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Annuities, Financial Literacy and Information Overload*



BY

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Motivation



- Research shows that financial literacy plays an important role in many investment decisions
- Less financially sophisticated individuals:
 - avoid the stock market (van Rooij, Lusari, and Alessie 2007,2008; Kimball and Shumway 2006; Christelis, Jappelli, and Padula 2006)
 - are less likely to save for retirement (Lusardi and Mitchell 2006,2007,2008,2009)
 - are less likely to participant in their 401(k) plans (Agnew, Szykman, Utkus and Young 2009)
 - are more likely to succumb to the default bias (Agnew and Szykman 2005)
- The success of recent behavioral research studies focused on the ‘annuity puzzle’ suggests a further role for literacy

Contribution



- This paper uses a large-scale laboratory experiment to test how financial literacy
 - relates to cognitive and emotional overload
 - may influence the decision to annuitize
 - relates to subsequent feelings of confidence and satisfaction
- The results have important implications for educators and retirement plan sponsors

The Basic Choice



- In our experiment, we had participants play a “Retirement Game”
- Individuals were given \$60 to start the game
- They could use this money to either:
 - invest the \$60 in a simulated “market” and determine how much to withdraw for living expenses on their own each period
 - purchase a fairly priced annuity offering a fixed payment \$16.77 each period they lived

Framing in Experiment



- Prior to making the choice, participants viewed a five minute marketing presentation



Important Experimental Design Features



- Everyone had the same probability of “dying” each round and this probability was known upfront
 - This eliminated adverse selection
- Subjects were paid with post-dated checks
 - This created real time delays associated with choosing future over present consumption in the lab

Game Survival



Round	Date Printed on Check	Die Throws Needed for You to Move on to the Next Round
1	June 2, 2006	2, 3, 4, 5, 6, 7, 8, 9 or 10
2	July 2, 2006	3, 4, 5, 6, 7, 8, 9, or 10
3	August 2, 2006	4, 5, 6, 7, 8, 9, or 10
4	September 2, 2006	5, 6, 7, 8, 9, or 10
5	October 2, 2006	6, 7, 8, 9 or 10
6	November 2, 2006	No die throw. End of experiment.

The Investment Option



- If they chose the investment option, they had the following decision to make each period they lived
 - how much to withdraw for living expenses
 - minimum withdrawal required (\$5 per period)
 - monetary penalties were established for outliving resources
 - how much to invest in the ‘market’
 - the remainder was put into a ‘holding account’

Determining the “Market Returns”



- The market return for each period was determined by the sum of the roll of two 6-sided dice

Sum of the Two 6-sided Dice	Return on Your Investment	Example: Loss or Gain on an Investment of \$10	Number of Possible Ways to Get Sum
2	- 38 %	\$3.80 loss	1
3	- 25 %	\$2.50 loss	2
4	- 16 %	\$1.60 loss	3
5	- 8 %	\$0.80 loss	4
6	0 %	no gain or loss	5
7	+ 8 %	\$0.80 gain	6
8	+ 16 %	\$1.60 gain	5
9	+ 24 %	\$2.40 gain	4
10	+ 32 %	\$3.20 gain	3
11	+ 41 %	\$4.10 gain	2
12	+ 54 %	\$5.40 gain	1

Example of Investment Option



Beginning
Balance
\$60

Step 1:
Choose \$ to
Withdraw

Step 2:
Choose \$ to
Invest in
'Market'

Step 3:
Remainder to
'Holding
Account'

Example Calculation:

Beginning Balance	\$60
-Withdrawal	\$15
-'Market'	<u>\$25</u>
Remainder:	
'Holding Account'	\$20



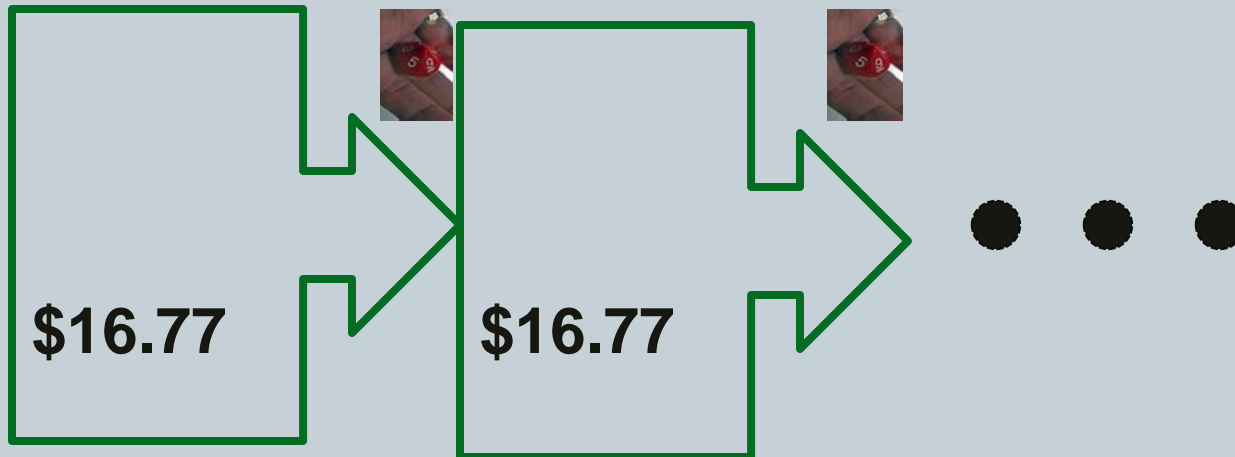
If survive,
repeat steps
EACH
period with
new balance

