con-  
sumption stream. Consumer credit facilitates this in-  
tertemporal reallocation by providing a pool of mon-  
ey from which a consumer can borrow in the present  
and can repay in the future. However, the cognitive  
demands associated with following the life-cycle hy-  
pothesis are high and beyond the scope of most con-  
sumers.

In the present research, we argued that consumers  
use the size of the credit limit available to them as a  
signal of their future earnings potential, and hence  
the available credit limit would positively impact the  
propensity to spend. However, we also introduced  
the notion of credibility of the limit and argued that  
consumers have beliefs about the credibility of the  
process used to determine the credit limit. If this

credibility is high (for naïve consumers), the effects of credit limit on spending will be strong, however if the credibility is low (for older, more experienced consumers) the effects of credit limit will be attenuated. We tested these predictions in five separate studies across which we achieved triangulation by using a variety of approaches (experiments, surveys, and a combination of the two), subjects (undergraduate students and older subjects), nature of predictor variables (manipulated and measured), and dependent measures (purchase likelihood, credit card balance, new charges). We found support for our hypotheses across all five studies.

### **Theoretical Implications**

The present paper adds to a growing body of literature in marketing and behavioral decision theory that goes beyond the traditional domains of inquiry (e.g., product choice and effects of marketing mix variables) and focuses on consumer decisions relating to the appropriate use of income to finance consumption (cf. O'Curry 2000, Prelec and Loewenstein 1998, Thaler 1999). Given that purchasing is typically contingent on the availability of funds, this line of inquiry is clearly important in developing a more comprehensive understanding of consumer decision making.

Two discussion points are in order here. First, we would like to point out a major difference between our approach and prior work in consumer decision making. Prior work typically shows that consumers deviate from rational behavior in systematic ways and has developed models explaining this deviation. On the contrary, the present research argues that consumers are actually trying to be rational, but that their rationality is constrained by the quality of their inferences and by the cognitive complexity of the life-cycle hypothesis calculations.

Second, we note that our results might at first blush seem inconsistent with prior research showing that the propensity to consume out of future income is low (cf. Shefrin and Thaler 1988). In our case, we showed that consumers are willing to spend out of available credit, but only when the credibility is high. When the credibility is low, our results are consistent

with prior research. The credibility about the process used to determine the credit limit seems to have an effect similar to the effect of willpower and self-control on spending decisions. Hence, we see our results as qualifying prior research that shows that the propensity to spend out of future income is low (Shefrin and Thaler 1988) and that consumers are generally debt averse (Prelec and Loewenstein 1998).

### **Practical and Policy Implications**

Growing credit card debt, especially due to the influence of escalating credit limits (Andelman 1998, *Monthly Review* 2000) has heightened the need to address consumer education and credit card regulation issues. Recent reports suggest that the savings rate in the United States is negative (Cable News Network 2000) and that consumers are "increasingly living beyond their means in order to make ends meet, or in some cases in a desperate attempt to inch up their living standards" (*Monthly Review* 2000, p. 3). We have shown that naive consumers naturally infer a high level of credibility, and hence such consumers might be susceptible to treat credit as "an alternate form of income" (Norton 1993, p. 20). By the time these consumers have gained experience and have started discounting the relevance of the credit limit in their spending decisions, they may have already piled up considerable debts. What regulations should be imposed to solve such problems, and how can the consumer help herself from needlessly relying on the provided credit limit as a signal of their future earning potential?

Ideally, credit limits should reflect future earning potential and should therefore be calculated using a set of appropriate indices that allow banks to estimate future earnings potential. However, an interview with the chief financial officer of a bank revealed that not only did banks typically not use elaborate methods to set credit limits, but that banks differed in the rules they used. Our research points to a need for a common set of guidelines that would result in credit limits that more accurately reflect the future earnings potential of the consumer. Our research also highlights the necessity of policy measures to control the seemingly indiscriminate increases in credit limits. Finally,

our research calls for policy requiring banks and other lending institutions to inform consumers about the procedures used to determine (or increase) their credit limits. The practice of telling consumers that they “deserve” increases in their credit limits are not only noninformative but might also mislead consumers into believing that their projected future net worth has actually increased.

