

The Trouble with Consumer Credit

Literacy Considerations and Policy Implications

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Research paper prepared for the
Task Force on Financial Literacy



Date of publication: February 9, 2011

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Abstract

While consumer credit has an important role to play in allowing households to manage their consumption patterns over time, it can result in irrational decision making if not managed properly. In particular, this report summarizes research showing that:

- individuals often fall prey to psychological biases that colour their evaluation of various credit options; and
- individuals often lack the computation skills necessary to accurately estimate the effect of debt on their future financial well-being.

In addition to summarizing the available evidence, this report discusses the implications of research when considering financial literacy and public policy. This report also identifies research gaps that could be investigated to improve policy-relevant understanding of borrowing behaviour.

1. Introduction

The late Dalton Camp, a Canadian journalist and politician, once remarked that “having lost its value, money may no longer be the root of all evil, credit having taken its place” (quoted in Banks and Stevens 2005, p. 78). While it cannot be said unequivocally that credit is the root of all evil, it has the potential to cause problems for individuals and for society, particularly when access to it is ubiquitous and trouble-free. Anecdotally, a typical rite of passage for North American post-secondary students is (or was) to receive unsolicited credit card offers in the mail or on campus,¹ and rebuilding home kitchens or undertaking extensive home renovations is a reality for more and more families as they can now open lines of credit with a simple phone call, sometimes without ever needing to show up at the bank. In addition, financial institutions often encourage individuals to apply for credit “even if you don’t need to borrow right now.”² Credit is so ubiquitous that it is nearly impossible to get through the day without coming into contact with credit cards, mortgages, lines of credit, or instalment plans. Credit allows people to finance acquisitions; it plays an important role in the lives of most individuals, and many times it is an afterthought or an incidental thought in the user’s mind. Consumers swipe their credit cards, sign the receipt, and think about how much they paid for their purchases only later that evening or perhaps even later (Soman 2001). This report summarizes the available evidence related to borrowing behaviour, assesses this evidence, and discusses its implications when considering financial literacy and the relative merits of education and proper choice architecture in improving financial outcomes at the individual and societal level.

The trouble with credit is that it calls for individuals to be rational in their decisions when using it. The reality is that people are often subject to cognitive and psychological biases (cf. Thaler and Sunstein 2008), making them go into more debt than they initially bargained

1 This practice has been curbed in the United States recently by the *Credit Card Accountability, Responsibility and Disclosure Act* (CARD Act).

2 See, for example, www.rbcroyalbank.com/products/personalloans/royal_credit_line.html; accessed June 14, 2010.

for. According to the Certified General Accountants Association of Canada (2009), household debt in Canada, which includes mortgages and credit card debt, was at an all-time high of CAD\$1.41 trillion in December 2009, putting our household debt-to-income at a staggering 144 per cent. The situation is similar in the United States, where household debt was USD\$13.5 trillion in 2009 (U.S. Federal Reserve 2010), with the debt-to-income at 122 per cent (Whitehouse 2010). This is troubling, considering that the seven-year job growth rate ending in 2009 was the weakest since the Great Depression and that the GDP was just slightly higher at USD\$14.1 trillion in the year before (World Bank 2010). Spending allows us to acquire goods and services, and our desire for more of them makes us rely on credit to make those acquisitions possible (Duesenberry 1949; Richins and Rudmin 1994). Indeed, there are times when credit or even debt is necessary (e.g., for education and emergencies), but when individuals dip into their credit accounts to finance luxuries such as a 50-inch HDTV or a sports car and are then unable to pay back those loans, access to credit becomes dangerous and debt can quickly accumulate.

Credit often has devastating consequences for individuals financially, psychologically, socially, and even morally. Financially, debt is the leading cause of personal bankruptcies (White 2007). Psychologically, individuals who are in debt report low levels of happiness and well-being (Brown, Taylor, and Price 2005). Socially, being a debtor is associated with the stigma of being reckless, overindulgent, and irresponsible (Livingstone and Lunt 1992). It is timelier than ever to understand its origins and offer solutions for improving the financial welfare of individuals and society.

What contributes to rising consumer debt? One of the answers lies in knowing how people use credit and understanding many individuals' lack of financial literacy. In his book *Subprime Mortgages: America's Latest Boom and Bust* (2007), Edward Gramlich, a former professor of economics at the University of Michigan and a former member of the U.S. Board of Governors of the Federal Reserve System, noted a connection between low levels of financial literacy and the recent American mortgage crisis. As *The Economist* noted, "take the greed and the financial misrepresentation out of it, and the root of this [mortgage]

crisis is massive levels of financial illiteracy” (Bryant 2008). Empirically, Lusardi and Mitchell (2006, 2007) found that less than one fifth of participants in a study were able to correctly calculate the amount of money they would have in a savings account that had an interest rate of 2 per cent per year after five years. An equally astonishing finding is that only half of those participants correctly divided a \$2 million lottery equally among five winners. These concerns about financial illiteracy and its consequences have sparked government efforts to improve financial education. In Canada, the Honourable Jim Flaherty, Minister of Finance, established the Task Force on Financial Literacy; in the United States former President George W. Bush created the President’s Advisory Council on Financial Literacy. Both of these organizations have the objective of promoting literacy by proposing or implementing national strategies for lowering levels of consumer debt. President Barack Obama even proclaimed April 2010 as National Financial Literacy Month.

This report is divided into several sections. First, the literature on the role of credit in household economics is reviewed. Second, the psychological influences that govern borrowing behaviour and possibly lead to the abuse of credit are discussed, and a framework to organize these biases is presented. Third, research that documents computation errors made when individuals interpret and compute the burden of various forms of available credit is reviewed. In the course of the review, recommendations on how these errors can be overcome are presented. It is hoped that a behavioural approach will offer an understanding of the causes of and solutions to low levels of financial literacy beyond existing approaches.

Throughout this report, several behavioural biases that lead to individuals misunderstanding or miscalculating financial matters will be discussed. Standard models from economics assume that individuals are rational beings, but empirical evidence shows that individuals are susceptible to various influences. They are not necessarily able to cognitively make the often complex calculations that are needed to maximize these calculations’ utility. Individuals also fall prey to influences that occur at the point-of-usage of credit products; they make decisions that emphasize short-term goals rather than long-

term ones, and they often make systematic mistakes in basic computation and numeracy skills that affect their financial decisions.

Appendix A provides an annotated bibliography of key articles reviewed in this report. The literature reviewed can be categorized along two dimensions. First, research investigates the effects of consumer credit at the usage occasion and the effects of the continued historical use of credit. As an illustration, Feinberg (1986) finds that the mere presence of credit card stimuli at the point of purchase increases the likelihood and amount of spending. This is an effect that arises due to the features of the usage occasion. On the other hand, Soman (2001) shows that individuals who routinely use credit cards have poor memory of their past expenses, underestimate these expenses, and consequently overspend believing they have more liquidity at their disposal than they do. This is an example of an effect arising from the continued historical use of credit. The second dimension along which the literature can be classified is the dominant theoretical paradigm. Research articles that follow the economic approach are largely normative in nature and capture what individuals should be doing. Those that follow the psychological approach are descriptive and outline what people actually do and, in particular, reveal biases that can hinder effective decision making. Articles that follow the computation approach show that while people might have the right approach to decision making, they often lack the cognitive apparatus to compute the consequences of using credit. Appendix B provides an organizing framework of these two dimensions and gives examples of research articles that follow each approach.

The next section discusses recent approaches to financial literacy from the perspective of public policy.

2. Financial Literacy and Public Policy

The Task Force on Financial Literacy defines “financial literacy” along four dimensions. First, individuals must possess *knowledge* relating to personal financial matters, including an understanding of basic financial principles. Second, they must have the *skills* necessary

to apply that knowledge in everyday life so that they have a basic technical understanding of the financial concepts they face daily. Third, they must be *confident* in applying their knowledge and skills, meaning that they must feel self-assured about the financial decisions they make. Finally, they must use and apply their knowledge, skills, and confidence *responsibly* so they make the best financial decisions for themselves and their families. The Task Force on Financial Literacy summarizes financial literacy as people having the ability to “draw on their existing knowledge in a particular situation and apply it in such a way that is appropriate to their circumstances.”³

A recent Canadian Financial Capability Survey (Statistics Canada 2009), however, revealed that many Canadians fail on the first three factors:

- about one third of participants did not know what happens to their buying power when the inflation rate is higher than the interest they earn on an investment (knowledge);
- nearly one quarter did not track their finances or plan ahead for retirement (skills); and
- more than one third admitted they are struggling with keeping up with their budgeting decisions (confidence).

Another survey (Mackenzie Investments 2008) revealed that many Canadians also fail on the last factor (responsibility). More than 50 per cent of participants reported that they spent their disposable income without thinking about their financial future. Moreover, as found in a similar Credit Canada (2007) survey:

- 80 per cent of Canadians do not know their credit score;
- 61 per cent do not have a financial advisor (7 per cent believe that that carrying debt is a “bad” thing but 92 per cent do so anyway); and
- more than a quarter of Canadians do not consider the consequences of a rising interest rate when borrowing money.

