

Consumers' Understanding of Credit Card Debt

Shortcomings and Solutions

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Related Work

- Many Americans are financially illiterate (*Lusardi & Mitchell, 2007, 2008*).
- People treat savings growth as linear, not exponential (*Eisenstein & Hoch, 2007; McKenzie & Liersch, forthcoming in JMR*).
- People tend to underestimate interest rate associated with a stream of payments (*Stango & Zinman, 2009*).

Rigid Algorithms

(Fischbein, 1994)

Problem: Five kilos of apples cost 15 shekels. How much will 7 kilos of apples cost?

$$\frac{15 \text{ shekels}}{5 \text{ kilos}} = \frac{X \text{ shekels}}{7 \text{ kilos}}$$

Problem: Seven workers finish a certain piece of work in 28 days. In how many days will five workers finish the work?

$$\frac{28 \text{ days}}{7 \text{ workers}} = \frac{X \text{ days}}{5 \text{ workers}} \quad ????$$

Intuitive Algorithms

- People acquire algorithms based on education, experience, and aptitude.
- The algorithms work fine when new problems are formally identical to old ones.
- People often apply the algorithms when new problems *resemble* old ones.
- Perceived resemblance does not guarantee formal equivalence.

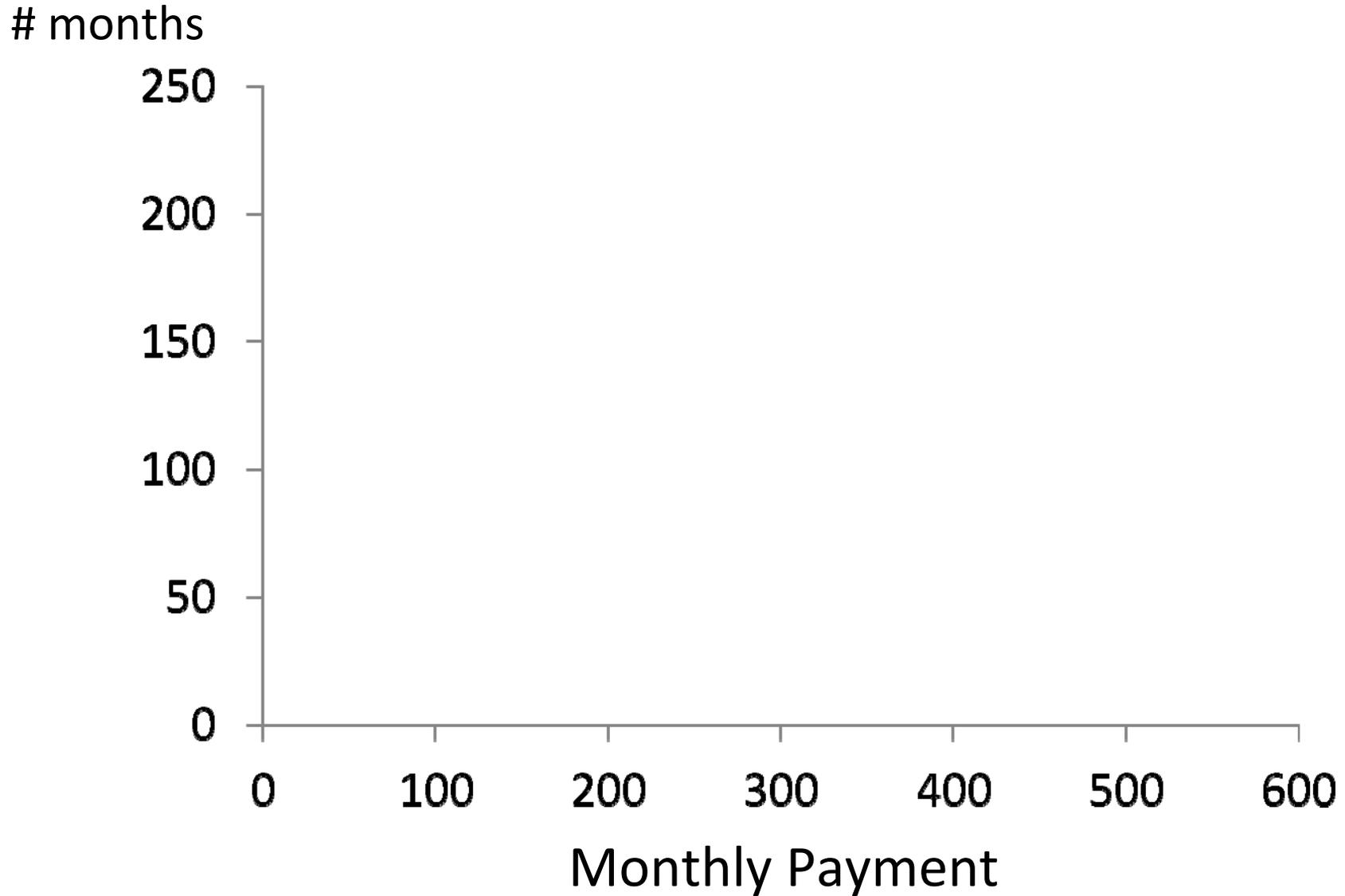
Intuitive

$$X_1 - X_2 \quad \frac{X_2 - X_1}{X_1}$$

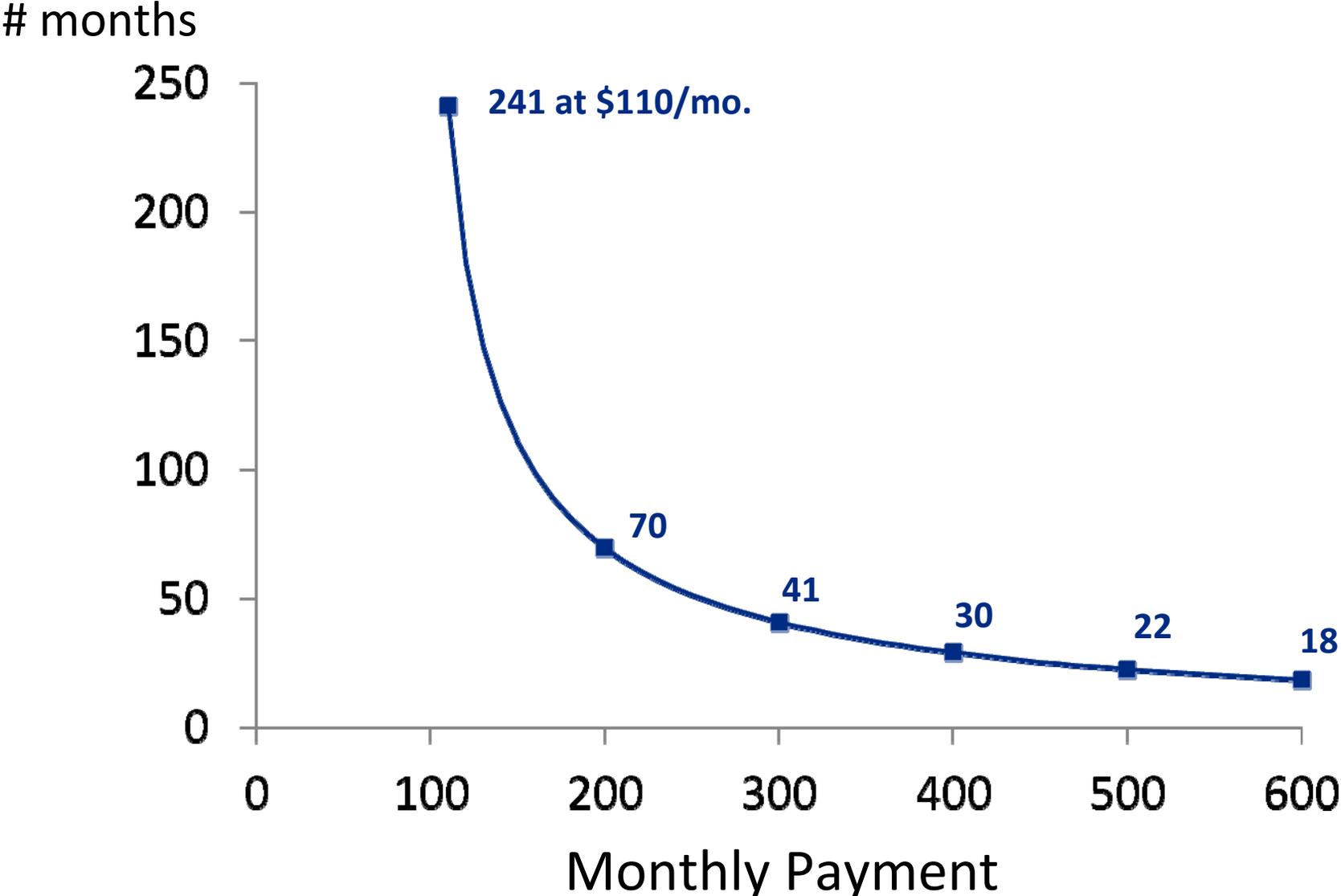
Not Intuitive

$$N = \frac{-\log(1 - iA/P)}{\log(1 + i)}$$

Number of months needed to pay off a \$10,000 debt when APR = 12% as a function of the fixed monthly payment.