Consumers who want to control their spending out of future wealth typically do so by using rules (Shefrin and Thaler 1988) like the matching rule. However, even the most prudent consumer who might use credit cards only for purchasing long-lived products or just for convenience may occasionally get tempted and spend out of their credit limits. Our research suggests that educating naïve consumers about the validity of their credit limit and the process used to set it should help them realize that the available credit should not be integrated with spending money.

### **Limitations and Future Research**

While we believe that our research has taken a first step towards understanding intertemporal allocations of income, it was not without limitations and a number of related questions remain unexplored. First, we conducted our experiments in the domain of credit cards. In the real world, however, there are a number of other forms of consumer credit (overdraft loans, layaways, installment payment schemes, etc.). Will the results obtained for credit cards hold across all forms of debt? At present, we can only speculate on two possibilities. One could argue that the effects of credit limits would be stronger for credit cards since cards can be used to purchase a number of different items while other forms of credit are typically constrained towards a single item. Consequently, the physical format of a credit card loan facilitates the setting up of a “general expenditure” spending account from which the consumer can draw. Conversely, one could also argue that the credibility associated with credit cards is lower than that associated with other loans, and hence consumers might be more reluctant to use them. The effect of the form of the consumer credit instrument is an interesting avenue for future research to explore.

Second, we identified age, experience, and number of credit cards as determinants of credibility of the limit. However, there are several other factors that could serve as inputs into the formation of beliefs about credibility. One important environmental factor is the nature of the consumer’s experience with credit. In an environment in which marketers use credit limits as a tactical tool, we would expect increasing experience to result in decreasing credibility. However, in environments where the credit-limit-setting process is well regulated, it is possible that experience may have the opposite effect. Similarly, we might expect cultural differences (arising due to both the familiarity—hence experience—with credit as well as the social acceptability of credit). Future research should examine this possibility in more detail.

Third, our approach in this paper was to develop and test a deterministic decision problem about the intertemporal allocation of income. While this approach is certainly neither new nor unacceptable in research in economics and marketing, thinking about the future is definitely related to a fair degree of uncertainty, and the resulting complexity makes the normative solution even more difficult. In an experimental sense, we actually allowed for a stochastic component in Study 2 where subjects were given their “mean” future income, but were also told that there was error around that mean and one of their tasks was to predict the size of that error. However, future development of a modified model of the life-cycle hypothesis could incorporate a stochastic component.

Fourth, two other explanations could account for the effects of credit limits on spending decisions. Some consumers might be myopic to the extent that they do not even consider the future in making present consumption decisions and instead focus on their ability to make payments in the present. Similarly, some consumers (especially naïve ones) may not have developed their willpower and precommitment strategies and hence might easily fall prey to tempting purchases if present liquidity is available. While these explanations cannot account for all the data presented across our five studies and are orthogonal to our proposed framework, we certainly

acknowledge that these processes may be operating in the real world.

Finally, we studied only one decision relating to intertemporal allocation of incomes—the decision to use future income in the present. However, there are other related decisions that deserve the attention of researchers. Foremost among these is the decision to set aside current income for use in the future (i.e., savings). A declining (and presently negative) savings rate has drawn the attention of researchers and policy makers alike to the psychology of savings (*Monthly Review* 2000). Do consumers view savings as a separate mental account or is it merely treated as the “residue” after all expenses have been paid for? Does the “savings” mental account share the properties of other mental accounts or do special rules apply to it? Future research answering these and other related questions should help develop a more complete understanding of how consumers attempt to manage their lifetime income and consumption streams.

### Acknowledgments

The authors thank Emily Chow, Amanda Snow Conant, Shiphra Habibian, Kareen Kinzli, and Susanna Leung for excellent research assistance. They also thank Donnie Lichtenstein, Gary McClelland, the editor, associate editor, and anonymous reviewers for comments on previous drafts of this manuscript. The research reported in this paper was fully supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, Hong Kong, China (Project No. HKUST6021/00H).

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*This paper was received September 6, 2000, and was with the authors 4 months for 2 revisions; processed by Barbara Kahn.*