

1-1-2015

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Recommended Citation

Ackert, L. F., & Church, B. K. (2015). Credit cards, financial responsibility, and college students: an experimental study. *International Journal of Behavioural Accounting and Finance*, 5(1), 1-26.

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Credit cards, financial responsibility, and college students: an experimental study

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Abstract: Policymakers are concerned about the limited financial expertise of young adults because their naiveté leaves them vulnerable to the perils of excess debt. We report the results of three experiments designed to investigate college students' mental representations of credit cards, focussing on linkages to financial responsibility. Students complete an inferential reasoning task in which they assess conditional relations to provide evidence on their rudimentary understanding of *what* credit card ownership entails. The findings suggest that students readily associate credit card ownership with the need to exercise financial responsibility. Yet, they have difficulty correctly assessing conditional relations. While these young adults believe that they *should be* financially responsible, their mental models do not fully describe the linkages between credit card ownership and financial responsibility. Additional investigation indicates that analogical transfer can be used to enrich students' mental models, underscoring an obligation to exercise financial responsibility.

Keywords: credit card; financial responsibility; conditional reasoning.

Reference to this paper should be made as follows: Ackert, L.F. and Church, B.K. (2015) 'Credit cards, financial responsibility, and college students: an experimental study', *Int. J. Behavioural Accounting and Finance*, Vol. 5, No. 1, pp.1–26.

Biographical notes: Lucy F. Ackert is Professor of Finance in the Coles College of Business at Kennesaw State University. She holds a PhD from Emory University and her research interests include individual's use of information and financial market reaction to information. In 1993 she received a Smith Breeden Prize for Distinguished paper in the Journal of Finance. She has published in a variety of journals and recently co-authored a book in the area of Behavioral Finance.

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This paper is a revised and expanded version of a paper entitled 'Inferential reasoning and credit cards' presented at the *Financial Management Association Annual Meeting*, Atlanta, 18–20 October, 2012.

1 Introduction

Credit cards have become a way of life, offering convenience and purchase protection, allowing for online shopping, and providing a cushion in case of emergencies. Nowadays, credit cards are widely available, even to individuals with little or no credit history. Consumer advocates, however, have expressed concern that the banking sector is preying on individuals who have limited financial means and are particularly susceptible to misuse of credit cards, which can lead to serious financial harm (e.g., Warren, 2004). Brenkert (2010, p.276) contends that marketers target vulnerable groups, offering credit cards to those who may not be able to exercise financial restraint. Indeed, credit cards generally are associated with a subjective loss of control over expenditures (Penz et al., 2004).

College students, as a whole, may be characterised as having limited resources and being financially naïve. Nonetheless, they represent an important demographic for the banking sector, largely because they have few financial ties. Credit card issuers compete for college students' business, hoping to attract loyal customers for future dealings (e.g., car loans and home loans). College students' lack of experience with financial dealings, coupled with their age, suggest that they are susceptible to lapses in self-control. Along these lines, Gathergood (2012) provides evidence of a positive association between lack of self-control and credit card over-indebtedness.

In the current study, we conduct three experiments to investigate college students' mental representation of credit cards, focussing on linkages to financial responsibility. Extant findings suggest that students' knowledge of credit cards is inadequate, particularly their knowledge of the potential costs. Chen and Volpe (1998) administered a multiple-choice questionnaire to college students and found that less than one-half were able to correctly answer very basic questions on credit card usage and annual percentage rates (APR). Warwick and Mansfield (2000) surveyed college students and found that the majority had no idea of the interest rate on their credit card; further, nearly one-half did not know their credit balance or credit limit. Mansfield et al. (2003) report that college students who have difficulties with self-control are more likely to abuse credit cards. We are not interested in financial knowledge, per se, but rather in mental linkages and implications that are readily associated with owning a credit card. In our experiments, students complete an inferential reasoning task, which requires them to assess conditional relations (e.g., Wason, 1966, 1968). The task is such that students' responses provide evidence of their rudimentary understanding of *what* credit cards entail, including the

associated costs (being prudent and financially responsible, paying one's bills when due, etc.). Students' understanding, in turn, has implications for measures that can be taken to curb irresponsible financial behaviour, be it financial education or mechanisms to promote self-control.

We focus on college students because this group is potentially vulnerable, having little practical experience with financial matters. Further, college students may suffer significantly if they mismanage credit card debt. Possible consequences include emotional turmoil, drug and alcohol abuse, faltering academic performance, dropping out of school, prolonged financial difficulties, and in even rare instances, suicide (Johnson, 2005).

A study conducted in the USA by Sallie Mae, in the spring of 2008, found that 84% of undergraduates had at least one credit card, 50% had more than four credit cards, and the average credit card debt was \$3,173, with all figures showing a marked increase since 2004 (Sallie, 2009). The data also suggest that a considerable number of students use credit cards to live beyond their means: 82% incurred finance charges each month, 60% expressed surprise at the magnitude of their credit card balance, and 40% acknowledged charging items, knowing full well that they could not pay the bill (Sallie, 2009). In another study, conducted by the U.S. Public Interest Research Group (PIRG), a significant proportion of students indicated using credit cards to pay for educational necessities: 55% used credit cards to pay for textbooks and 24% for tuition (PIRG, 2008). Hence, credit cards appear to be woven into the fabric of everyday college life for many students. In 2013, 21.8 million students were expected to attend colleges and universities in the USA, an increase of about 6.5 million from the fall of 2000.¹ This population represents a significant number of people.

Concern about the misuse of credit cards by young people is not strictly an US problem, but rather a growing worldwide problem. Internationally, the population of college-aged people exceeds 150 million.² In the UK alone, over 2 million students attended institutions of higher education in 2011.³ Young people are of great interest because access to credit and ensuing credit habits develop as individuals reach adulthood.

Irresponsible borrowing is, of course, not only a problem of the young. More than a quarter of the UK population reports that their debt is a significant burden (Financial Conduct Authority 2014). A taste for borrowing can have important consequences for the overall economy in the long term. For example, many European countries experienced large increases in household debt prior to the recent financial crises, due at least in part to easing credit constraints (Chmelar, 2013). As the economies contracted, many households found they could not service the accumulated debt. Thus, high debt levels can lead to destabilising effects in the economy, and accordingly, policymakers have received calls to promote responsible borrowing. All around the world, regulators have responded with warnings to households and additional restrictions on lenders.⁴

Credit cards are of particular concern to policymakers because they are among the most commonly used credit product among low income citizens (Financial Conduct Authority 2014). For example, in the UK the poorest 10% of the population has unsecured debt that is more than four times annual income and outstanding credit card balances have nearly tripled since 1998 (Centre for Social Justice, 2013).

The remainder of this paper is organised as follows. First, we provide a basis for understanding why credit cards are used (or misused) by consumers and develop a framework to guide our experimental investigation. In the following three sections we describe each of the three experiments, including experimental procedures, results, and

discussion. In the final section, we discuss our findings, point to the practical implications, and offer concluding remarks.

2 Framework

2.1 Background on credit cards

A credit card allows the user to put off payment for a good or service. Credit cards were first offered in the USA by hotels, gas stations, and department stores in the early 1900s (Garcia, 1980). Two benefits are derived: transactions convenience and an easy source of credit. Researchers recognised that credit cards facilitate desired lifestyles and can lead to increased freedom or financial ruin (Bernthal et al., 2005). Credit cards offer benefits that are functional and hedonistic, but not without potential costs. The credit user's underlying ideology impacts credit choices. In Western societies the advent of consumerism was driven to some extent by both frugality and entitlement. Bernthal et al. (2005) report that study participants who expressed belief in the value of frugality were more successful credit card users. For these people, credit cards are a necessary evil. On the other hand, those who were less responsible saw the credit card as a mean to acquire rewards they were entitled to.