3 See www.financialliteracyincanada.com/eng/about-financial-literacy/definition.php, accessed June 14, 2010.

It seems that financial education is more important and timelier than ever. Financial education programs in Canada and the United States typically aim to teach individuals how to balance cheque books, save for a child's education, plan for retirement, and steer clear of deceptive practices by the banking industry and credit issuers.⁴ There is evidence, however, that even after participating in such courses, individuals still fail to save adequately or continue to spend irresponsibly (Choi, Laibson, Madrian, and Metrick 2004; Clark and D'Ambrosio 2002; Madrian and Shea 2001). Financial education programs should go beyond knowledge, skills, confidence, and acting responsibly; there needs to be a set of behavioural interventions to guide individuals in the appropriate decisions regarding personal finances (Thaler and Sunstein 2008). Financial education should teach the theory behind literacy, educating individuals about the behavioural factors behind their use and abuse of credit. Individuals should learn about the strategies that can help them control the temptation to use credit and to use it wisely. Indeed, many individuals know that they should not spend so much on frivolous goods, but they do so anyway.

Recent attempts in public policy have aimed to address low levels of financial literacy by protecting individuals who are especially susceptible to deceptive practices by credit issuers. These individuals likely come from lower socio-economic backgrounds and are likely have low levels of educational attainment and thus lack access to the community resources that help build better lives socially and economically. For instance, Lusardi and Mitchell (2007) found that low levels of financial literacy were especially severe among Blacks, Hispanics, and women—pockets of the population that are typically low in socio-economic status or educational attainment. Such individuals are not likely to have acquired the necessary educational attainment and cognitive abilities required for financial literacy (Lusardi and Mitchell 2007; Lusardi 2008). However, at the same time, Livingstone and Lunt (1992) controlled for age and found that socio-economic status plays a relatively minor role in the accumulation of debt. Even at the post-secondary educational level, where often-selective admission requires applicants to have a certain number of years in school

4 See, for example, www.hesc.com/content.nsf/CA/2/FACTS_Module_1_Smart_Start, accessed June 14, 2010.

and a track record of success, college students still repeatedly receive low scores on financial literacy tests—although business students, men, and individuals who have higher grade point averages tend to do better than their peers (Chen and Volpe 1998). There are similar findings that students who have business-related backgrounds tend to do better than students in other areas. These findings suggest only that a lack of targeted financial training and not a mere lack of education is likely a contributor to the low levels of financial literacy and rising debt (Avard et al. 2005; Rosacker, Ragothaman, and Gillispie 2009).

A recent attempt from a policy perspective to help people manage credit card debt better was the development of new regulations to limit business practices that are not beneficial to consumers and to provide clear and timely information to Canadians about credit cards (Department of Finance Canada 2009). The equivalent attempt in the United States to manage the rising rates of credit card debt is the *Credit Card Accountability, Responsibility and Disclosure Reform Act of 2009* (CARD Act: U.S. Congress, 2009a, 2009b), signed by President Barack Obama in May 2009. The aim of the act was “to protect consumers, and especially young consumers, from skyrocketing credit card debt, unfair credit card practices, and deceptive credit card offers” (U.S. Congress, 2009a, p. 1). This legislation aims to protect credit card holders and features a few protections of note. First, there are protections against arbitrary credit card rate changes and due-date gimmicks without giving cardholders advance notice. Second, individuals can keep better track of their personal finances by requiring credit card issuers to have a cardholder’s express consent, or at least give advance notice, for changes in credit limits or interest rates. These policy reforms indirectly address financial literacy. Many individuals are often unaware of what “fixed rates” and “prime rates” mean, and the CARD Act requires credit card issuers to use simple and understandable terms. Similar protections against arbitrary rate changes protect individuals who tend to be unaware of interest rates when they sign up for a credit card or who are unable to calculate how much they owe on their balance (Lusardi and Mitchell 2006, 2007). Unfortunately, by protecting individuals without teaching them the relevant skills, these policies may signal to them only that such skills are unnecessary.

Financial education programs aimed at teaching individuals proper decision-making strategies related to personal financial matters can reduce abuse of credit and the possibility of going into debt. The following section on the behavioural intentions of using credit takes the discussion as a backdrop for understanding how financial education programs should employ and teach the behavioural interventions to improve the financial welfare of individuals and society.

3. The Economics of Consumer Credit

According to classical economics, individuals want a high standard of living while maintaining a smooth level of consumption over their lifetime. There is often a disparity between the liquidity that people have and what they want, causing them to prefer allocating their income smoothly over their lifetime. This is the proposition of the life-cycle hypothesis (LCH) of consumption (Ando and Modigliani 1963; Modigliani and Brumberg 1954). Individuals can smooth out their lifetime consumption in two ways. First, they can store their past income and use it in the future. This is common in the form of savings and investments that allow individuals access to a pool of funds after retirement. Second, individuals can use their predicted future income in the present. This is more difficult than the first alternative, since it is physically impossible to take possession of yet-to-exist future income without external intervention. Consumer credit products such as mortgages, credit cards, lines of credit, and instalment plans act as those interventions by offering access to a pool of funds that individuals can use in the present. The catch is, of course, that they must repay the funds later with interest. But the ability to borrow future money that comes from credit allows us to smooth out consumption over our lifetime, in accordance with the LCH.

The ability to transfer funds inter-temporally is the hallmark of the LCH, in contrast to alternative models based on Keynesian economics in which saving depends solely on current income. Since the LCH assumes that individuals will earn more income as they progress through their working years and experience a decline in income at retirement, they will thus borrow when they are young, save during middle age, and spend less during

retirement. In other words, the LCH mathematically models spending, savings, and borrowing behaviours not as a linear function of current resources but as a discounted value of future ones.

However, numerous findings suggest that individuals do not typically follow the LCH model in terms of their spending, saving, and borrowing behaviours, especially regarding the largest credit product over most people's lifetimes—mortgages. Although sound financial planning sets out that mortgages be paid off before retirement so that money can be used for personal expenses during the golden years, this is often not the case. An Ipsos Reid (2010) poll on Canadian housing trends revealed that 22 per cent of participants aged 50 or older were holding a mortgage on their primary home, despite the fact that 35 per cent of those same participants were worried about the effect of inflation on their retirement income. Similarly, Wolff (1981) found that mortgage debt, but not other forms of household debt, tended to follow age closely. These findings have prompted Courant, Gramlich, and Laitner (1984, p. 279) to remark that “for all its elegance and rationality, the life-cycle model has not tested out very well.” In fact, research suggests that while consumers seem to possess intuition that is consistent with the LCH, they do not have the necessary cognitive and self-control apparatus that allows them to make hypothesis-consistent decisions on whether and how much to borrow (Soman and Cheema 2002).

4. The Psychology of Consumer Credit

The problem is not that the LCH is flawed but that it assumes a degree of rationality and cognitive sophistication that most individuals do not possess (cf. Akerlof and Shiller 2009; Thaler and Sunstein 2008). For individuals to demonstrate full rationality, they must have complex cognitive-processing abilities. Can they correctly value their present and predicted future resources and interest rates, perform complicated net present value calculations to compute their lifetime income, *and* apportion its appropriate interest-adjusted value throughout their lifetime? These calculations are extensive, and thus unlikely to occur, given the difficulty that some individuals have in making even simple calculations such as dividing up a \$2 million lottery equally among five winners (Johnson, Kotlikoff, and

Samuelson 1987; Kotlikoff, Samuelson, and Johnson 1988; Lusardi and Mitchell 2007; Shefrin and Thaler 1988). This section discusses the psychological factors that affect how individuals use and abuse credit. The subsequent section discusses computational factors underlying how individuals become trapped by common numeracy fallacies that prevent them from making optimal decisions when managing their personal financial matters.