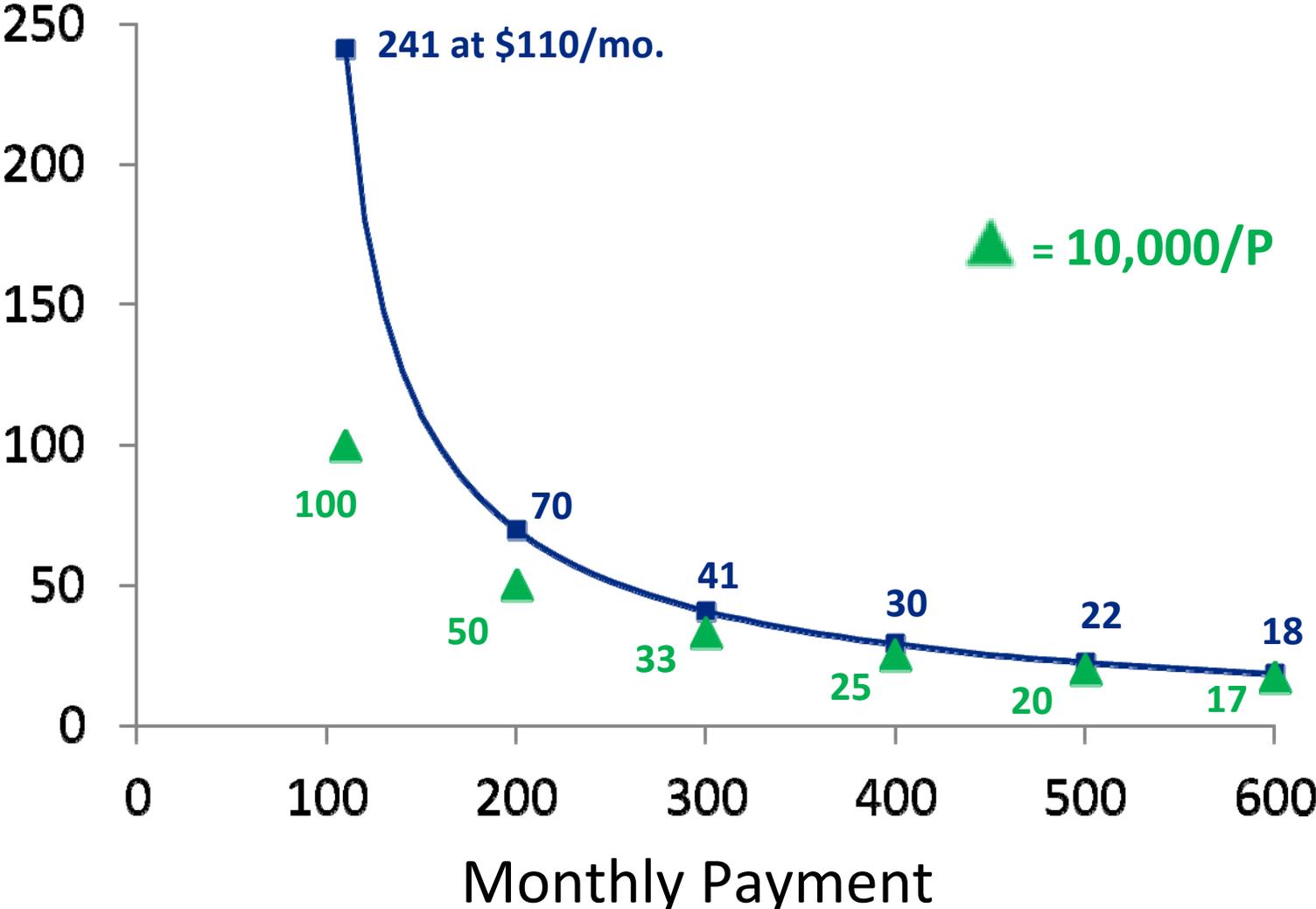


Number of months needed to pay off a \$10,000 debt when APR = 12% as a function of the fixed monthly payment.



Number of months needed to pay off a \$10,000 debt when APR = 12% as a function of the fixed monthly payment.

months



The Payoff Time Problem

You owe \$10,000 on the card and the interest rate is 12% annually. You have destroyed the card and will not use it any more.

*Suppose that you plan to pay a fixed amount of **\$110** [\$210, \$310, \$410] **per month** until the card is completely paid off. What is your best estimate of how many months it will take to totally pay off the card?*

*Measured numeracy, using a modified version of established scales (Lipkus, Samsa, & Rimer, 2001; Weller et al., 2010).

Numeracy Estimate

Low

95

Just divided 10,000 by 110 and then added a few more months for interest.

High

189

I divided the ten thousand by 110 to see how many months it would take to pay it off without interest. Then I got that it would be 9 years. I multiplied 10,000 by .12 and got 1200 interest per year. I multiplied that by 9 years and came up with 10,800. I added the interest to the principal and came up with 20,800 and I divided that by 110 for the amount paid until it was paid off, and I came up with 189 months.

High

240

I used an amortization calculator.

The Payoff Time Problem

Results (N = 582)

Monthly Payment	Correct answer	Median participant estimate	Interquartile range of estimates
\$110	241	110	85-150
\$210	65	60	53-80
\$310	40	44.5	36-60
\$410	29	30	26-40

- Numeracy predicted only the \$110 payment condition
Low Numeracy → *regr. model estimate = 78 months*
High Numeracy → *regr. model estimate = 169 months*

Payoff Time Problem Summary

- People decompose the problem into pieces and apply the math that they know.
- People dramatically underestimate when payments barely cover interest.
- High numeracy reduces the bias toward underestimation, but does not eliminate it.

The Payoff Amount Problem

American Consumers Bank

Payment Due Date

7/15/2010

Previous Balance \$	Payment Activity \$	New Activity \$	Fees and Finance Charges	New Balance \$	Minimum Amount Due \$
A 10,794.63	B -300.00	C +0.00	D +107.95	E 10,602.58	F 212.00

G Annual Percentage Rate 12.0%
--

Late Payment Warning: If we do not receive your Minimum Amount Due by the Payment Due Date listed above, you will have to pay a late fee of up to \$39.00.

Imagine that you would like to pay off the entire balance on the card in three years. You have cut the card into pieces and will no longer be using this card.

Given that you will not be using the card, what is your best estimate of how much you will need to pay each month so that you will have no balance remaining after three years?