As discussed above, over-indebtedness is a growing problem. Gross and Souleles (2002) examine delinquency rates among credit card users, arguing that default rates may change over time due to changes in borrowers' credit quality or willingness to default. People's preferences for default vary because social, information, and legal costs change over time. Perhaps not surprisingly, Gross and Souleles (2002) conclude that people with lower credit ratings are more likely to default. More interestingly, they report that the relationship between economic fundamentals and default has shifted over time. They conclude that people have become less hesitant to default because social stigma and information costs associated with financial irresponsibility have declined over time. How people think about default has changed.

2.2 Mental models theory

We rely on mental models theory (e.g., Johnson-Laird, 1983, 2004; Johnson-Laird and Byrne, 1991) as a means to gain insight into *how* individuals think about credit cards: individuals' mental representations that are associated with having a credit card and using the credit card. Mental models theory allows us to develop an underlying framework, providing a basis for our experimental study. The theory posits that, when individuals think or reason, they construct mental models of possibilities, representing the circumstances at hand (premises and conclusions). A unique model is constructed for each possibility, and each model encompasses what is true given the circumstances (truth contingencies), but not what is false (Johnson-Laird and Savary, 1999; Barres and Johnson-Laird, 2003). Pragmatically, mental models include representations of perception, imagination, and comprehension of discourse. To the extent possible, the models are iconic: that is, the structure of a particular model corresponds to the known structure of what it represents (Johnson-Laird, 2004).⁵

Mental models provide a means for individuals to apply the semantics of a logical calculus in order to reason. Individuals construct mental models to grasp meaning, as a

basis to reason – rather than using unconscious, tacit rules, akin to formal logic. Mental models are shaped by individuals' memory stores, which draw on prior experiences (Johnson-Laird and Byrne, 2002; Johnson-Laird, 2008). Memory stores comprise background knowledge (what is known about reasoning in general) and domain-specific knowledge (what is known about a precise context). The latter can have a very pronounced effect on individuals' performance in reasoning tasks, for better or worse (e.g., Griggs and Cox, 1982; Johnson-Laird and Byrne, 2002; Johnson-Laird, 2008).

The vast majority of college students have prior experiences with credit cards, either directly (through ownership themselves) or indirectly (through knowledge of ownership by parents, friends, and acquaintances). So they have various concepts stored in long-term memory that involve credit card ownership, including domain-specific knowledge. The linkages between concepts affect students' ability to draw valid inferences in reasoning tasks that involve credit cards.

Initially, we investigate college students' performance in Wason's (1966, 1968) selection task to gain insight into the nexus of relations associated with owning a credit card. In the original, abstract version of the selection task, the setting is stark and context free. Four cards are presented, two showing letters and two showing numbers (e.g., *A*, *B*, 2, and 3). Each card has a letter on one side and a number on the other side. The experimenter makes a claim, such as the following:

If a card has an A on one side, then it has a 2 on the other side.

The first part of the claim is the antecedent (*if a card has an A on one side*) and the second part the consequent (*then it has a 2 on the other side*). The *A* and *B* cards indicate whether the antecedent is true or false, respectively. Likewise, the 2 and 3 cards indicate whether the consequent is true or false, respectively.

Participants must decide what card(s) to turn over in order to determine whether the claim is true or false. The claim is conditional, so it is violated by any card that has an *A* on one side, but does not have a 2 on the other side. Participants *should* turn over the *A* card and the 3 card to assess the claim. These two cards represent potential counterexamples, which may falsify the claim: that is, possibilities that are consistent with the premise (true antecedent), but inconsistent with the conclusion (false consequent). Although most participants select the *A* card, very few choose the 3 card (e.g., Wason, 1966, 1968). Yet by turning over the 3 card, participants can test whether the claim is refuted (Popper, 1959/2002). For the most part, participants do not think about instances that involve the false consequent when testing a claim, particularly with abstract problems.

Recall that mental models theory asserts that individuals construct mental models of possibilities that are *true* given the circumstances (Johnson-Laird and Savary, 1999; Barres and Johnson-Laird, 2003). In the selection task, participants are focussed on instances in which *A* occurs on one side and 2 on the other: these two instances are consistent with the claim and, thus, envisaged as the most pertinent. Indeed, experimental findings indicate that the *A* card and the 2 card are chosen most often. Mental models theory suggests that these two cards are chosen because they represent truth-contingent possibilities, where such possibilities are consistent with the experimenter's claim being true. Participants tend *not* to choose the 3 card because they fail to adequately consider the false consequent in constructing the counterexample: the negation is not a truth-contingent possibility. Participants do not appear to fully recognise that the 3 card (corresponding to *not 2*) potentially negates the claim and creates the counterexample.

Subsequent studies provide evidence that individuals may be more likely to construct counterexamples in a contextually rich setting, which allows them to draw on domain-specific knowledge (Johnson-Laird and Byrne, 2002). Griggs and Cox (1982) devise a concrete version of the selection task, referred to as the drinking-age problem. Four cards are presented, labelled *drinking beer*, *drinking coke*, *16 years of age*, and *22 years of age*. The experimenter makes the following claim:

If a person is drinking beer, then the person must be over 19 years of age.

In this setting, the vast majority of participants, who are college students enrolled in a large, state university, select the *drinking beer* (true antecedent) and *16 years of age* (false consequent) cards to assess the claim.⁶ Presumably, most participants have prior experiences with underage drinking (either directly or indirectly), which facilitates their consideration of the counterexample (the false consequent).⁷ That is, they are very cognisant of specific instances that violate the experimenter's claim.

We are interested in college students' mental representation of credit cards. As a first step, we consider the mental linkage between credit card ownership and financial responsibility. We assume that credit card ownership is a benefit and that students are well aware of the benefit. For example, credit cards make it possible for students to establish credit, allow for convenience in shopping, offer purchase protection, and provide a safety net in case of emergencies. But credit card ownership also imposes a cost. Students need to be financially responsible and exercise self-control (e.g., Mansfield et al. 2003). Otherwise, they incur additional costs, potentially giving rise to emotional and financial burdens (e.g., Johnson, 2005; PIRG, 2008).

We contend that students' understanding of the implications associated with credit cards is a key determinant of their ability to responsibly handle credit card ownership. In the current study, we probe students' mental representation of their obligation to be financially responsible. We investigate whether students readily associate credit card ownership with financial responsibility. Regulators seem to have their doubts, expressing concerns that students are unable to exercise financial restraint. Indeed, in 2009 the U.S. Congress passed the *Credit Card Accountability Responsibility and Disclosure Act* (CARD), limiting college students' access to credit cards. As part of the CARD Act, which became effective in 2010, anyone under the age of 21 must have an adult co-signor or provide evidence of financial means (e.g., employment or a steady stream of income) to obtain a credit card (U.S. Congress, 2009, section 301).⁸ Prior to the passage of the CARD Act, college students could obtain credit cards with little to no difficulty.⁹

3 Experiment 1

In Experiment 1, we devise a concrete version of Wason's selection task to assess college students' representation of the costs associated with credit card ownership. Four cards are presented, labelled *owns a credit card*, *does not own a credit card*, *prudent and responsible with money*, and *not prudent and responsible with money*. We ask students to consider the following rule:

If you have a credit card, you are prudent and responsible with money.

The rule links credit card ownership (the antecedent) with financial responsibility (the consequent). If students' mental linkages are fully fleshed out (i.e., they have sufficient understanding of the potential costs associated with credit card ownership), domain-specific knowledge should provide a ready means for them to construct the counterexample (e.g., Johnson-Laird and Byrne, 2002), even when starting with the false consequent. In this case, students may instinctively recognise that the false consequent is necessary to appraise the claim, and they may be inclined to select the *not prudent and responsible with money* card. By comparison, if students have weak or impoverished linkages, they may have much more difficulty constructing the counterexample when starting with the false consequent. They may be inclined to focus on truth-contingent possibilities in testing the claim. Our first experiment is designed to shed light on this issue.