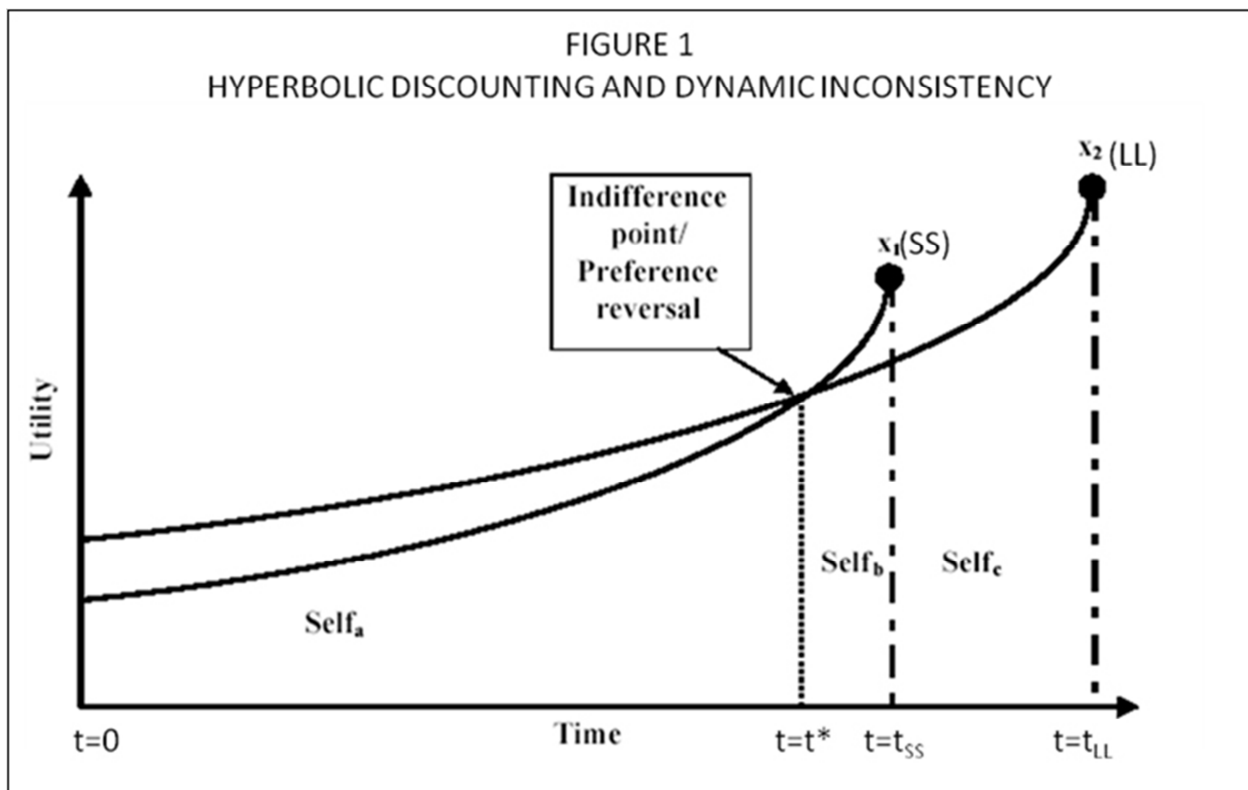
Hyperbolic Discounting

Credit products allow individuals to access a pool of funds against future income to use in the present. At the heart of the psychology of consumer credit thus lies the question of how individuals perceive the future. Of course, future events are far off, and individuals can perceive them as less likely to occur or less important. Classical economics approaches assume that individuals discount the future by a fixed percentage for each unit of time they must wait. For instance, if the discount rate is 10 per cent per year, an individual should equally like to have \$100 today and \$110 a year from today. The preference should similarly be consistent across time; he or she should equally like to have \$100 a year from today and \$110 two years from today. This view, called *exponential discounting*, proposes that individuals discount the future depending on the time they must wait in order for those events to occur and that the discount rate is constant (cf. Samuelson 1937).

However, evidence shows that individuals do not use exponential discounting but rather *hyperbolic discounting*, which proposes that a time-dependent discount factor changes as time increases. Hyperbolic discounting provides the answer to the following puzzles:

- A rational individual who is watching his or her diet knows that he or she should choose a healthy fruit plate, but the individual may opt for a chocolate cheesecake anyway (Soman et al. 2005).
- A significant number of households know that they need to save more money, but they are unable to do so (Thaler and Benartzi 2001).
- When asked to choose between \$10 now versus \$12 tomorrow, many people choose to receive \$10 today. However, if the choice is between \$10 in a year and \$12 in 366 days, almost everyone prefers the \$12 (Soman et al. 2005).

These are examples of what is known as dynamic inconsistency—a switch in preferences over time. Figure 1 shows an example of hyperbolic discounting for a situation in which a consumer chooses between two options: SS (a smaller, sooner option) and LL (a larger, later option). The fundamental property of hyperbolic discounting is the fact that discount rates are not constant but increase rapidly as the event in question becomes temporally proximal. As Figure 1 shows, both the SS and LL events occur in the future, but the individual views them from the present ($t = 0$). The discounting lines arising from these two options show the discounted value (or utility) at any given point in time. When the individual is at $t = 0$, it is easy to see that the discounted value of LL is greater than the discounted value of SS. In other words, when both events are in the future, the individual opts for the LL reward. However, as time passes and is now at t^* , a reversal occurs. As the figure shows, in the close proximity of SS, its discounted value starts to appear larger than LL, and hence the individual is tempted to choose SS. Researchers in this area refer to the time period between t^* and t_{SS} as the lapse zone, a zone in which the most prudent individual could stray from his or her best laid plans.



Hyperbolic discounting can explain why individuals rack up credit card debts at high interest rates. Harris and Laibson (2002) found that the rewards provided by buying something today with credit tend to outweigh the discounted displeasure of future bill statements and repayment of loans. Indeed, why not enjoy the 50-inch HDTV today when one doesn't have to worry about paying it back next month? This thinking, however, leads individuals to accrue debt on credit cards in order to finance acquisitions. This is similar to Herrnstein's (1961) "matching law," which proposes that individuals tend to prefer rewards that occur sooner than later.

Although individuals tend to not save enough, their *choice* of savings product and the liquidity that comes with it have consequences for their ability to repay debt. When individuals think about saving for retirement in the future (vs. borrowing against the future), they tend to use a smaller discount rate for delayed rewards. This makes it more attractive to invest in investment products that have a higher expected return only in the long run. Thus, in investing behaviours, individuals also exhibit impulsivity in the short term but patience in the long term. Consequently, because individuals have high levels of credit card debt but low levels of liquid assets, they are unable to smooth out their consumption over their lifetime as predicted by the LCH. Exponential discounting, meanwhile, cannot easily explain these behaviours in borrowing and saving using a single and constant discount rate.

There are similar explanations for mortgage debts. Sound economic advice suggests a 20-per-cent down payment on mortgages, implying a loan-to-value (LTV) ratio of 80 per cent. This advice is typically followed in Canada. In the United States, however, down payments can be as low as 5 per cent, with a LTV of 95 per cent. Schedules of mortgage payments typically follow a deferred-cost characteristic. There is often a low interest rate in the U.S. for an introductory period of approximately two years, followed by a high interest rate throughout the remaining term of the loan. In Canada, the situation is not as problematic—down payments tend to be higher and, although there are low introductory

rates for other loan products (in particular, credit cards), they are not a big issue for mortgages.

Short-term low interest and long-term high interest is especially popular for interest-only loans that have various payment options and adjustable-rate mortgages, which allows for zero or even negative amortization during the introductory low-interest rates. These types of mortgages are problematic for individuals who steeply discount future events. They think they will have more funds available in the future, or they focus on short-term rewards at the expense of long-term costs. They thus underestimate the total cost of a deferred-cost mortgage and enter into contracts that lock them into a high interest rate that they are unable to pay. Such underestimation of costs leads to increased demand for such credit products, but the consequences are grave—as exemplified by the sub-prime mortgage crisis that led to numerous personal foreclosures and bankruptcies.

Hyperbolic discounting is also captured by the psychological phenomenon known as *resource slack*, which suggests that individuals continue to think they will have enough time and money in the future, when in fact they don't once they reach that future (Lynch and Zauberman 2006; Zauberman and Lynch 2005). This false belief in plentiful resources in the future, however, repeats itself and explains the typical pattern of borrowing using credit. Individuals believe that they will have enough money in the future and thus opt to pay with credit that allows them to repay the loans in the future. But when it is time to pay for the goods bought on credit, the lack of funds at that moment causes individuals to dip into credit a second time, going into debt. Zauberman and Lynch (2005) refer to this as the “Yes...Damn!” effect. For instance, Agarwal, Skiba, and Tobacman (2009) found that individuals often take out a short-term payday loan, are unable to repay, and then take out repeated loans to cover the previous debt. The cycle is vicious: individuals do not learn from their mistakes, and they continue to perceive the future as more abundant than the present, generating an accumulation of debt.

Self-Control and Curbing Temptations

Hyperbolic discounting proposes that people have a recurring urge for immediate consumption (Ainslie and Haslam 1992b; Herrnstein 1961; Kirby 1997). There is an internal struggle that individuals need to overcome in order to adhere to the strict pattern that characterizes the LCH. Many individuals, however, cannot overcome this struggle. Thaler and Shefrin (1981) describe human beings as both a “farsighted planner and a myopic doer” (p. 392). The planner looks at the long run, but the doer wants immediate gratification and seizes control when he or she faces a tempting opportunity, thus pushing preferences from the “shoulds” or “needs” to the “wants.” Note that the “should” options typically involve needs—consumption opportunities that are normatively evoked. On the other hand, the “wants” are typically indulgences—consumption that is nice to have but not essential. This internal struggle also characterizes the problem of self-control. For instance, a dieter’s desire for a rich piece of chocolate cake requires an inhibiting goal in order to maintain his or her diet. Similarly, a shopper wanting to splurge on a 50-inch HDTV must find a way to restrain the impulse. Overspending is a failure in self-control, leading to reliance on credit to finance such behaviour.