Next Period Balance = \$s in Market * (1+r_m) + \$s in Holding Acct.

The Annuity Option



- No decisions to make
- Receive \$16.77 each period that you survive



- In this experiment, the annuity choice is the less complicated choice
- We would expect those who are overwhelmed, confused or overloaded to prefer the annuity

Additional Data Collected



- **Financial Literacy Measures**
 - Actual performance on a ten question financial literacy exam
 - Perceived performance on the same exam
 - Accuracy of perceived performance
- **Cognitive and Emotional Overload Measures**
- **Confidence Measure**
 - Measured immediately after making choice
- **Satisfaction Measure**
 - Measured after the game is completed and the payouts are known
- **Controls: Demographics, Risk, Biases**

Our Sample



Sample Size	828		Income	
Age			% Less than \$20,000	4%
%<30	11%		% \$20,000 to \$40,000	12%
%31-40	11%		% \$40,001 to \$60,000	16%
% 41-50	14%		% \$60,001 to \$80,000	16%
% 51-65	29%		% \$80,001 to \$100,000	16%
%>65	35%		% \$100,001 to \$150,000	17%
Education			% More than \$150,000	11%
% High School	8%		Financial Literacy	
% Some College	19%		% High	44%
% College	35%		Sex	
% Graduate Work	38%		% Male	47%

Our Financial Literacy Findings



- Accuracy of Self-reported Test Performance
 - The accuracy of the participants' predictions appear to be related to demographics and their actual test performance
 - Inaccuracy of self-reported scores motivated us to use tested financial literacy in subsequent analysis
- Tested Financial Literacy
 - Based on a probit analysis, we found age, education and sex to be significantly related to tested performance

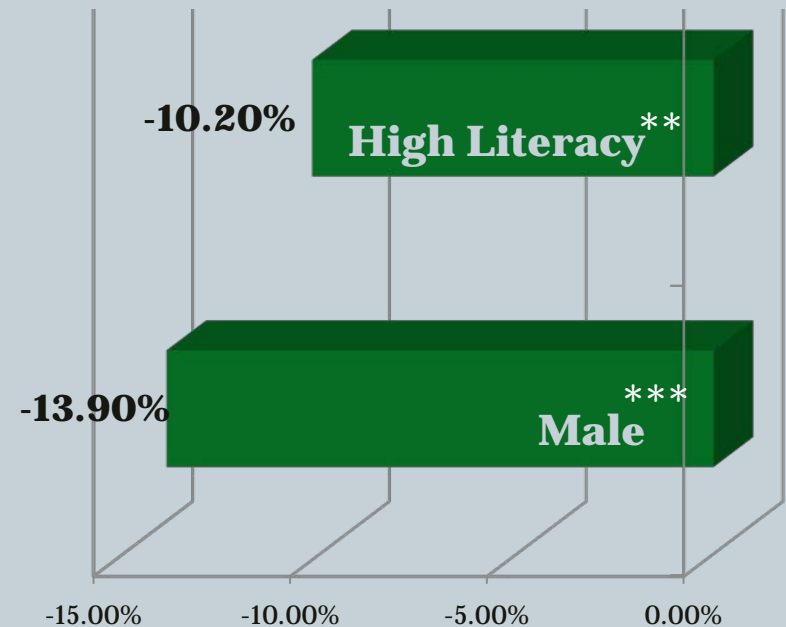
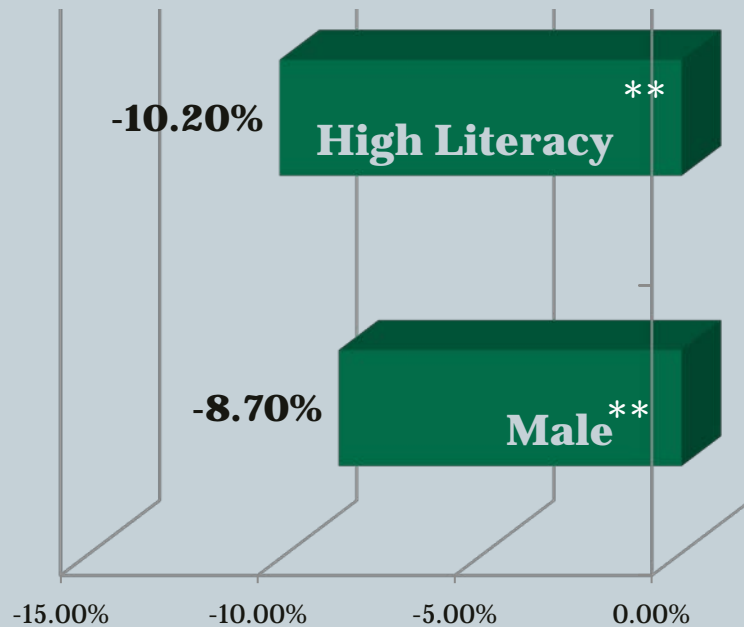
Marginal Effects from Probit Analysis