3.1 Participants and method

Table 1 summarises the data for each of the three experiments and gives an overall picture of the results, more fully described subsequently. In the table, we include the number of participants in each experiment and their average age, sex, and academic status (undergraduate or graduate), along with the percentage choosing the two correct cards. For the first experiment, we recruited 46 undergraduate students from a large, public university.¹⁰ The students had a wide cross-section of interests in terms of their academic pursuits, representing 17 different areas of study. The students had a median age of 21.0 years and 20 students were male. We paid them \$10 for taking part in the experiment.

Table 1 Summary information (this table reports summary information for the three experiments)

	<i>Experiment 1</i>	<i>Experiment 2</i>	<i>Experiment 3</i>	
			<i>Credit card task second</i>	<i>Credit card task first</i>
Number of participants	46	46	25	30
Average age	21.0	20.0	21.1	21.0
Percentage undergraduates	100.0	100.0	88.0	86.7
Percentage male	47.8	32.6	64.0	50.0
Percentage choosing correct cards in credit card task	26.1	2.2	80.0	33.3
Percentage choosing correct cards in cassava root task	NA	NA	72.0	66.7

We distributed experimental materials describing a context-rich version of Wason's selection task. The materials included the following text.¹¹

Many university students use credit cards as a means to manage cash flows and day-to-day finances. By spending wisely and responsibly, credit cards allow individuals to take advantage of opportunities and facilitate discretionary spending.

When individuals reach 18 years of age, they are often besieged by offers from credit card companies. The companies offer various incentives to encourage young adults to get a credit card, including no annual fees, 0% interest for six months, cash-back bonuses on purchases from affiliated retailers, and a host of other incentives. In some instances, individuals are automatically qualified to receive a credit card simply by responding to the promotional offer. In other instances, a limited credit history is required for approval.

By obtaining a credit card, university students can establish a positive credit history, which represents an important step for young adults. For those who already have a limited credit history (e.g., a car loan), it is easier to get a credit card, potentially with more favourable terms.

We are interested in the relation between students having a credit card and their spending habits. Please consider the following rule.

If you have a credit card, you are prudent and responsible with money.

Participants are shown a picture of four cards, each with one side showing. Each card represents a student, and each card side includes a fact about the student. One side indicates whether the student has a credit card and the other side whether the student is prudent and responsible with money.

The four cards, with the visible sides, appear below.

Prudent and responsible with money	Does not have a credit card	Not prudent and responsible with money	Has a credit card
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The first card corresponds to the true consequent, the second to the false antecedent, the third to the false consequent, and the fourth to the true antecedent. Participants are instructed to determine the card(s) that definitely need(s) to be turned over to determine if the above rule is violated. Because the rule is conditional, the true antecedent (*has a credit card*) and the false consequent (*not prudent and responsible with money*) should be selected.

Next, participants are asked to rank the cards from 1 – 4 based on how likely each is to violate the above rule. A rank of 1 is assigned to the card most likely to violate the rule, a rank of 2 to the next most likely to violate the rule, and so on to a rank of 4 to the least likely to violate the rule. Lastly, participants complete a post-experiment questionnaire designed to collect general, demographic information.

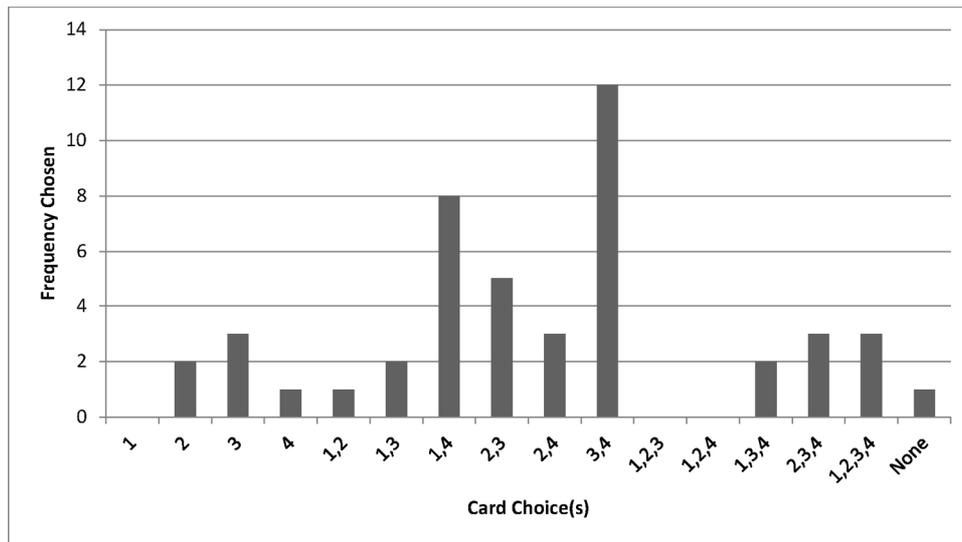
3.2 Results

Participants' card choice(s) are depicted in Figure 1. On average, participants select 2.0 cards to assess the rule. The modal response is to choose the correct cards: *not prudent and responsible with money* and *has a credit card*, representing the false consequent and true antecedent, respectively. However, only 12 of 46 participants (26.1%) select this combination. For comparative purposes, Cosmides and Tooby (1992) report that, in the abstract version of Wason's selection task, less than 25% of the participants typically choose the correct cards. Thus, we do not observe much overall

improvement in our credit card task – in terms of selecting the *correct* combination of cards.

We further examine participants’ choice of each correct card. We count the number of times that participants choose the false consequent and the true antecedent. We find that the false consequent is chosen 30 times and the true antecedent 32 times, out of 96 card selections, making up 31.3% and 33.3% of the total selections, respectively. Notably, participants are just as likely to select the false consequent as the true antecedent ($\chi^2 = 0.095, p = 0.758$).¹² The data from Wason’s (1968) study, on the other hand, indicate that participants are much more likely to choose the true antecedent than the false consequent. We perform binomial tests to gauge whether participants’ choice of each correct card differs from random chance (one-fourth of the time). In both cases, the difference is statistically significant, exceeding chance selection: $p = 0.099$ for the false consequent and $p = 0.042$ for the true antecedent. Accordingly, participants in our credit card task are more likely to choose *one* of the cards necessary to create the counterexample than otherwise.¹³

Figure 1 Frequency of card choice(s) in Experiment 1



The four cards in Experiment 1 are denoted 1, 2, 3, and 4 in the bar chart. The numeric notation corresponds to cards as follows: 1 = prudent and responsible with money (true consequent), 2 = does not have a credit card (false antecedent), 3 = not prudent and responsible with money (false consequent), and 4 = has a credit card (true antecedent). The logically correct cards to select are 3 and 4.

Next, we turn to participants’ ranking of the four cards: recall that a rank of 1 is assigned to the card most likely to violate the rule and a rank of 4 to the card least likely to violate the rule. We find that the top ranked card is the false consequent (mean = 1.31), followed by the true antecedent (mean = 2.13), the false antecedent (mean = 2.87), and the true consequent (mean = 3.69). Bonferroni pairwise comparisons indicate that the mean rankings are all significantly different from one another at $p < 0.012$.¹⁴ Participants seem to recognise that the two cards necessary to create the counterexample are the ones that are most likely to violate the rule.

3.3 Discussion

The results of the first experiment indicate that students, in general, are not adept at selecting the right *combination of cards* to assess the credit card rule – that owning a credit card implies being prudent and responsible with money. Yet, our data suggest that students are more likely to select the correct cards than the incorrect cards. Further, it is noteworthy that when students rank the four cards, the false consequent is ranked first (most likely to violate the rule) and the true antecedent is ranked second (next most likely to violate the rule), with all pairwise comparisons being significantly different from one another. Our findings suggest that most students are cognisant of the dangers of irresponsible financial behaviour and, further, that their memory stores include linkages between *having a credit card* and *not being prudent and responsible with money*. However, their mental models do not appear to be fleshed out, making it difficult for them to contemplate falsifying possibilities when reasoning (see also Johnson-Laird and Savary, 1999; Barres and Johnson-Laird, 2003).