American Consumers Bank

Payment Due Date

7/15/2010

Previous Balance \$	Payment Activity \$	New Activity \$	Fees and Finance Charges	New Balance \$	Minimum Amount Due \$
A 10,794.63	B -300.00	C +0.00	D +107.95	E 10,602.58	F 212.00

G Annual Percentage Rate 12.0%
--

Late Payment Warning: If we do not receive your Minimum Amount Due by the Payment Due Date listed above, you will have to pay a late fee of up to \$39.00.

Possible Intuitive Strategies:

- Anchor on \$212 (*Navarro-Martinez, Salisbury, et al., forthcoming in JMR*).
- Anchor on Balance/36
 $\$294 + \$30 = \$324$
- (Balance + interest)/36
 $[10,602 + .36(10,602)]/36 = \400

Correct Answer

\$352.16

Does The New Credit Card
Statement Help?

American Consumers Bank

Payment Due Date

7/15/2010

Previous Balance \$	Payment Activity \$	New Activity \$	Fees and Finance Charges	New Balance \$	Minimum Amount Due \$
(A) 10,794.63	(B) -300.00	(C) +0.00	(D) +107.95	(E) 10,602.58	(F) 212.00

(M) Annual Percentage Rate 12.0%
--

Late Payment Warning: If we do not receive your Minimum Amount Due by the Payment Due Date listed above, you will have to pay a late fee of up to \$39.00.

Minimum Payment Warning: If you make only the minimum payment each period, you will pay more in interest and it will take you longer to pay off your balance. For example:

If you make no additional charges and each month you pay...	You will pay off the balance shown on this statement in about...	And you will pay an estimated total of...
(G) Only the Minimum Amount Due	(H) 22 years	(I) \$20,294.97
(J) \$352.16	(K) 3 years	(L) \$12,677.67

Correct Answer

\$352.16

Table says “if you make no additional charges and each month you pay...”

What if the consumer is still using the card?

Imagine that you would like to pay off the entire balance on the card in three years. You also plan to continue using the card. In a typical month, you expect to charge about \$500 of new purchases on this card. You will spend approximately this amount every month.

Given that you will still be using the card, what is your best estimate of how much you will need to pay each month so that you will have no balance remaining after three years.

American Consumers Bank

Payment Due Date

7/15/2010

Previous Balance \$	Payment Activity \$	New Activity \$	Fees and Finance Charges	New Balance \$	Minimum Amount Due \$
A 10,300.00	B -300.00	C +500.00	D +102.58	E 10,602.58	F 212.00

M Annual Percentage Rate
12.0%

Late Payment Warning: If we do not receive your Minimum Amount Due by the Payment Due Date listed above, you will have to pay a late fee of up to \$39.00.

Minimum Payment Warning: If you make only the minimum payment each period, you will pay more in interest and it will take you longer to pay off your balance. For example:

If you make no additional charges and each month you pay...	You will pay off the balance shown on this statement in about...	And you will pay an estimated total of...
G Only the Minimum Amount Due	H 22 years	I \$20,294.97
J \$352.16	K 3 years	L \$12,677.67

Correct Answer
(\$500 in monthly purchases)