Cognitive Overload

Emotional Overload

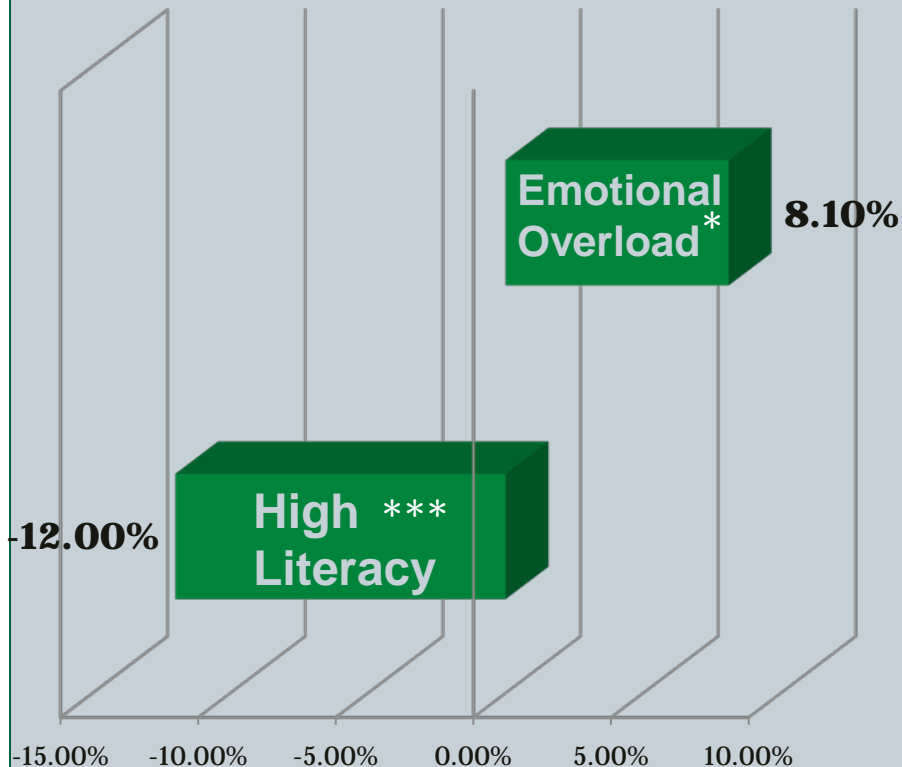
Males and individuals with high financial literacy are less likely to experience both types of overload



sample size=613

Probability of Picking the Annuity

- Marginal Effects: Probit



sample size=612

- Individuals in the high literacy category are more likely to pick investments
- Individuals experiencing emotional overload are more likely to pick annuities
- Cognitive overload was not statistically related to picking the annuity

Confidence and Satisfaction



- Individuals were less likely to be confident if they experienced high cognitive or emotional overload
- Males were more confident with their choice
- After controlling for the game payout and the initial confidence level, those who experienced more cognitive or emotional overload were less satisfied

Anecdotal Evidence



- “These different vehicles that are offered to people are so confusing and so complicated that you’re not quite sure what you’re getting into. And then once you are into it, you’re never quite sure that you know what’s going on with it. It’s very, very unsettling.”
 - William and Mary Focus Group Member
 - Williamsburg, VA April 7, 2010

Questions for Future Research



- The results raise new research questions:
 - Could certain groups be overconfident in their financial knowledge and not seek help?
 - Could those who underestimate their knowledge be less confident with their choices and more easily overwhelmed?
 - Can educational programs reduce cognitive and emotional overload by increasing financial literacy?
- Plan sponsors should consider simplifying the decision and information presented to reduce overload
 - The option that requires the least effort may attract the less financially literate