It is possible that students' consideration of the false consequent may be affected by the specific relation between the antecedent and consequent of the credit card rule. Prior studies provide evidence that individuals are more likely to consider the false consequent in reasoning tasks that involve deontic rules as opposed to factual rules (e.g., Quelhas and Byrne, 2003; Quelhas et al., 2010). Deontic rules imply an obligatory or ought relation between the antecedent and consequent – beyond mere statements. For our purposes, credit card ownership may suggest a duty or obligation to exercise financial responsibility: that is, how one ought to behave. Students may believe that if they own a credit card, they should be financially prudent, which facilitates their consideration of the false consequent.¹⁵ We investigate whether changing the credit card rule, so that it is simply factual, weakens students' performance.

4 Experiment 2

The basic setup of the second experiment is similar to that of the first experiment, with a slight variation. We use the same four cards, but alter the decision rule, switching the antecedent and consequent. Students assess the following:

If you are prudent and responsible with money, you have a credit card.

The change may influence students' interpretation of the decision rule, specifically whether it invokes a deontic relation. As mentioned above, individuals are more likely to consider violations (e.g., the false consequent) when assessing a deontic rule than a factual rule (e.g., Quelhas and Byrne, 2003; Quelhas et al., 2010). The decision rule in Experiment 2 is unlikely to trigger a deontic relation because being prudent and responsible with money does not presuppose that one ought to have a credit card. In contrast, the decision rule in Experiment 1 likely gives rise to a deontic relation: students, to some extent, may believe that owning a credit card obligates them to be prudent and responsible with money. Indeed, the results of the first experiment are consistent with this conjecture.

To logically test the decision rule in Experiment 2, students should select *prudent and responsible with money* (true antecedent) and *does not have a credit card* (false consequent). But if the decision rule does not invoke a deontic relation, they may be less

likely to choose the correct cards as compared to Experiment 1. In particular, students may be less inclined to choose the false consequent. Now we turn to the specifics of the second experiment.

4.1 Participants and method

We recruited 46 additional undergraduate students from a large, public university to participate in Experiment 2.¹⁶ As before, the students were pursuing various academic interests, including 14 different areas of study. The students had a median age of 20.0 years and 15 were male. The procedures are identical to those of Experiment 1, with one exception. We change the decision rule so that participants assess the following rule:

If you are prudent and responsible with money, you have a credit card.

The four cards are the same as those from Experiment 1, although the specific cards that constitute the antecedent and consequent are reversed.

Prudent and responsible with money	Does not have a credit card	Not prudent and responsible with money	Has a credit card
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The first card corresponds to the true antecedent, the second to the false consequent, the third to the false antecedent, and the fourth to the true consequent. Participants are instructed to determine the card(s) that definitely need(s) to be turned over to determine if the above rule is violated. Because the rule is conditional, the true antecedent (*prudent and responsible with money*) and the false consequent (*does not have a credit card*) should be selected. Otherwise, the procedures are identical to those of Experiment 1.

4.2 Results

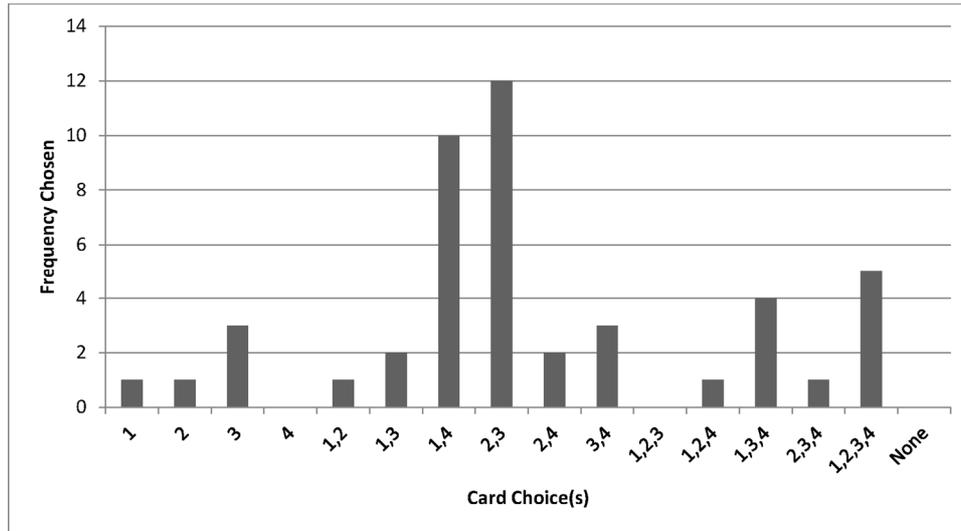
Participants' card choice(s) are depicted in Figure 2. On average, participants select 2.2 cards to assess the rule. Only one participant out of 46 (2.2%) selected the correct cards. The modal response is to choose *not prudent and responsible with money* (false antecedent) and *does not have a credit card* (false consequent), comprising 12 of 46 participants (26.1%). The next most common response is to choose *prudent and responsible with money* (true antecedent) and *has a credit card* (true consequent), making up 10 of 46 participants (21.7%).

Next, we examine the number of times each card is chosen. We find that the false consequent (*not having a credit card*) is chosen the least often – 23 times out of 103 card selections, representing 22.3% of the total selections. The true antecedent, false antecedent, and true consequent are chosen 24, 30, and 26 times, respectively.¹⁷ Binomial tests indicate that none of the card choices (frequencies) differs from random chance ($p > 0.19$). Thus, participants are no more likely to choose either of the correct cards than the incorrect cards.

Subsequently, we examine participants' rankings of the four cards. We note that the top ranked card is the false antecedent (mean = 1.44), followed by the true consequent

(mean = 2.39), the false consequent (mean = 2.69), and the true antecedent (mean = 3.59). We perform Bonferroni tests and find that five of six pairwise comparisons are significantly different at $p < 0.001$: the means of the second and third ranked cards do not differ significantly. In Experiment 2, participants seem to place less emphasis on the false consequent.

Figure 2 Frequency of card choice(s) in Experiment 2



The four cards in Experiment 2 are denoted 1, 2, 3, and 4 in the bar chart. The numeric notation corresponds to cards as follows: 1 = prudent and responsible with money (true antecedent), 2 = does not have a credit card (false consequent), 3 = not prudent and responsible with money (false antecedent), and 4 = has a credit card (true consequent). The logically correct cards to select are 1 and 2.

4.3 Discussion

Experiment 2 provides evidence of a marked drop in participants' selection of the correct cards, as compared to Experiment 1: 2.1% vs. 26.1%. A chi-square test indicates that the difference is statistically significant ($\chi^2 = 10.84$, $p = 0.001$). Students appear to be less attuned to the false consequent in Experiment 2, as compared to Experiment 1. The false consequent is chosen the least number of times and it is the third ranked card out of four (i.e., third most likely to violate the rule). We assert that students in Experiment 2 interpret the decision rule as a factual rule, which inhibits their consideration of the false consequent. Students in Experiment 1, on the other hand, may interpret the decision rule, to some degree, as a deontic rule. This interpretation makes it easier for students to recognise the importance of the false consequent.

We make one further observation with respect to Experiment 2. Looking at the face of the four cards (i.e., *what* is on each card), the rankings are very similar across experiments one and two. The top ranked card, irrespective of the decision rule, is *not prudent and responsible with money*, followed by *has a credit card*, *does not have a credit card*, and *prudent and responsible with money*. This result reinforces our claim that students have developed mental linkages between *having a credit card* and *not being*

prudent and responsible with money and, in turn, are aware of the cost associated with irresponsible financial behaviour. We suggest that students' overall poor performance in the credit card selection task is reflective of inherent difficulties in conditional reasoning. In Experiment 3 (described below), we investigate whether completing another selection task, in which students often identify the correct combination of cards to assess the decision rule, facilitates their performance in the credit card selection task.