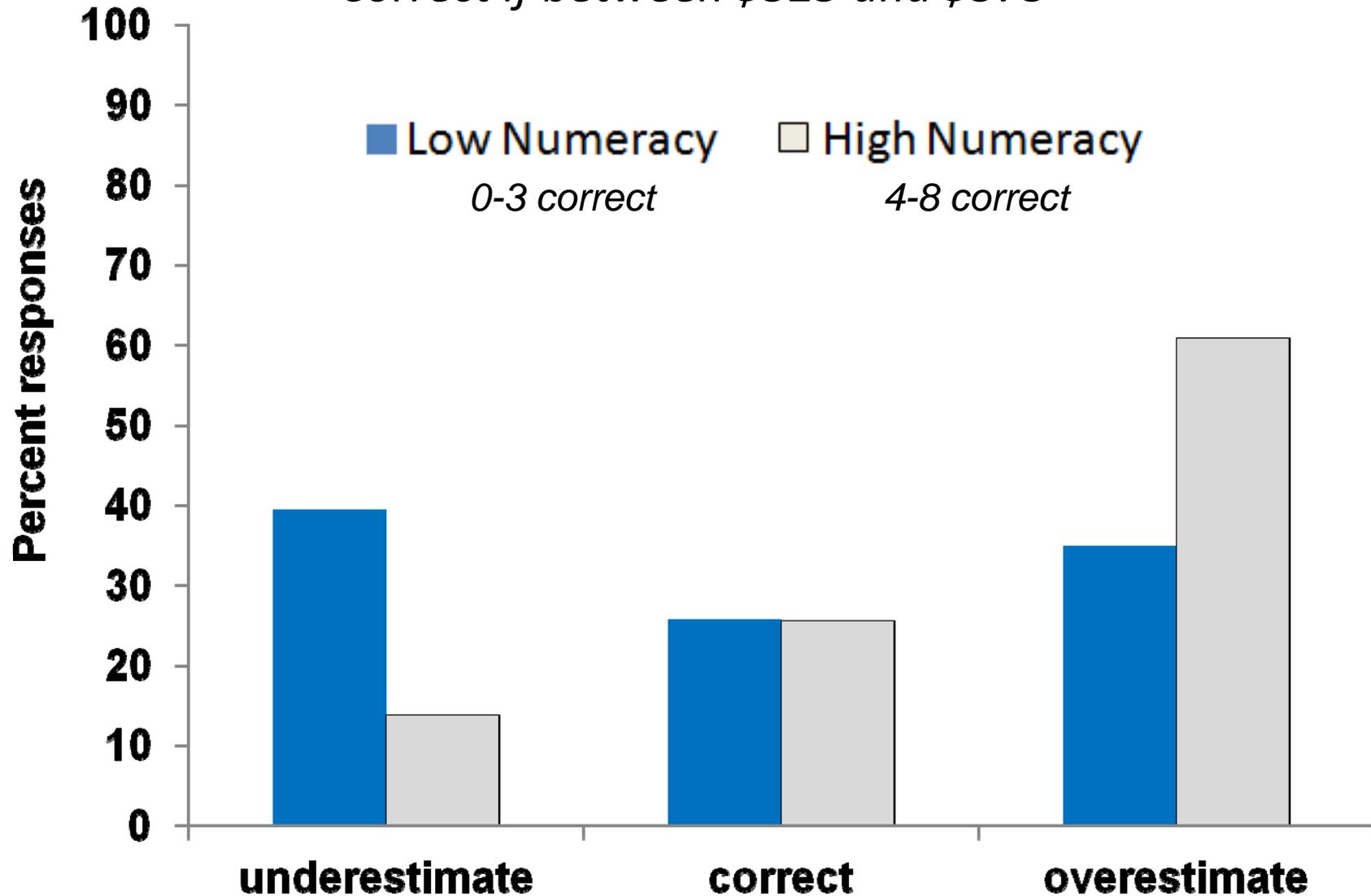
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