The easy means of paying with credit only exacerbates the inability to maintain self-control. First, the decision point at which individuals withdraw money or write a cheque often makes them think twice about what they are doing—they must actually confirm the transaction or sign the cheque. However, with credit cards, the decision point fades into insignificance. An individual can quickly swipe his or her Visa card and complete the transaction without thinking about what he or she is doing. Second, there is no “pain of paying” with credit cards (Prelec and Loewenstein 1998; Zellermayer 1996). Paying by cash is painful because individuals have to physically take out cash and give it to the cashier, which is essentially giving away money that the individual has earned. Paying by credit card, however, involves a very different psychological feeling since no actual money exchanges hands. Indeed, some regions such as London and Hong Kong have further removed the pain of paying with plastic by using smart cards that allow individuals to buy

anything from transit passes and restaurant meals simply by tapping a card on a machine (Soman and Lam 2002).

Third, payment by credit card results in a disassociation between consumption and payment, known as *transaction decoupling* so that costs (payment) and benefits (consumption) become “decoupled” from each other. Payment methods that are low in salience such as used with credit cards can facilitate this separation, effectively anaesthetizing individuals from being exposed to the psychological pain of paying (Soman 2003). Unlike cash payments where the payment is made at the time of purchase, with credit card payments, individuals don’t have to pay until a month later, when the bill comes by mail or email. The time lag between receiving the benefit and having to pay for it decouples the cost from the benefit; thus, individuals feel no pain from paying. Although the Internet allows individuals to check their accounts online, the actual bill arriving in the mail is often most psychologically prominent. These factors only make it harder for individuals to maintain self-control and easier for them to spend using credit cards.

In view of this, individuals must impose rules on themselves to curb their spending (Baumeister, Heatherton, and Tice 1994; Hoch and Loewenstein 1991). For instance, they can periodically check their credit balances online or set or lower credit limits when first signing up for credit products (Soman and Cheema 2002). Fortunately, a psychological phenomenon known as *mental accounting* can help curb the temptation to dip into credit accounts. According to mental accounting (Heath and Soll 1996; Shefrin and Thaler 1988; Thaler 1985; Thaler 1999), individuals group sets of “budgets” together, such as one for home renovations, another for entertainment expenses, and even ones for grocery items and dining out. The critical divergence between standard economics and mental accounting is that although the former proposes that funds are perfectly fungible, and hence such different mental accounts are inconsequential, the latter proposes that funds are non-fungible, and hence the funds and how individuals use them do indeed matter. Accordingly, the use of mental accounts can make the trade-offs between competing funds and their uses easier and, more important, act as a self-control device. As an accountant categorizes

particular funds for his or her business and prevents overspending, individuals use mental accounts to direct their own spending just as well. This non-fungibility hypothesis can further curb overspending, which relates to the temptation to access credit to facilitate acquisitions. When an individual uses nearly all the funds in a particular mental account, this can control his or her tendency to spend using funds from another account, redirecting the individual to unspent funds in other accounts.

A different stream of research shows that although access to credit cards often makes individuals overspend on certain goods (Prelec and Simester 2001), individuals can be averse to accruing debt (*debt aversion*, Prelec and Loewenstein 1998), making them curb their overspending, at least for some kinds of goods. A field experiment by Wertenbroch, Soman, and Nunes (2006) showed that individuals who scored high on impulsivity preferred to pay with cash instead of credit cards for certain luxuries. They did so to keep themselves from overspending on credit cards for such tempting items; however, the same individuals were not likely to overspend on utilitarian necessities. Similarly, a subsequent study found that staff members at a university were more likely to pay with cash for luxuries but with credit cards for utilitarian necessities. The authors explained their finding in both studies by proposing that individuals can curb their impulses for the hedonic nature of luxury goods by using a payment or psychological mechanism that can limit the amount they spend, thereby ensuring they have sufficient funds to afford their purchases. The immediate implication of this is that individuals should pay with cash for hedonic goods, but the findings also support the idea of mental accounting, i.e., that individuals should create separate budgets for particular kinds of purchases in order to help manage their spending.

These findings reveal the need for individuals to understand the mechanisms by which credit pays for purchases. Self-control and mental accounting demonstrate that smooth transactions can facilitate spending, facilitating the willingness to spend and exacerbating an individual's lack of self-control. Thus, individuals need to understand the determinants of their current liquidity and ability to access pools of funds, which are often constrained.

At the same time, these findings, both in theory and practice, serve as a basis for understanding decision-making principles underlying borrowing behaviour that should be taught in financial education programs.

Mental Accounting and Budgeting Decisions

The theory of mental accounting can also shed light on the decision-making processes relating to instalment plans, a self-disciplining device that people use to curb the immediacy of wants and that allows individuals to avoid getting into too much debt, at least initially. Instalment plans allow individuals to pay a regular and fixed amount of money each month over a specified term. In this way, individuals have a mental monthly amount that they need to repay the creditor, with each monthly payment being similar or equal to each other. The total number of monthly budget accounts needed to repay the loan thus forms the “total” mental accounting of the instalment plan. However, although the total number of monthly amounts does not affect the monthly budgeting process, it does affect the amount of interest accrued. Thus, there are two factors governing how individuals mentally account for instalment plans: one that allocates monthly payments in order to repay the loan without considering interest charges, and another that considers the total duration of the loan and considers interest charges. An individual’s evaluations and choice of instalment plans is thus a compromise between these two competing mental budgets. Whereas short-term loans have lower interest but high monthly payments, long-term loans have higher interest but low monthly payments.

How individuals choose between these two types of mental accounts has consequences for their consideration of the total debt they must repay. If they mentally account for instalment plans using a monthly budgeting process, they are likely to discount the interest charges that will accrue as the duration is extended. However, if they mentally account for interest charges using the total duration of the loan, they will likely consider these accruing charges and not discount those future repayments. Brochures and stores that advertise “buy now, pay later” payment options that are popular today can increase an individual’s tendency to think of a monthly mental budget without considering the future financial

consequences of those payment plans. This falls in line with *prospect theory* (Kahneman and Tversky 1979), which suggests that people are more affected by losses than gains and that individuals would like to avoid or minimize those losses if at all possible.

5. The Computation of Consumer Credit

In order to make sense of credit, individuals must be able to make sense of the information, figures, and numbers provided by banking institutions and credit issuers. They should also know how to interpret and calculate interest rates, monthly payments, and remaining balances that they must pay. In an effort to make such statements clearer to individuals, the new Canadian credit card regulations and the U.S. CARD Act have introduced a number of requirements, including simplified definitions, a minimum size of font to be used on statements, and the presentation of changes to the annual percentage rate in percentage terms. However, clearer information is only part of the solution. Individuals often cannot make the complex calculations needed to fully manage their personal financial matters. For instance, only one fifth of Americans, given the price of a jar of peanut butter and the number of ounces it contains, have the quantitative literacy to calculate the cost per ounce of peanut butter (Kirsch et al. 2002).

To get a better sense of financial literacy levels in the U.S., Lusardi and Mitchell (2007) used data from the Health and Retirement Study (see hrsonline.isr.umich.edu/index.php) of the University of Michigan. Participants were asked the following financial literacy questions:

- **Percentage calculation:** If the chance of getting a disease is 10 per cent, how many people out of 1,000 would be expected to get the disease?
- **Lottery division:** If five people have the winning number in the lottery and the prize is \$2 million, how much will each winner get?

Participants who answered one of these questions correctly were also asked the following:

- **Compound interest:** Let's say you have \$200 in a savings account. The account earns 10-per-cent interest per year. How much would you have in the account at the end of two years?

As a benchmark for participants' knowledge in general, all participants were asked if they knew the name of the current U.S. President and Vice-President (political literacy).

Table 1 provides a summary of the authors' results. Although more than 80 per cent correctly calculated the percentage, only slightly more than half got the lottery division right. Only 18 per cent could correctly compute compound interest; of those who calculated the compound interest incorrectly, 43 per cent made a simple interest calculation, thereby overlooking the interest that accrues on principal and interest (Lusardi and Mitchell). These authors argue that low levels of computational ability could be a significant obstacle to the effectiveness of financial literacy education programs.

**Table 1 Financial Literacy Among Early Baby Boomers
(Number of Respondents =1984)**

Question Type	Correct	Incorrect	Did Not Know
Percentage calculation	83.5%	13.2%	2.8%
Lottery division	55.9%	34.4%	8.7%
Compound interest (if asked)	17.8%	78.5%	3.2%
Political literacy	81.1%	11.0%	7.7%

Notes

Source: Lusardi and Mitchell (2007), Table 5. Percentages may not add up to 100 because a few respondents declined to answer the questions.

These problems involving basic calculations that should be learned in school pose dangers for individuals who are trying to understand more complex financial concepts. The 1992 U.S. National Adult Literacy Survey (Kirsch et al. 2002) revealed that although individuals could locate key words in a newspaper article, they could not find errors on their credit

card bills and explain those errors by drafting a letter. Massoud, Saunders, and Scholnick (2007) offer a competing explanation of individuals who are delinquent in payments or are over their credit limit. Rather than these individuals being *unable* to pay back the money due to insufficient funds in their banking accounts, the authors proposed that they are *inattentive* regarding personal financial management, thus lacking *responsibility* in managing personal finances. Such individuals are most susceptible to changes in policies regarding overdraft and penalty fees, even though they do not pose a higher default risk for banks.