5 Experiment 3

We conduct a third experiment to further probe students' reasoning. In our first two experiments, most students fail to choose the correct cards to assess the decision rule. Yet, in both experiments, students respond that *not prudent and responsible with money* and *has a credit card* are the top-ranked cards with respect to violating the decision rule. Students appear to link the two cards (e.g., based on prior experiences), but the linkage does not have a pronounced effect on performance in the selection task: that is, it does not substantially improve students' inferential reasoning.

Prior research suggests that individuals readily comprehend that a conditional relation is invalidated (falsified) by the cooccurrence of the true antecedent and the false consequent (e.g., Wason, 1966; Johnson-Laird and Tagart, 1969; Evans, 1972; Barrouillet et al., 2008; Sevenants et al., 2008). But, individuals' ability to reason along these lines is suspect (e.g., Wason, 1966). In everyday occurrences, individuals typically do not look for instances that are inconsistent with their expectations or beliefs. As such, students' mental models linking credit card ownership and financial responsibility do not appear to be fully fleshed out, causing them to neglect falsifying possibilities (or to inadequately consider such possibilities) in inferential reasoning.

In Experiment 3, we introduce two changes to the credit card selection task (from Experiment 1). First, we are more specific about being prudent and responsible with money, referring to it as paying one's bills when due. We make this change because being prudent and responsible with money is somewhat vague, whereas paying one's bills when due is concrete and tangible. Previous findings suggest that, under certain conditions, concrete content aids reasoning and problem solving (e.g., Markovits and Vachon, 1990; Davidsson and Wahlund, 1992; Reeves and Weisberg, 1993). Second, we investigate whether students' mental models can be enriched by analogical transfer, facilitating their performance in the credit card selection task. Analogical transfer involves applying knowledge or skills gained in one setting to another (e.g., Gick and Holyoak, 1980, 1983; Gentner, 1983, 1989; Holyoak, 1984). For our purposes, students must be cognisant of falsifying possibilities, and the significance of such possibilities, to successfully complete the credit card task. We investigate whether having students complete a novel selection task, in which they typically succeed (i.e., they choose the combination of correct cards), improves their performance in the credit card selection task.

We repeat the basic setup of our earlier experiments, but introduce a second selection task, manipulating the order in which students complete the two tasks. For the second task, we use an adaptation of the cassava root task (described below), developed by Cosmides (1989). In the cassava root task, students assess a decision rule that involves an unfamiliar social law.¹⁸ According to Cosmides (1989), individuals have well-developed cognitive processes that are directed toward reasoning about social exchanges (e.g.,

violating social laws). The implication is that individuals' mental models involving social exchanges are often fully fleshed out, enabling them to readily contemplate falsifying possibilities. Cosmides (1989) reports that 75% of her participants successfully complete the cassava root task, and others (e.g., Gigerenzer and Hug, 1992; Lieberman and Klar, 1996) have replicated the finding.

We examine whether having students complete the cassava root task, followed by the credit card task benefits their performance in the latter. Because the structure and surface features of the two tasks are very similar, analogical transfer is likely to occur (Gentner and Toupin, 1986; Holyoak and Koh, 1987). Thus, completing the cassava root task first likely sheds light on *how to* complete the credit card task. We contend that experience with the cassava root task highlights the importance of falsifying possibilities, including the pitfalls of failing to fulfil obligations and not satisfying responsibilities. By recognising the importance of falsifying possibilities, inferential reasoning can be improved. If individuals activate the correct decision rule while completing the cassava root problem, they are able to readily apply the rule to the credit card problem (e.g., Davidsson and Wahlund, 1992). Our third experiment is designed to address this issue.

5.1 *Participants and method*

We recruited 55 students from a medium-sized, public university to participate in Experiment 3. The students' academic pursuits comprised 11 different areas of study. The students had a median age of 21.1 years and 31 were male. The procedures are similar to those of Experiment 1, with the following changes. We alter the credit card decision rule and asked participants to assess the following.

If you have a credit card, you pay all your bills when due.

As mentioned previously, we made the change because *being prudent and responsible with money* is imprecise and potentially ambiguous. The change in decision rule necessitates that we modify the four cards, which appear below.

Pays all bills when due	Does not have a credit card	Pays at least one bill late per month	Makes purchases using a credit card
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The first card corresponds to the true consequent, the second to the false antecedent, the third to the false consequent, and the fourth to the true antecedent. Participants need to turn over the third and fourth cards to correctly assess the decision rule.

We also lengthened the background material for the credit card task, elaborating on the consequences of paying/not paying one's bills when due. The background material used in Experiment 3 is shown below.

Many university students use credit cards as a means to manage cash flows and day-to-day finances. By spending wisely and responsibly, credit cards allow individuals to take advantage of opportunities and facilitate discretionary spending.

When individuals reach 18 years of age, they are often besieged by offers from credit card companies. The companies offer various incentives to encourage young adults to get a credit card, including no annual fees, 0% interest for six months, cash-back bonuses on purchases from affiliated retailers, and a host of other incentives.

By obtaining a credit card, university students can establish a positive credit history, which represents an important step for young adults. For those who already have a limited credit history (e.g., a car loan), it is easier to get a credit card, potentially with more favourable terms.

Students can benefit from obtaining a credit card as long as they are prudent and responsible with money. Students who pay their bills (e.g., rent, utilities, tuition, etc.) on a timely basis can be regarded as prudent and responsible with money. By paying bills on a timely basis (when due), students avoid unnecessary interest and penalty charges.

Students who do not pay their bills on a timely basis may be poor candidates for obtaining a credit card. Such students may be less responsible financially and more apt to misuse credit cards. In turn, they likely incur interest and penalty charges and experience greater debt than others.

We are interested in assessing a rule whereby students who obtain a credit card are those who have a history of paying their bills when due. Financial experts assert that students should only have a credit card if they are financially responsible, and one means to assess financial responsibility is whether students pay their bills on time.

The first three paragraphs were used in our earlier experiments, while the subsequent paragraphs represent new background material.

Experiment 3 also includes a second selection task (the cassava root task).¹⁹ We manipulate the order that participants perform the two selection tasks. Twenty-five participants complete the cassava root task, followed by the credit card task (CC Second condition). Thirty participants complete the two tasks in the reverse order (CC First condition). Importantly, we do not provide students with any feedback on performance in the first task prior to completion of the second task. By not providing feedback, we ensure that students' performance in the second task is not explained by their learning the correct combination of cards in the first task.

The background materials for the cassava root task include the following text, developed by Cosmides (1989).

You are a Kaluame, a member of a Polynesian culture found only on Maku Island in the Pacific. The Kaluame have many strict laws, which must be enforced, and the elders have entrusted you with enforcing them. To fail would disgrace you and your family.

Among the Kaluame, when a man marries, he gets a tattoo on his face; only married men have tattoos on their faces. A facial tattoo means that a man is married; an unmarked face means that a man is a bachelor.

Cassava root is a powerful aphrodisiac – it makes the man who eats it irresistible to women. Moreover, it is delicious and nutritious – and very scarce.

Unlike cassava root, molo nuts are very common, but they are poor eating – molo nuts taste bad, they are not very nutritious, and they have no other interesting 'medicinal' properties.

Although everyone craves cassava root, eating it is a privilege that people closely ration. You are a very sensual people, even without the aphrodisiacal properties of cassava root, but you have very strict sexual mores. The elders strongly disapprove of sexual relations between unmarried people, and particularly distrust the motives and intentions of bachelors.

Therefore, the elders have made laws governing rationing privileges. The one you have been entrusted to enforce is as follows.

If a man eats cassava root, then he must have a tattoo on his face.