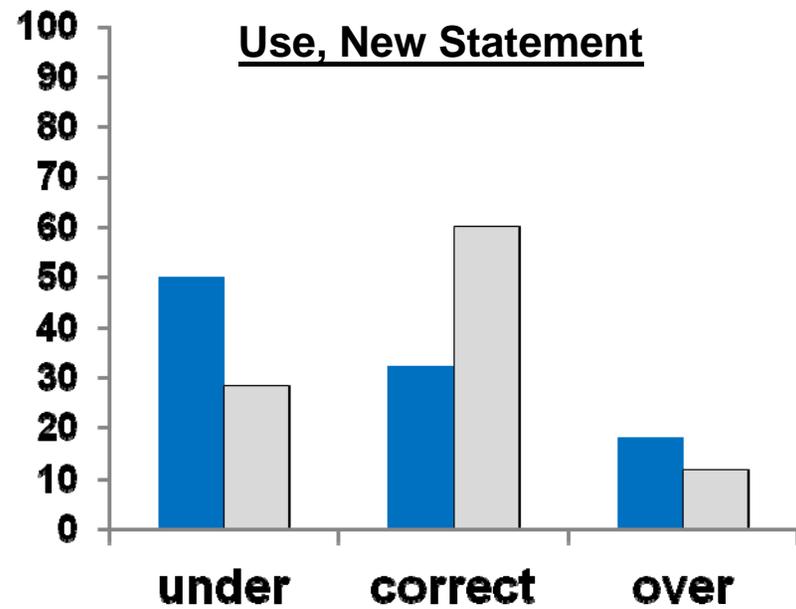
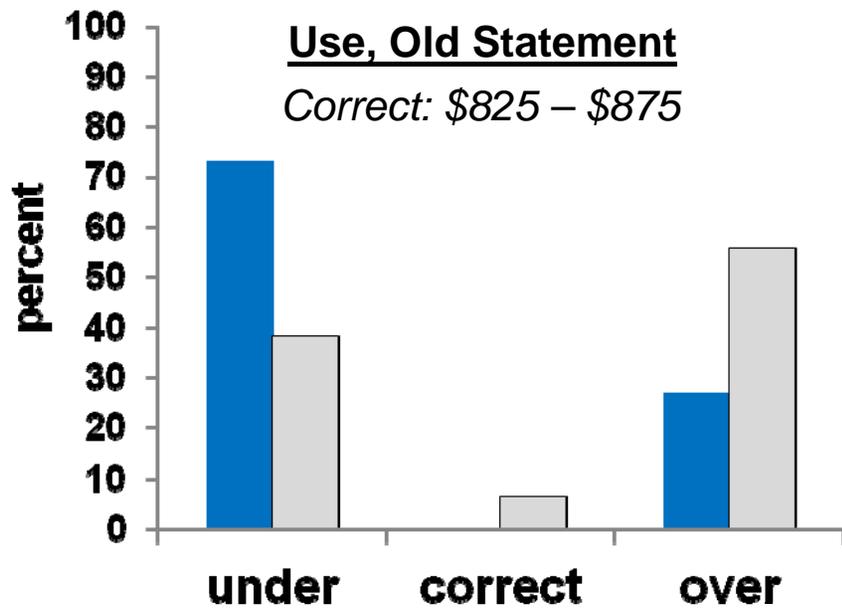