Percentages and Fractions

One area in which individuals are susceptible to errors is changes in percentage rates. For instance, in standardized test scores in California, Dewdney (1993) found that participants liked a 60-per-cent decrease followed by a 70-per-cent increase, perceiving the net change to be positive when in fact it was a net decrease of 32 per cent. In the consumer domain, Paulos (1988) found that consumers mistakenly judge a 40-per-cent price discount followed by another 40-per-cent discount to be a total discount of 80 per cent, believing they could buy more in this situation than if the retailer provided a single but economically equivalent percentage discount of 64 per cent. Indeed, examples abound in the marketplace of retailers using this strategy of double discounts to attract consumers and thereby boost profits.

This fallacy of *whole number dominance* (Cosmides and Tooby 1996) likely has roots in evolutionary psychology, since knowledge of whole numbers is much more useful than complex numbers such as percentages. The fallacy refers to the tendency for whole numbers to be psychologically more salient than other forms such as fractions, decimals, and percentages. For instance, the fallacy would predict that individuals would believe that $5/6 + 4/7 = 9/13$ since $5 + 4 = 9$ and $6 + 7 = 13$ (Behr, Wachsmuth, and Post 1985; Bezuk and Cramer 1989); similarly, $0.17 > 0.7$ since $17 > 7$ (Hoz and Gorodetsky 1989). Fractions are more difficult than whole numbers to learn in school; likewise, percentages may even be more difficult to learn because, depending on their use, they can be either numbers or

functions. According to Morwitz, Greenleaf, and Johnson (1998), individuals who are processing percentages “must expend more cognitive effort...because this requires a multiplication operation or both multiplication and addition...[and] because multiplication operations typically require significantly more cognitive effort than addition operations” (p. 456; cf. Bettman, Johnson, and Payne 1990).

Perceiving Numbers as “Whole”

The fallacy of whole numbers is evident in many situations. In the *money illusion* (Fehr and Tyran 2001; Fisher 1928), individuals tend to think of money in nominal terms; they tend to prefer a 5-per-cent salary rise in a year over a 2-per-cent one, even if the former had a 4-per-cent inflation rate and the latter had none. The illusion is more apparent when individuals are in a country in which the currency is foreign to them. This area of research suggests that, for a Canadian consumer, it is psychologically easier for him or her to buy a pen for \$1 in Canada than it is for that same individual to purchase the same pen while on a trip to Japan for ¥91.62, the equivalent of \$1. Similarly, \$1 feels psychologically less than ¥91.62, even though the two values are equivalent; this is because 1 is lower than 91.62, and the psychological feeling of “lowness” makes the \$1 seem cheaper to the individual than it actually is.

Similarly, in the *numerosity heuristic* (Wertenbroch, Soman, and Chattopadhyay 2007), individuals tend to over-infer quantity from numerosity; they perceive that a mere “more” in units is better, even if the size of each unit decreases. For instance, imagine that two dieters sit side-by-side, each with a cheesecake in front of them. One of the dieters has a cheesecake that is whole, and the second dieter has one that is cut into six equal slices. Which dieter is likely to eat more? The numerosity heuristic predicts that the dieter who has a cheesecake cut into six pieces would eat less than the other dieter. Even though the two cheesecakes are of equal size, the one cut into six pieces makes the second dieter feel as though there is more food on the plate than there actually is. This heuristic has particular consequences in understanding foreign exchange rates; the authors found that individuals tend to pay more to participate in a lottery that has a “high” exchange rate (e.g.,

where \$10 in fictional currency equals \$1 in real currency) than they would in a lottery that has a “low” exchange rate (e.g., where \$0.10 in fictional currency equals \$1 in real currency).

There are implications of these whole number fallacies on interpreting interest rates—a critical component of understanding and evaluating credit. Soll (2010) asked participants which of several credit cards, all of which had balances owing of \$4,000, would save them the most money if new interest rates were applied to the cards and the participants made monthly payments of \$100. For instance, one card’s rate changed from 6 per cent to 0 per cent, while another card’s rate changed from 28 per cent to 24 per cent. More than 98 per cent of participants responded that the first card would save them more money than the second card. In fact, the correct response was the second card. Whereas the first card would reduce their payments by only 5 months (from 45 to 40 months), the second card would actually reduce their payments by 31 months (from 117 to 81 months). Participants also responded similarly when they made theoretical monthly payments of \$300 on those same credit cards. The author reasoned that the whole number fallacy came into play: participants felt that the difference between 6 and 0 was greater than the difference between 28 and 24, and thus the money saved was greater with the first card than with the second.

Probabilities and Making Predictions

In order to successfully manage consumer credit across the life cycle, individuals need to be able to make predictions about their future. For instance, forecasting future medical needs and the cost of medical care is necessary to compare one insurance plan that has a high deductible and comprehensive catastrophic coverage with another that has a low deductible and many exclusions or coverage limits. Probability is another area in which most people have poor arithmetic intuitions. Making predictions necessarily means understanding probabilities, which many individuals are unable to do. People tend to be simplistic when determining probabilities, expressing limited possibilities such as “very likely,” “somewhat likely,” and “unlikely,” rather than pure probabilities (de Bruin et al.

2000; Fischhoff and de Bruin 1999). For instance, when individuals say “a fifty-fifty chance” or simply “50,” they often do not mean “50 per cent.” Rather, saying “fifty-fifty” or “50” tends to reflect a subjective estimate and an inability to translate their feelings into a true number of probability. In other words, they are unsure of what they mean, believing the situation to be somewhat uncertain and *not* having an equal chance of success or failure. These inabilities in understanding or calculating probabilities have consequences in medical decisions (Viscusi 1993; Black, Nease, and Tosteson 1995) and employment decisions (Dominitz and Manski 1997), among others.

Evidence for Computational Mistakes

Lusardi and Mitchell (2006) devised three questions to measure basic financial literacy that involved interest rates, the effects of inflation, and the concept of risk diversification. The first two questions involved compound interest, inflation, and fundamental economic concepts involving financial numeracy, and the third question involved stock risk and evaluated participants’ knowledge of crucial investment strategies. Results revealed that among participants 50 years of age or older, only 50 per cent were able to answer the first two questions, more than one third could not answer the third question, and only one third could answer all three questions correctly. Other questions that Lusardi and Mitchell (2007) posed revealed similarly troubling findings (see Table 1). Despite the fact that this segment of individuals should be at the peak of their wealth accumulation and near retirement—meaning they should have dealt with many financial decisions in their lives such as mortgages, car loans, and credit cards—only half of the participants could correctly divide \$2 million into five equal portions, and 43 per cent made a simple interest calculation on a savings account that had compound interest, ignoring the interest that accrues on both principal and interest.

Having basic numerical literacy is important in making appropriate personal financial decisions. Chevalier and Ellison (1999) found that mutual fund managers who graduated with high-average quantitative SAT scores tend to outperform those who graduated from less-selective institutions. Similarly, Stango and Zinman (2009) demonstrated that

households that systematically miscalculate interest rates from information on nominal repayment levels tend to hold loans that have higher interest rates than households that calculate rates correctly, even when controlling for individual characteristics. Meanwhile, Zagorsky (2007) found that individuals who have low IQ scores tend to exhibit financial distress primarily by being less likely to pay bills and more likely to go bankrupt; this distress, however, was not correlated with socio-economic status. As well, Dhar and Zhu (2006) found that individuals who have professional occupations make more prudent decisions in investment trading situations than those who have other occupations.

A further stream of research also shows that consumers are unable to comprehend the effect of small changes in compound interest rates and annual percentage rates on the net present value of the borrowing cost (Eisenstein and Hoch, 2007; McKenzie and Liersch, 2009). As a result, consumers tend not to weigh the annual percentage rate as heavily as they should in their credit card choices and usage decisions.

6. Implications for Public Policy and Financial Literacy

This discussion of the psychological and computational issues that lead individuals astray when it comes to personal finances suggests that behavioural intervention in financial literacy programs is needed to teach individuals the proper skills so they can make responsible financial decisions for themselves and their families. Previous findings indicate that current financial education programs may not be enough: individuals who have taken such courses often still fail to save sufficiently for retirement or continue to spend using credit, thereby accumulating debt (Choi, Laibson, Madrian, and Metrick 2004; Clark and D'Ambrosio 2002; Madrian and Shea 2001). Accordingly, financial education programs should adopt behavioural interventions to guide individuals toward making proper and responsible decisions regarding their personal financial matters. A discussion of these needed interventions is presented here.