Cassava root is so powerful an aphrodisiac that many men are tempted to cheat on this law whenever elders are not looking. The cards below have information on four young Kaluame men sitting in a temporary camp; there are no elders around. A tray filled with cassava root and molo nuts has just been left for them. Each card represents one man. One side of a card tells which food a man is eating, and the other side of the card tells whether or not the man has a tattoo on his face.

Your job is to catch men whose sexual desires might tempt them to break the law – if any get past you, you and your family will be disgraced.

The four cards are shown below.

Eats cassava root	No tattoo	Eats molo nuts	Tattoo
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The first card is the true antecedent, the second is the false consequent, the third is the false antecedent, and the fourth is the true consequent. Participants must turn over the first and second cards to correctly assess the decision rule. Lastly, once participants have performed both selection tasks, they complete a post-experiment questionnaire designed to collect general, demographic information.

5.2 Results

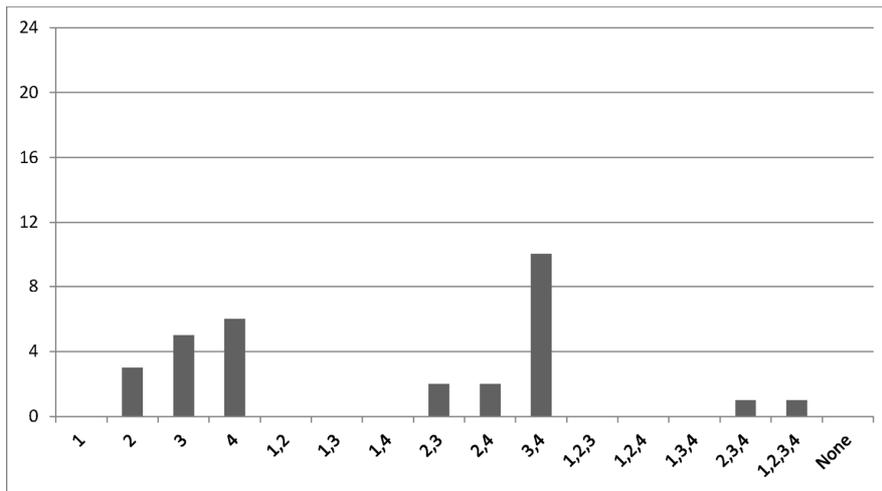
Participants' card choice(s) in the credit card selection task are depicted in Figure 3, with a separate panel for each experimental condition. In the CC First condition, 10 out of 30 participants (or 33.3%) select the correct combination of cards (refer to panel A). In the CC Second condition, on the other hand, 20 out of 25 participants (or 80.0%) select the correct combination. A chi-square test indicates that the difference is statistically significant ($\chi^2 = 11.98, p = 0.001$).

Next, we examine participants' card choice(s) in the cassava root task, which are shown in Figure 4. When participants complete the cassava root task first (CC second condition), 18 out of 25 (or 72.0%) select the correct combination of cards (refer to panel B). When they complete the cassava root task second (CC First condition), 20 out of 30 (or 66.7%) select the correct combination (refer to panel A). A chi-square test indicates that the difference is not statistically significant ($\chi^2 = 0.18, p = 0.670$). The rates are comparable to those reported by Cosmides (1989).

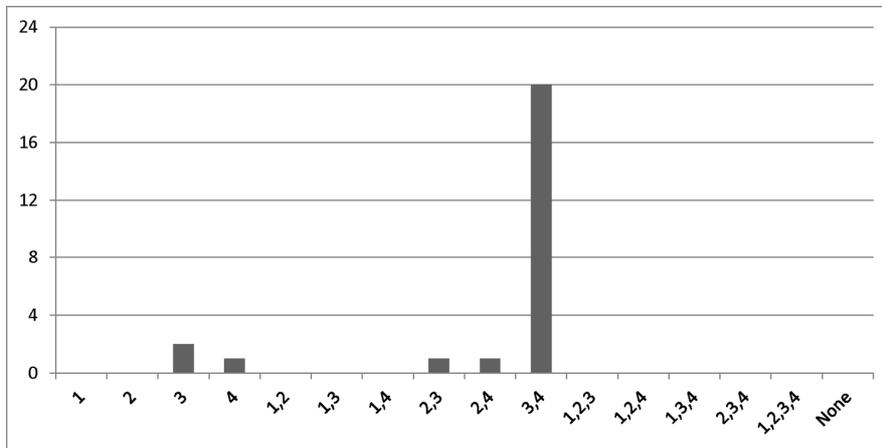
We contend that when students complete the cassava root task first, their performance in the credit card task is improved because of analogical transfer. To shed light on this issue, we investigate the association between students' performance across the two tasks

by experimental condition. If analogical transfer is at work, students in the CC Second condition should be more likely to identify the correct combination of cards in the credit card task as long as they are successful in the cassava root task by comparison to students in CC First condition. Our reasoning is that analogical transfer (from the cassava root task to the credit card task) can only occur when the cassava root task is completed first.²⁰

Figure 3 Frequency of card choice(s) in Experiment 3: credit card task: (a) panel A: CC first condition and (b) panel B: CC second condition



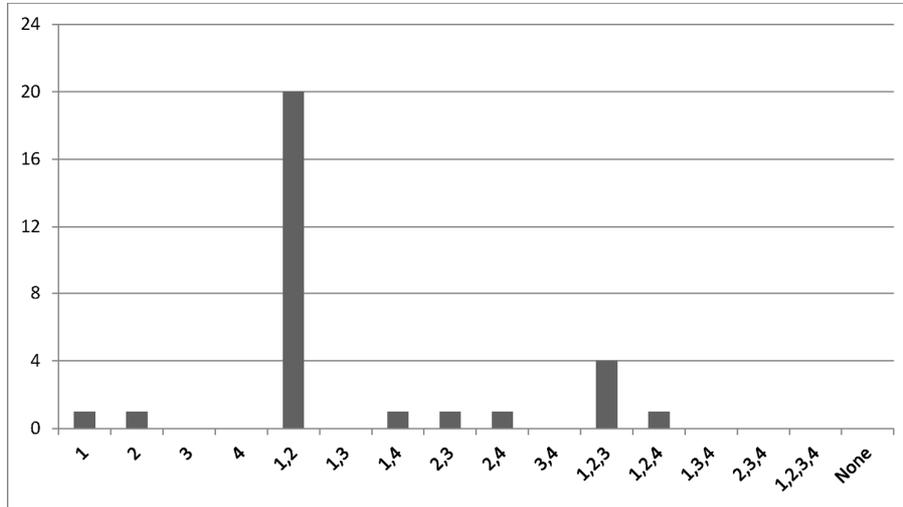
(a)



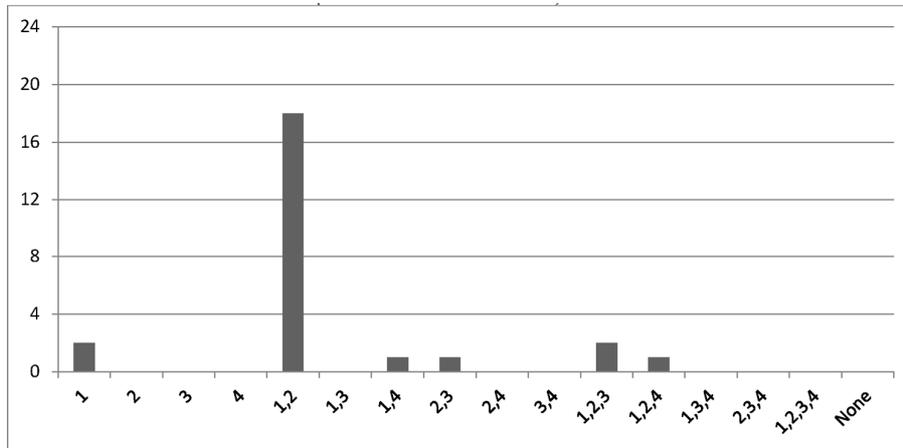
(b)

In the CC First condition (Panel A), participants complete the credit card task first, followed by the cassava root task. In the CC Second condition (Panel B), participants complete the two selection tasks in the reverse order. The four cards in credit card task in Experiment 3 are denoted 1, 2, 3, and 4 in the bar chart. The numeric notation corresponds to cards as follows: 1 = pays all bills when due (true consequent), 2 = does not have a credit card (false antecedent), 3 = pays at least one bill per month late (false consequent), and 4 = makes purchases using a credit card (true antecedent). In both conditions, the logically correct cards to select are 3 and 4.