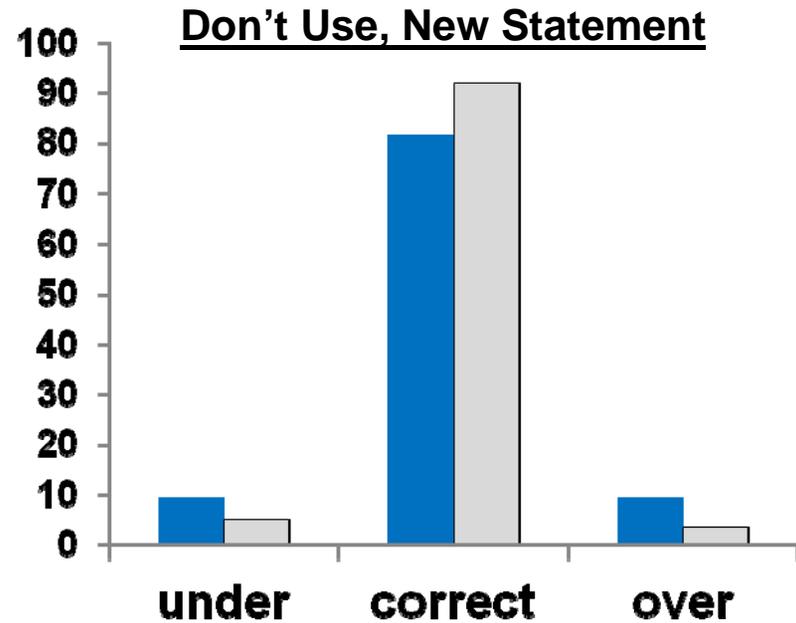
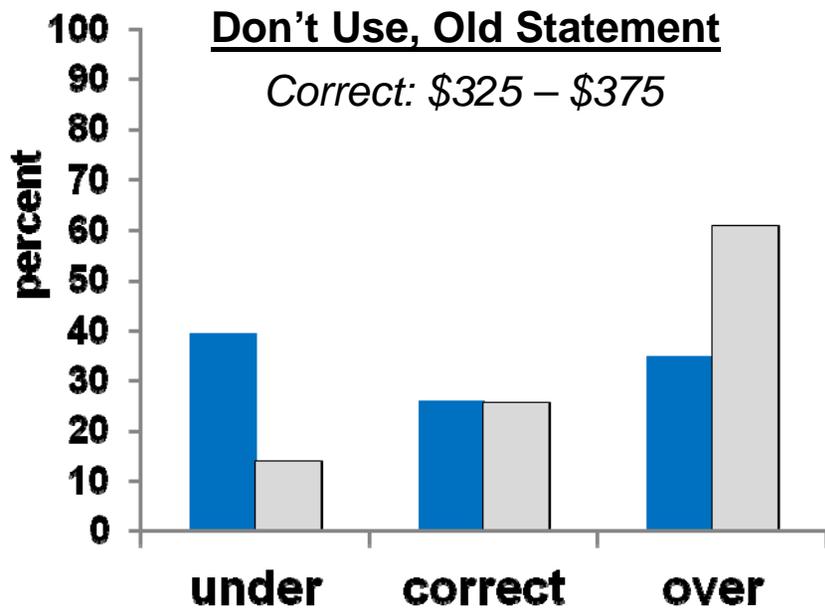
The Payment Amount Study