Motivations and Setting Goals

As mentioned previously, merely increasing levels of educational attainment and number of years in the classroom is likely not enough to improve financial literacy. Despite some evidence of a positive correlation between the number of years in school and scores on tests of financial literacy (Lusardi and Mitchell 2007), the evidence is mixed. At the high school level, even a well-regarded financial management course was ineffective at developing personal financial skills one to five years after students took such a course (Mandell 2009). Results from the national Jump\$⁵ survey among American high school seniors also showed that those who attended a full-semester course that taught general money management or personal finance are not more financially literate than seniors who did not take such a course (Mandell and Klein 2007). What's needed is a set of financial education programs aimed at teaching the *targeted* skills in financial matters to individuals at an appropriate stage in their financial decision-making process. Only individuals who perceive such programs to be relevant to their current circumstance are likely to benefit from them. For instance:

- high school students are unlikely to worry about saving for retirement, but they must learn how to save for everyday items that they like to buy for themselves and others;
- college students, who are more likely to use credit cards for the first time, must learn the relevant knowledge and skills pertaining to managing credit that will affect their lives; and
- individuals who are starting their first jobs are more likely to benefit from programs that teach them how to save for retirement and choose investment plans that their employers may offer, a typical focus for individuals in that part of their life cycle.

As a corollary to this discussion, one could conclude that financial literacy classes in high school will be useful if they are reinforced by another intervention at the time of a major financial decision.

⁵ See www.jumpstart.org.

Motivation is a key driver of human behaviour. Earlier models of motivation such as the Vroom model (Vroom 1964) or of expected utility based on economics have long predicted that individuals are driven by two common factors: the perceived likelihood of being rewarded by performing the proper behaviour, and the value that individuals place on the outcome of those behaviours. More recent models of motivation are derived from goal-setting theory, which offers four key factors in driving motivation toward a desired behaviour (Locke 1968, 1996, 2002). These goals are:

- challenging, but not too difficult so that the individual will obviously fail to achieve them;
- committed to by the individual so that he or she is personally interested in attaining the goal;
- specific, so that the objectives and assessment of the desired behaviours are clear; and
- accepted by the individual so that he or she adopts the goal internally and motivation comes from rewards that are intrinsic and not extrinsic.

Another important factor in driving motivation is feedback (Schmidt and Bjork 1992). Individuals learn about their performance through feedback so that they can adapt toward the proper or expected behaviours readily. In order to increase performance, feedback should be immediate (Kettle and Häubl 2010). This includes negative feedback, which individuals strive to avoid (van Dijk, Zeelenberg, and van der Pligt 2003).

Motivation to be financial literate does not stop at motivation to learn about the basic knowledge and skills pertaining to personal financial matters. The world continues to change daily. Markets rise and fall, nations move up and down the ladder of world power, and new technologies and scientific discoveries continue to reshape the financial sectors that drive economic and global change. Individuals do not need be aware of every financial article that appears in the newspaper, but they should be motivated to learn about and keep up with economic situations in the world today. Financial literacy is, without doubt, a

key factor that leads to success in personal financial management, but motivation to be financially literate and continually literate are also key factors in literacy success. Accordingly, financial literacy programs will likely be most effective when individuals in such courses are in a time in their lives when such programs are relevant and beneficial to them.

Teaching Relevant Skills

What should financial education programs teach their participants? This discussion suggests that a targeted set of skills aimed at managing personal financial decisions is important in improving literacy and curbing rising debt levels. Participants in financial education programs need to be aware of the factors that make them susceptible to impulsive spending habits. They should realize how to make inter-temporal decisions appropriately by learning how they perceive future events and limiting the tendencies that make them perceive that future as discounted or abundant. Meanwhile, the use of mental accounting can help manage impulses that can lead to overspending. Participants in financial education programs should thus learn to set mental budgets that account for their everyday and planned spending, the accounting of which can limit their impulses to spend on purchases when their budgeted accounts reach their limit. In terms of computation, participants also need more than a basic set of quantitative skills. Beyond mere training in mathematics in elementary, secondary, and post-secondary school, they need to be aware of common shortcuts that individuals can adopt in order to arrive at a conclusion when their cognitive capacities (assumed in full rationality) may be limited. For instance, thinking that $2/4 + 3/5 = 5/9$ may seem trivial on paper, but it has important consequences (e.g., calculating the fraction of debt that an individual can realistically repay) in understanding the very credit products that people use to finance their acquisitions.

Relevant skills will also be of use beyond spending behaviours. Thaler and Sunstein (2008) showed that individuals' preference for the status quo makes them "locked" into retirement plans that are typically insufficient for maintaining a comfortable quality of life post-retirement. However, an understanding of the important behavioural variables that affect

their personal financial matters will allow them to choose products that maximize their well-being for all of their life cycle. For instance, learning about human psychology will “nudge” participants in financial education programs to save more and participate fully in government- or company-provided retirement plans, benefiting themselves and their families in the future. Meanwhile, being able to properly calculate interest rates, deductibles, and other banking fees will allow participants to properly understand the consequences of withdrawing from plans too early and the benefits of putting a portion of future income into such plans continuously.

Beyond the Financial Literacy Curriculum

Financial education programs should also teach more than knowledge, skills, confidence, and responsibility in order for individuals to make the proper decisions regarding their personal financial matters. It seems likely that individuals will continue to be tempted and be caught by computational traps that make them unable to avoid dipping into credit accounts and misinterpreting interest rates. What’s needed in addition to financial education programs is a set of policy initiatives that address how information on credit is provided and delivered to the individual (Klayman and Brown 1993). The new legislation in Canada (Department of Finance Canada 2009) and the CARD Act in the U.S. is a step in the right direction, but clearly more is needed. Rather than protecting individuals from malpractice and deception by credit card issuers, public policies and legislation must make information on credit matters accessible and understandable to individuals.

Consider the practices of mortgage lending in the United States. The choice of mortgage products is complex. Different sub-prime loan contracts can have a variety of prices, time periods in which to repay the loan, and other policies and issuer-created rules that affect borrower behaviour. As a result, most individuals are unlikely to understand the complex variety available to them, thus diminishing their chance of choosing the contract that is in their best financial interest and well-being (Iyengar and Lepper 2000). Because many individuals are myopic, this may also give mortgage issuers the opportunity to exploit such irrationality by offering contracts that have low short-term prices but high long-term

prices. Thus, mortgage contracts should be presented to individuals in a way that emphasizes the annual percentage rate, the absence of which substantially distorts the total value of the loan and repayment. When borrowing from the bank, individuals typically expect to prepay a deferred-cost loan by the end of the low-rate introductory period and thus put less emphasis on the annual percentage rate (Bar-Gill 2009). More emphasis on the annual percentage rate should increase the individual's attention to it by stressing the limits of the prepayment option for deferred-cost loans. Although this specific example is drawn from the United States, the general lessons of helping people identify and highlight *relevant* information are certainly applicable in Canada.

There are two aspects in highlighting relevant information: identifying what is relevant and highlighting it conspicuously. In the case of credit cards, for example, the annual percentage rate is a very relevant piece of information. It is also possible, however, that some people are more comfortable thinking about credit card pricing in terms of actual dollars rather than percentage points (annual percentage rate). Hence, it may be prudent to frame this information both as an annual percentage and as the dollar equivalent for a given level of balances. The information could be highlighted in a number of different ways, e.g., by standardizing credit card offers so that this information appears consistently by highlighting the information conspicuously and through repetition.

An example of highlighting relevant information comes from the new credit card regulations in Canada (Department of Finance Canada 2009). Although institutions are already required to make certain disclosures to consumers, the information can be placed anywhere in the documentation. The measures proposed in the new legislation would require that for credit contracts and credit card applications, all salient information such as fees and rates is provided in a summary box to bring the information to the consumer's attention. Since the format of the information would be identical for all credit card issuers, consumer would be able to make easy comparisons of all credit card options. Likewise, the new legislation also requires credit issuers to state the implications of making only minimum payments. This information incorporates the existing annual percentage rate and

is a different way of presenting the percentage rate and balance information. These provisions will adequately ensure that the appropriate information will be highlighted.

Concluding Comments: The Last Kilometre Problem and Areas for Future Research

Research reviewed in this report argues that efforts to solve social problems such as poverty, education, hunger, and public health, or to solve personal and household problems such as savings rates, eating disorders, and healthy lifestyles, have focused excessively on developing solutions and not getting individuals to adopt those solutions (cf. Thaler and Sunstein 2008; Mullainathan 2009). Mullainathan (2009) refers to this as the “last mile problem”—or, in a Canadian context, the “last kilometre problem”—a term borrowed from the field of telecommunications. The “last kilometre” refers to the final leg of delivering connectivity from a communications provider to a customer, and it is often considered to be the weakest link because of the complexities in physically reaching a vast and geographically dispersed body of end-users.