Figure 4 Frequency of card choice(s) in Experiment 3: cassava root task: (a) panel A: CC first condition (cassava root task second) and (b) panel B: CC second condition (cassava root task first)



(a)



(b)

In the CC First condition (Panel A), participants complete the credit card task first, followed by the cassava root task. In the CC second task (Panel B), participants complete the two selection tasks in the reverse order. The four cards in the cassava root task in Experiment 3 are denoted 1, 2, 3, and 4 in the bar chart. The numeric notation corresponds to cards as follows: 1 = eats cassava root (true antecedent), 2 = no tattoo (false consequent), 3 = eats molo nuts (false antecedent), and 4 = tattoo (true consequent). In both conditions, the logically correct cards to select are 1 and 2.

We find that in the CC Second condition, 18 students identify the correct combination of cards in the cassava root task, of which 15 (or 83.3%) are successful in the credit card task. In contrast, in the CC First condition, 20 students identify the correct combination in the cassava root task, of which only 10 (or 50.0%) are successful in the credit card task.

A chi-square test indicates that the difference is statistically significant ($\chi^2 = 4.68$, $p = 0.031$). This finding is consistent with our argument that completing the cassava root task first benefits students' performance in the credit card task.

Further inspection of the data indicates that in both experimental conditions, students focus predominantly on the true antecedent (*makes purchases using a credit card*) and the false consequent (*pays at least one bill late per month*) in choosing cards to assess the credit card decision rule. In the CC Second condition, out of 47 card selections, 22 (or 46.8%) involve the true antecedent and 23 (or 48.9%) the false consequent. By comparison, in the CC First condition, out of 49 card selections, 20 (or 40.8%) involve the true antecedent and 19 (or 38.8%) the false consequent.²¹ We find that, in every case, binomial tests indicate that the true antecedent or the false consequent are more likely to be selected than random chance ($p < 0.025$). Notwithstanding, the focus on the correct cards is more pronounced in the CC Second condition than in the CC First condition. Students are less likely to select an incorrect card in the CC Second condition (2 out of 47 or 4.3%) than in the CC First condition (10 out of 49 or 20.4%), and a chi-square test indicates that the difference is statistically significant ($\chi^2 = 5.72$, $p = 0.017$).²²

5.3 Discussion

The results of Experiment 3 suggest that analogical transfer facilitates students' performance in the credit card selection task. By first completing the novel task that involves social law, students become attuned to the need to fulfil obligations and satisfy responsibilities. They transfer such knowledge to the credit card task, which makes them more mindful of the problems associated with being financially irresponsible. We contend that analogical transfer enriches students' mental representations, such that the false consequent (failure to show financial responsibility) is integrated in their mental models. In turn, students' mental representations linking credit card ownership and financial responsibility become fully fleshed out.

We observe that, in Experiment 3, students are much less likely to select incorrect cards (the false antecedent and/or the true consequent) than in experiments one and two. This result holds even if we only consider the CC First condition from Experiment 3. We believe that this result is attributable to the lengthened discussion in the background material, which expands on the consequences of paying/not paying one's bills when due. We suggest that that the lengthened discussion draws students' attention to the advantages of credit card ownership and the hazards of irresponsible financial behaviour. We note, however, that absent analogical transfer, students' performance in the credit card selection task does not improve: a chi-square test ($\chi^2 = 0.46$, $p = 0.496$) indicates that success in identifying the correct combination of cards does not differ when comparing students' performance in the CC First condition in Experiment 3 (33.3% are successful) to their performance in Experiment 1 (26.1% are successful). Therefore, the lengthened discussion appears to focus students' attention on the correct cards, but it does not improve their inferential reasoning skills.

6 Conclusion

We report the results of three experiments designed to investigate college students' mental representations of credit cards, focussing on linkages to financial responsibility. Extant findings suggest that students' knowledge of credit cards is inadequate, particularly their knowledge of the potential costs (e.g., interest charges that accrue on outstanding balances). In the current study, we are not interested in students' financial knowledge, per se, but rather in mental linkages that are readily associated with owning a credit card. In our experiments, students complete an inferential reasoning task, which asks them to assess conditional relations. The task is such that students' responses provide evidence on their rudimentary understanding of *what* credit card ownership entails, in turn representing linkages in students' mental models.

The findings of our first two experiments suggest that students readily associate credit card ownership with the need to exercise financial responsibility. Yet, they have difficulty correctly assessing conditional relations. Students, in general, believe that they *should be* financially responsible, but their mental models do not appear to be fully fleshed out: that is, the linkage between credit card ownership and the failure to exercise financial responsibility appears to be insufficient. We conduct a third experiment to determine whether analogical transfer can be used to enrich students' mental models of credit card ownership, emphasising an obligation to exercise financial responsibility. In the third experiment, students complete the credit card reasoning task after a novel reasoning task that involves social law. We find a marked improvement in students' performance in the credit card task. These findings suggest that the novel task underscores the need to fulfill obligations and satisfy responsibilities. Students transfer this knowledge to the credit card task, which in turn brings to mind the perils of being financially irresponsible. We encourage future research examining the reasoning and transfer of knowledge for more experienced users of financial products.

The results of the experiments reported here have implications for measures that can be taken to bolster students' understanding of the need to be financially responsible. It is commonly believed that negative consequences will deter undesirable behaviour. So, for example, in order to discourage excessive spending, credit card balances are carried over with high financing charges and late payments are penalised with large fees. However, the desired results may not be realised. In their study of late fees at daycare centres, Gneezy and Rustichini (2000) report that more parents are late picking up their children at daycare centres when fines for late pick up are in place. They argue that a fine can be viewed as a price paid for a commodity or service. The fine may not deter parents from picking up their children late if parents view it as compensation to the daycare centre for a service. If credit card owners view credit card penalties as payment for a service, they will not attach guilt or shame to carrying large balances.

Our findings from Experiment 3 suggest that if college students are to make wise financial decisions they must internalise the obligation to exercise financial responsibility. It is their duty to spend prudently and to pay their bills when due, and a failure to do so is unacceptable. One practical means to highlight students' obligation is to further educate them on the perils of the misuse of credit before they develop dangerous habits. Financial education programs are currently offered through various non-profit agencies such as the Federal Reserve and the National Endowment for Financial Education. Potentially, young adults could complete an educational program on financial responsibility, which might signal their financial wherewithal. In fact, the US

evidence suggests that educational efforts and policy changes have had some success in discouraging the accumulation of credit card debt. In a recent report, Sallie Mae finds that US college students are using credit cards more responsibly in recent years (Sallie, 2013): the reports indicates that six of ten students pay off their credit card bill each month, and only 1% makes less than the minimum payment. Furthermore, average credit card debt for college students has dropped to \$499, from markedly from \$3,173 in 2008 (Sallie, 2013). Since the implementation of the CARD Act in 2009, credit card usage among US college students has declined every year.

Though declining usage of credit card may be due, in part, to the global recession, educational efforts seem to be working. In a similar vein, all states in the USA have adopted graduated licensing, which limits young drivers who first acquire their license, with more freedom given over time. The National Highway Traffic Safety Administration and the Insurance Institute for Highway Safety argue that, due to inexperience and immaturity, young drivers are prone to take risk. Drivers education combined with graduated licensing have reduced the teenage fatality rate.²³ As with driving restrictions in some locales, financial certification and a graduated credit system would allow young adults time to acquire experience and maturity before a large debt burden accumulates.