- Manipulated Factors
 - Old or new statement
 - Still using the card or not
- Participants (N = 502) saw statement and estimated the constant monthly payment needed to pay off the card in 3 years.
 - Counted as “correct” if within \$25 of right answer
 - Measured numeracy
 - Paper uses multinomial logit

Results for old statement, not using the card

Correct if between \$325 and \$375





■ Low Numeracy ■ High Numeracy

The Payoff Amount Problem

- Old Statement
 - Low numeracy → underestimate needed payment
especially when still using the card
 - High numeracy → overestimate
- New Statement
 - Clearly helps a lot when not using the card
 - Helps somewhat when still using card
half of less numerate individuals still underestimate
- Underestimation is the more serious error
 - Less numerate likely to suffer more from their bias

Two Additional Issues with the New Statement

- The Minimum Payment Box
- The 3-Year Payment Box

The Minimum Payment Box

Assume you won't use the card.

New Balance \$	Minimum Amount Due \$	Annual Percentage Rate
E 10,602.58	F 212.00	M 12.0%

If you make no additional charges and each month you pay...	You will pay off the balance shown on this statement in about...	And you will pay an estimated total of...
G Only the Minimum Amount Due	H 22 years	I \$20,294.97
J \$352.16	K 3 years	L \$12,677.67

If you pay exactly \$212 each month, how long would it take to pay off the balance?

- (a) Less than 22 years
- (b) 22 years
- (c) more than 22 years

87% said 22 years.

Correct Answer: ~6 years

The 3-year Payment Box

Assume you won't use the card.

New Balance \$	Minimum Amount Due \$	Annual Percentage Rate
E 10,602.58	F 212.00	M 12.0%

If you make no additional charges and each month you pay...	You will pay off the balance shown on this statement in about...	And you will pay an estimated total of...
G Only the Minimum Amount Due	H 22 years	I \$20,294.97
J \$352.16	K 3 years	L \$12,677.67

Suppose that each month you pay exactly the amount indicated in Box J for that month. This will be a lower amount each month. Balance on card after 48 months?

Median answer: \$0

Correct answer: \$3,434

Conclusions

- Low numeracy individuals are biased in a way that may exacerbate their debt problems.
 - They severely underestimate payment time when payments barely cover interest.
 - They tend to underestimate required monthly payments, especially when still using the card.
- The new statement is an improvement, but there is...
 - Underestimation of needed payments when using the card.
 - Confusion about meaning of numbers in the table.
- Policy implications.