Implementing programs to encourage households to save also presents an interesting last kilometre problem. This is typically a problem of psychology—people are reluctant to adopt positive behaviours because of biased beliefs, complexity of choice, self-control problems, and perceptual errors (cf. Ratner et al. 2008; Soman, Xu, and Cheema 2010). For instance, RRSP (registered retirement savings plan) accounts in Canada and IRA (individual retirement accounts) plans in the United States were designed to encourage people to save for retirement. However, evidence from Canada in 2008 shows that only about 25 per cent of eligible taxpayers open up RRSP accounts.⁶ More recently, a survey shows that contribution is at about 38 per cent (i.e., only 38 per cent of eligible people contributed before the deadline), with a significant number of people reporting that they had

6 See www.cbc.ca/news/background/rrsp, accessed June 15, 2010. In addition, Statistics Canada (www.statcan.gc.ca/daily-quotidien/100326/dq100326a-eng.htm, accessed July 24, 2010) reports that “there was a decrease in the share of employed tax filers who contributed to a Registered Retirement Savings Plan (RRSP) during the decade. In 1997, 41% of employed tax filers participated in an RRSP; by 2008, this proportion had declined to 34%. At the same time, the share of employed tax filers participating in employer-sponsored pension plans (EPP) remained stable at 32%.”

“forgotten” to contribute.⁷ Likewise, research in the U.S. context shows that contribution rates to 401(k) IRA plans is low because individuals find the plans too complex, decide to avoid the complexity altogether, and do not contribute (Choi, Laibson, and Madrian 2009). In the context of financial literacy, research suggests that the effectiveness of financial literacy programs can be enhanced by going beyond the notion of financial literacy as financial information. Indeed, the Task Force on Financial Literacy views financial literacy as having the knowledge, skills, and confidence to *use* financial information responsibly.

Financial literacy programs, therefore, need to view the individual as a complex organism, driven by goals, limited in cognitive ability, susceptible to psychological biases, and one who can be rational but easily tempted. Such programs need to educate individuals about financial instruments, opportunities and concepts, and educate people in the following:

- **Better decision-making skills:** What can individuals do to avoid being susceptible to psychological biases and decision-making traps, and what tools could they use to improve the effectiveness of their decisions in the context of these biases?
- **Broader framing of problems:** People often tend to view problems narrowly. In a financial decision-making context, examples include questions such as:
 - Which credit card offers the better deal?
 - Where should I invest retirement funds? or
 - Which mortgage is the best?

In reality, the answer to these questions depends on what the underlying goal is. With credit cards, is the consumer looking to maximize convenience or minimize monthly payments? Likewise, a clearer understanding of retirement goals can change the optimal investment strategy.

- **Self-control:** As discussed earlier, many people know what is good for them but fail to follow through because of self-control problems. Research in behavioural economics

⁷ See: www.vancouversun.com/business/Shockingly+some+people+simply+forgot+about+their+RRSP/2639830/story.html

has documented a number of strategies that individuals can use to maintain self-control. These include budgeting, earmarking, pre-commitment (see for instance www.stickk.com), reminders, and goal setting. All of these strategies are teachable. As such, developing programs that help develop self-control and teach individuals strategies to enhance self-control will boost the effectiveness of financial literacy programs.

The behavioural economics approach to improving the financial health of individuals is best undertaken at multiple levels. At one level, policy makers should recognize that individuals process limited information and hence require issuers of debt to clearly provide information that is relevant. Creditors should also provide tools to help the consumer make better decisions, for example, by providing mortgage calculators or comparison tools, which many banks provide on their web pages. In parallel, a broader view of financial literacy programs as discussed earlier provides individuals with more than just relevant information and aims to give them the confidence to use that information to make effective decisions.

There are three specific areas that call for additional research. The first relates to decision framing by individuals. Academic researchers use paramorphic models to capture reality, i.e., models that provide a theoretical account of what individuals might be doing. For instance, the model of discounting suggests that people behave *as if* they are discounting the future gradually over time. The life-cycle hypothesis posits that people behave *as if* they would like to smooth out consumption over their lifetimes. Not much research has gone into identifying what households actually do. Do they frame saving-consumption decisions as a trade-off between instant and delayed gratification? Are they looking to optimize the net present value of their mortgage, or are they looking to address another goal? Seeking answers to questions such as these involves a different set of research tools than reviewed here. Examples might include ethnography, field immersion, videography, and diary analysis.

A second area for future research is one of calibration. The goal of academic research is to document effects but not to document effect sizes. For instance, Soman and Cheema (2002) show that increases in credit card limits increases spending. But they do not go on to document the degree to which this relationship occurs, the exact functional form, or even the effects of various boundary conditions on the size of these effects. An understanding of the size of effects is crucial to successful financial literacy education.

A final area of potential investigation concerns the interaction of knowledge with other enabling factors. In their book *Nudge: Improving Decisions About Health, Wealth, and Happiness*, Thaler and Sunstein (2008) suggest that individuals could be nudged into making the “right” decisions by engineering the choice environment suitably. On the face of it, nudging seems to be a strategy that is completely independent of financial literacy. However, it is not clear whether the effects of nudging will be any different for populations that have high or low levels of financial literacy. From a practical standpoint, knowing how knowledge and other enabling (nudging) factors interact will be crucial in making decisions on how to best deploy financial literacy programs.

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Appendix A: Annotated Bibliography – Selected Key Articles

Empirical Evidence

Reference	Key Findings	Method/Data Used
Agarwal, Skiba, and Tobacman (National Bureau of Economic Research, 2009)	Individuals take out short-term payday loans, become unable to repay, and take out further loans to cover previous debts.	Individual-level dataset
Brown, Taylor, and Price (<i>Journal of Economic Psychology</i> , 2005)	High levels of non-mortgage debt lead to lower levels of psychological well-being.	British Household Panel Survey (more than 500 households)
Certified General Accountants Association of Canada (2009)	Canadian household debt was at an all-time high of \$1.3 trillion in 2008.	Study by the Certified General Accountants Association of Canada
Chevalier and Ellison (<i>Journal of Finance</i> , 1999)	Behavioural differences—no abilities, knowledge, or effort distinguish performance among mutual fund managers.	Data from Morningstar, Inc.
Choi, Laibson, Madrian, and Metrick (Harvard, 2004)	Employees take the “path of least resistance” and tend to accept employee changes in 401(k) savings plans.	11 large U.S. national companies.
Gross and Souleles (Wharton, 2001)	A rise in credit card limit tends to lead to a rise in credit card debt.	Nationwide study; variables/information from credit card issuer, credit bureau, and credit applications
Massoud, Saunders, and Scholnick (Schulich, 2007)	Individuals who pay penalty fees, despite an ability to pay, are likely to be poor, rent, and receive most of their income from government sources.	Canadian-wide study
Stango and Zinman (<i>Journal of Finance</i> , 2009)	An exponential growth bias can lead to underestimation of interest rates and value of future investments.	Economic analysis
White (National Bureau of Economic Research, 2007)	The rise in personal bankruptcies is attributable to credit card debt.	Theoretical analysis
Zagorsky (<i>Intelligence</i> , 2007)	IQ scores tend to correlate with income; a rise in financial distress correlates with IQ scores quadratically.	12,686 participants in National Longitudinal Survey (since 1979; U.S.)

Financial Illiteracy

Reference	Key Findings	Method/Data Used
Avard, Manton, English, and Walker (<i>College Student Journal</i> , 2005)	College students on average correctly answered only 6.96 out of 20 financial questions (401(k), home equities, compounded interest, stock trading); high school economics and finance courses had little effect.	407 students at Texas A&M University.
Banks and Oldfield (<i>Fiscal Studies</i> , 2007)	Low levels of numeracy among participants; numeracy levels correlated with retirement savings and investing decisions, controlling for cognitive ability, and education.	11,400 participants on the English Longitudinal Study of Ageing (U.K.)
Chen and Volpe (<i>Financial Services Review</i> , 1998)	Non-business majors, women, students in the low-income ranks, persons under the age of 30, and those with little work experience tend to have lower levels of financial knowledge.	924 students from college campuses in California, Florida, Kentucky, Massachusetts, Ohio, and Pennsylvania
Dhar and Zhu (<i>Management Science</i> , 2006)	Individuals in professional occupations tend to make more prudent decisions in investment trading situations than those in other occupations.	50,000 individual investors from a large discount brokerage firm.
Due (<i>Journal of Marketing</i> , 1955)	Two thirds of families who used instalment plans could not indicate charges or interest rates, even between high and low borrowers.	Family participants in the 1954 Survey of Consumer Finances
Kirsch, Jungeblut, Jenkins, and Kolstad (<i>Adult Literacy in America</i> , National Center for Education Statistics, 2002)	Approximately 22 per cent of participants had bottom-most scores on financial literacy, education and literacy scores correlate slightly, and average overall score of participants was lower than a similar 1985 National Adult Literacy Survey.	Approximately 13,000 individuals in National Adult Literacy Survey (U.S.)