Acknowledgements

The authors thank Murat Doral, Vivian Kirby, Tim Mathews, Mike Patrono, Anajana Rajamani, Shankar Venkataraman, and two anonymous referees for helpful comments and gratefully acknowledge the financial support of the Coles College of Business.

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Notes

¹See the website of the National Centre for Education Statistics at <http://nces.ed.gov/fastfacts/display.asp?id=372>

²See the *Chronicle of Higher Education* (18 September, 2009), which reports 151 million students internationally.

³See the website of the Association for Young People's Health at <http://www.youngpeopleshealth.org.uk/3/resources/17/key-data-on-adolescence/>.

⁴Examples abound across an array of diverse economies, including Asia ("Consumer loans surge across Asia: Banks from around the world target middle class," *Wall Street Journal*, 22 April, 2013), Canada ("Credit card debt in Canada, 1 in 20 fear they will never pay off bills, survey finds," *The Huffington Post Canada*, 14 January, 2013), and Turkey ("Credit card debt threatens Turkey's economy," *The New York Times*, February 27, 2014).

⁵By necessity, some components are represented symbolically in an individual's mind. For instance, negation (i.e., what is *not* the case) may be represented symbolically.

⁶Nearly 75% of the participants choose the correct cards.

⁷Cosmides and Tooby (1992) contend that it is not necessarily experience or familiarity that improves students' performance in the drinking-age problem. They assert that when reasoning tasks involve a social contract, individuals activate specialised cognitive mechanisms (e.g., detecting cheaters or violators) that facilitate performance. Cosmides and Tooby (1992) have devised novel reasoning problems that involve social exchange and produced performance rates comparable to those obtained in the drinking-age problem.

⁸In addition, the CARD Act mandates that colleges and universities transparently disclose any agreements that are made with card issuers for the purpose of marketing credit cards (U.S. Congress, 2009, section 304). This part of the Act is the result of banks partnering with colleges and universities (through alumni or athletic associations) to offer affinity cards, which allow banks access to student information.

⁹According to United College Marketing Services, the average college student receives between 25 and 50 credit card solicitations per semester (<http://www.ucms.com/college-credit-card-statistics.htm>).

¹⁰If students in our participant pool think differently than the economic agents of interest, generalisation of our results to other populations may not be appropriate. However, our interest here is in the decision-making of college-aged students.

¹¹Experimental instructions are included in Appendix.

¹²We find that 30 participants (65.2%) choose the false consequent and 32 (69.6%) choose the true antecedent. The proportions are not significantly different ($\chi^2 = 0.095, p = 0.656$).

¹³The cards for *prudent and responsible with money* and *does not have a credit card* are chosen 16 times (16.7%) and 17 times (17.7%), respectively. Binomial tests indicate that the proportion of times each card is selected is significantly less than chance occurrence ($p < 0.06$).

¹⁴Throughout the paper, we also perform nonparametric pairwise comparisons and, in all cases, inferences are unchanged.

¹⁵Subsequently, we distributed a brief questionnaire to 66 students (average age of 20.9 years, with 40 being male) from the same university as those who participated in Experiment 1. We asked students to indicate their level of agreement to a series of statements on an 11-point scale, with endpoints labelled 1 = strongly disagree and 11 = strongly agree. Relevant statements, with mean responses shown parenthetically, appear below.

- If you have a credit card, you *should* be prudent and responsible with money (10.62).
- If you have a credit card, you are tempted to spend beyond your financial means (7.80).
- If you have a credit card, you are prudent and responsible with money (4.45).
- The average university student is apt to misuse credit cards (7.93).

In all cases, the mean response is significantly different from the scale midpoint at $p < 0.001$. Students' responses suggest that they believe they *should be* financially responsible if they have a credit card (a deontic relation). However, students recognise that this relation does not necessarily hold and that credit card abuse often occurs.

¹⁶No student participated in more than one experiment.

¹⁷We find that 23 participants (50%) choose the false consequent and 23 (50%) choose the true antecedent.

¹⁸We use a novel second task because we want to avoid the possibility that participants' experience affects their performance (e.g., drinking-age problem).

¹⁹By lengthening the background text for the credit card task, the total word count for the two selection tasks are comparable: 414 words in the credit card task and 387 words in the cassava root task.

²⁰It is possible that students who complete the cassava root task first learn the structure of the task and then apply this learning in the subsequent credit card task. However, our results suggest that learning is not the entire explanation because performance on the Cassava task is *not degraded* when it occurs second. Recall that there is no feedback between tasks.

²¹In the CC second condition, we find that 25 participants choose the false consequent (100%) and 25 choose the true antecedent (100%). By comparison, in the CC first condition, 19 participants choose the false consequent (63.3%) and 20 choose the true antecedent (66.7%).

²²We also examine students' card selections in the cassava root task. We find that, in every case, binomial tests indicate that the true antecedent or the false consequent are more likely to be selected than random chance ($p < 0.01$). However, students' selection of an incorrect card does not differ significantly between the two experimental conditions ($\chi^2 = 0.33, p = 0.564$).

²³See <http://www.nhtsa.gov/people/injury/newdriver/saveteens/sect3.html> and <http://www.iihs.org/iihs/news/desktopnews/states-could-sharply-reduce-teen-crash-deaths-by-strengthening-graduated-driver-licensing-laws>.

Appendix

Instructions for the basic social contract condition follow. Instructions for other treatments are as described in the paper.

Instructions

You are being asked to respond to a request pertaining to university students and the use of credit cards. Your careful consideration is critical for our research and to recognise your effort, you will receive \$10 at the conclusion of the session today. Consider the following.

Many university students use credit cards as a means to manage cash flows and day-to-day finances. By spending wisely and responsibly, credit cards allow individuals to take advantage of opportunities and facilitate discretionary spending.

When individuals reach 18 years of age, they are often besieged by offers from credit card companies. The companies offer various incentives to encourage young adults to get a credit card, including no annual fees, 0% interest for six months, cash-back bonuses on purchases from affiliated retailers, and a host of other incentives. In some instances, individuals are automatically qualified to receive a credit card simply by responding to the promotional offer. In other instances, a limited credit history is required for approval.

By obtaining a credit card, university students can establish a positive credit history, which represents an important step for young adults. For those who already have a limited credit history (e.g., a car loan), it is easier to get a credit card, potentially with more favourable terms.

We are interested in the relation between students having a credit card and their spending habits. Please consider the following rule.

“If you have a credit card, you are prudent and responsible with money.”

Information pertaining to four students is shown below. Each square represents a two-sided card, with only one side showing. One side of the card indicates whether the student has a credit card and the other side indicates whether the student is prudent and responsible with money. Each square/card represents one student.

Please indicate those card(s) that you definitely need to turn over to see if the rule “if you have a credit card, you are prudent and responsible with money” is violated. Please place an ‘X’ under the cards(s) that you definitely need to turn over.

Prudent and responsible with money	Does not have a credit card	Not prudent and responsible with money	Has a credit card
------------------------------------	-----------------------------	----------------------------------------	-------------------

Rank _____

Note: Please mark the cards above you would turn over.

Next, please rank the students from 1-4 based on how likely each is to violate the rule “if you have a credit card, you are prudent and responsible with money.” Assign a rank of 1 to the student who is most likely to violate the rule, a rank of 2 to the student who is next most likely to violate the rule, and so on to a rank of 4 to the student who is least likely to violate the rule.

Prudent and responsible with money	Does not have a credit card	Not prudent and responsible with money	Has a credit card
------------------------------------	-----------------------------	----------------------------------------	-------------------

Rank _____

Note: Remember, a rank of 1 is assigned to the student who is most likely to violate the rule and a rank of 4 is assigned to the student who is least likely to violate the rule.