Reference	Key Findings	Method/Data Used
Lusardi (“Household Saving Behavior: The Role of Financial Literacy, Information, and Financial Education Programs,” National Bureau of Economic Research, 2008)	Low financial literacy scores among those with low education, women, African-Americans, and Hispanics; majority are not aware of their own pensions and save little.	Field experiment (U.S.)
Lusardi and Mitchell (Wharton, 2006)	Only a minority of Americans feel confident about their savings knowledge, and many fail to plan for retirement.	2004 Health and Retirement Study (U.S.)
Lusardi and Mitchell (<i>Journal of Monetary Economics</i> , 2007)	Most households are unfamiliar with basic economic concepts related to savings and investments; brief comparisons (similarities) with other countries, including Japan and Sweden.	Various U.S.-based surveys
Lusardi and Mitchell (National Bureau of Economic Research, 2009)	Financial knowledge correlates with retirement savings and readiness.	American Life Panel
Lusardi and Tufano (Harvard, 2008)	Literacy of debt knowledge is low; there is a strong relationship between debt literacy and financial experience, including debt levels.	Field experiment (U.S.)
Mandell (American Economic Association meetings, 2009)	High-school financial education programs do not improve students’ financial literacy.	Five U.S.-wide Jump\$start surveys of high school seniors
Mandell and Klein (<i>Financial Services Review</i> , 2007)	Lack of motivation may mediate usefulness of high school financial education programs on improving financial literacy.	U.S.-wide Jump\$start survey of high school seniors
Rosacker, Ragothaman, and Gillispie (<i>College Student Journal</i> , 2009)	College students in business majors (those taking accounting and finance) outperform non-business majors on financial literacy tests.	41 college students in the U.S.

Economics

Reference	Key Findings	Method/Data Used
Ando and Modigliani (<i>American Economic Review</i> , 1963)	Lifecycle hypothesis (LCH): Individuals borrow as they progress through working years and decrease their consumption after retirement.	Economic analysis
Johnson, Kotlikoff, and Samuelson (National Bureau of Economic Research, 1987)	LCH is attractive, but individuals are not fully able to compute economic decisions according to the model.	Laboratory study
Kotlikoff, Samuelson, and Johnson (<i>American Economic Review</i> , 1988)	Individuals tend to discount future labour income and future resources; argues for model incorporating such human irrationalities.	Laboratory study
Shefrin and Thaler (<i>Economic Inquiry</i> , 1988)	Self-control, mental accounting, and framing are incorporated in a behavioral enrichment of the LCH; funds in behavioural lifecycle hypothesis (BLCH) are non-fungible.	Economic analysis
Thaler and Shefrin (<i>Journal of Political Economy</i> , 1981)	The Strotz model is recast to include the agency in understanding self-control.	Economic analysis

Psychology

Reference	Key Findings	Method/Data Used
Bettman, Johnson, and Payne (<i>Organizational Behaviour and Human Decision Processes</i> , 1990)	Executive cognitive tasks and elementary information processes (e.g., reading, addition, and comparisons) require limited effort resource.	Laboratory study
Heath and Soll (<i>Journal of Consumer Research</i> , 1996)	Individuals tend to set budgets for categories of expenses and track expenses against their budget.	Laboratory study
Herrnstein (<i>Journal of the Experimental Analysis of Behaviour</i> , 1961)	In a consumer context, individuals tend to adapt to and prefer rewards that occur sooner than later.	Laboratory study

Reference	Key Findings	Method/Data Used
Hoch and Loewenstein (<i>Journal of Consumer Research</i> , 1991)	Conflict between desire and willpower as antecedents of self-control.	Theoretical analysis
Iyengar and Lepper (<i>Journal of Personality and Social Psychology</i> , 2000)	Choice can be attractive to individuals, but too much choice may lead to choice overload.	Field experiment in California supermarket; laboratory study
Kettle and Häubl (<i>Psychological Science</i> , 2010)	Anticipated positive and constructive feedback improves performance.	Laboratory study
Klayman and Brown (<i>Cognition</i> , 1993)	Offers suggestion to improve human judgment and decision making by altering aspects of the judgment or decision-making task rather than improving the skills of individuals.	Theoretical analysis
Livingstone and Lunt (<i>Journal of Economic Psychology</i> , 1992)	Individual differences in economic attributes, loci of control, and coping, not socio-economic or demographic factors, tend to affect likelihood of becoming indebted.	Laboratory study
Locke (<i>Organizational Behaviour and Human Performance</i> , 1968; <i>Applied and Preventive Psychology</i> , 1996; <i>American Psychologist</i> , 2002)	Hard goals are better motivators than medium or easy goals. Four components of goal-setting theory: challenging, committed, specific, and adopted by individual.	Laboratory study
Morwitz, Greenleaf, and Johnson (<i>Journal of Marketing Research</i> , 1998)	Partitioned prices (base plus extra price) lead to low consumer recall of actual prices and increase demand.	Laboratory study
Prelec and Loewenstein (<i>Marketing Science</i> , 1998)	Summary of mental accounting, pain of paying, debt aversion, and decision efficiency.	Laboratory study
Prelec and Simester (<i>Marketing Letters</i> , 2001)	Credit card users are more likely to pay and likely to pay more than individuals who pay with cash.	Laboratory study
Thaler (<i>Marketing Science</i> , 1985)	Summary of mental accounting as it pertains to consumer choices and decisions.	Laboratory study

Reference	Key Findings	Method/Data Used
Thaler (<i>Journal of Economic Perspectives</i> , 1990)	Summary of mental accounting.	Laboratory study
van Dijk, Zeelenberg, van der Pligt (<i>Journal of Economic Psychology</i> , 2003)	Individuals can minimize disappointment by lowering expectations.	Laboratory study
Zauberman and Lynch (<i>Journal of Experimental Psychology: General</i> , 2005)	Individuals tend to perceive abundance of time in the future, known as “resource slack.”	Laboratory study

Computation

Reference	Key Findings	Method/Data Used
Bezuk and Cramer (National Council of Teacher of Mathematics, 1989)	Difficulty in fractions often due to well-established ideas about whole numbers.	9-, 13-, and 17-year-olds in third and fourth National Assessment of Educational Progress (U.S.)
Cosmides and Tooby (<i>Cognition</i> , 1996)	Framing problems in terms of frequentist (vs. non-frequentist) terms tends to elicit greater number of correct responses in questions on probabilities (e.g., The Linda Problem).	Laboratory study; students at Stanford University
de Bruin, Bruine, Fischhoff, Millstein, and Halpern-Felsher (<i>Organizational Behaviour and Human Decision Processes</i> , 2000); Fischhoff and de Bruin (<i>Journal of Behavioural Decision Making</i> , 1999); see also Fisher (1928)	Popular usage of “fifty-fifty chance” or “50” tends to decrease reliance on 50 per cent meaning.	433 high school students in California; laboratory study
Fehr and Tyran (<i>American Economic Review</i> , 2001)	Individuals tend to think of money in nominal terms (“money illusion”).	Laboratory study
Hoz and Gorodetsky (<i>Journal of Structured Learning</i> , 1989); Wertebroch, Soman, and Chattopadhyay (<i>Journal of Consumer Research</i> , 2007)	Individuals tend to apply whole number illusion to decimals, such that $.17 > .7$, and currency effects.	Sixty-five 14- to 18-year-olds in high school; laboratory study

Appendix B: Organizing Framework

	Economics	Psychology	Computation
Effects of the History of Credit Usage	<ul style="list-style-type: none"> • Ando and Modigliani (<i>American Economic Review</i>, 1963) • Kotlikoff, Samuelson, and Johnson (<i>American Economic Review</i>, 1988) • Thaler and Shefrin (<i>Journal of Political Economy</i>, 1981) 	<ul style="list-style-type: none"> • Livingstone and Lunt (<i>Journal of Economic Psychology</i>, 1992) • Soman (<i>Journal of Consumer Research</i>, 2001) • Soman and Cheema (<i>Marketing Science</i>, 2002) • Soman and Gourville (<i>Journal of Marketing Research</i>, 2001) • Soman and Lam (<i>Marketing Letters</i>, 2002) 	

<p>Effects at the Usage Occasion</p>	<ul style="list-style-type: none"> • Johnson, Kotlikoff, and Samuelson (National Bureau of Economic Research, 1987) • Shefrin and Thaler (<i>Economic Inquiry</i>, 1988) 	<ul style="list-style-type: none"> • Feinberg • Heath and Soll (<i>Journal of Consumer Research</i>, 1996) • Hoch and Loewenstein (<i>Journal of Consumer Research</i>, 1991) • Iyengar and Lepper (<i>Journal of Personality and Social Psychology</i>, 2000) • Lynch and Zauberman (<i>Journal of Public Policy and Marketing</i>, 2006) • Morwitz, Greenleaf, and Johnson (<i>Journal of Marketing Research</i>, 1998) • Prelec and Loewenstein (<i>Marketing Science</i>, 1998) • Soman, Xu, and Cheema (Rotman School of Management, 2010) • Zauberman and Lynch (<i>Journal of Experimental Psychology: General</i>, 2005) 	<ul style="list-style-type: none"> • Cosmides and Tooby (<i>Cognition</i>, 1996) • de Bruin, Fischhoff, Millstein, and Halpern-Fisher (<i>Organizational Behaviour and Human Decision Processes</i>, 2000) • Fischhoff and de Bruin (<i>Journal of Behavioural Decision Making</i>, 1999) • Hoz and Gorodetsky (<i>Journal of Structural Learning</i>, 1989) • Kotlikoff, Samuelson, and Johnson (<i>American Economic Review</i>, 1988)
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