

## Abstract

We study how changes in indebtedness and resources affect psychological functioning and decision making. Highly indebted low-income households in Singapore benefited from a one-off, unanticipated debt relief program worth several months' household income. We measured household finances, anxiety, cognitive functioning, and economic decision making pre- and post- debt relief. Debt relief significantly improved cognitive functioning and reduced anxiety, risk aversion, and present bias. We test the hypothesis that poverty-induced impairments in psychological functioning alter economic decision making. Reducing cognitive bandwidth taxes by eliminating debt accounts significantly reduces present bias, but changes in absolute scarcity, performance in inhibitory control tasks and anxiety are unrelated to economic decision making. Interventions targeting cognitive bandwidth taxes could be more effective at alleviating poverty than providing untargeted transfers.

## ★ Key Results

- Participants exhibit improved cognitive functioning, and reduced anxiety, risk aversion, and present bias after receiving debt relief.** This demonstrates realistic interventions can remedy poverty induced deficiencies. (See Figures 1 to 4)
- Our results are consistent with Mani et al. (4) but contrast with Carvalho et al. (6),** suggesting financial shocks must be large to improve cognitive functioning and reduce risk aversion in the poor. (See Table)
- Poverty affects functioning more through bandwidth taxes than material scarcity. Eliminating a debt account:**
  - Improves cognitive functioning equivalent to reducing aggregate debt by SGD \$1238.
  - Significantly reduces anxiety and present bias whereas reducing aggregate debt has no impact. (See Paper for more details)

## Key Figures and Tables

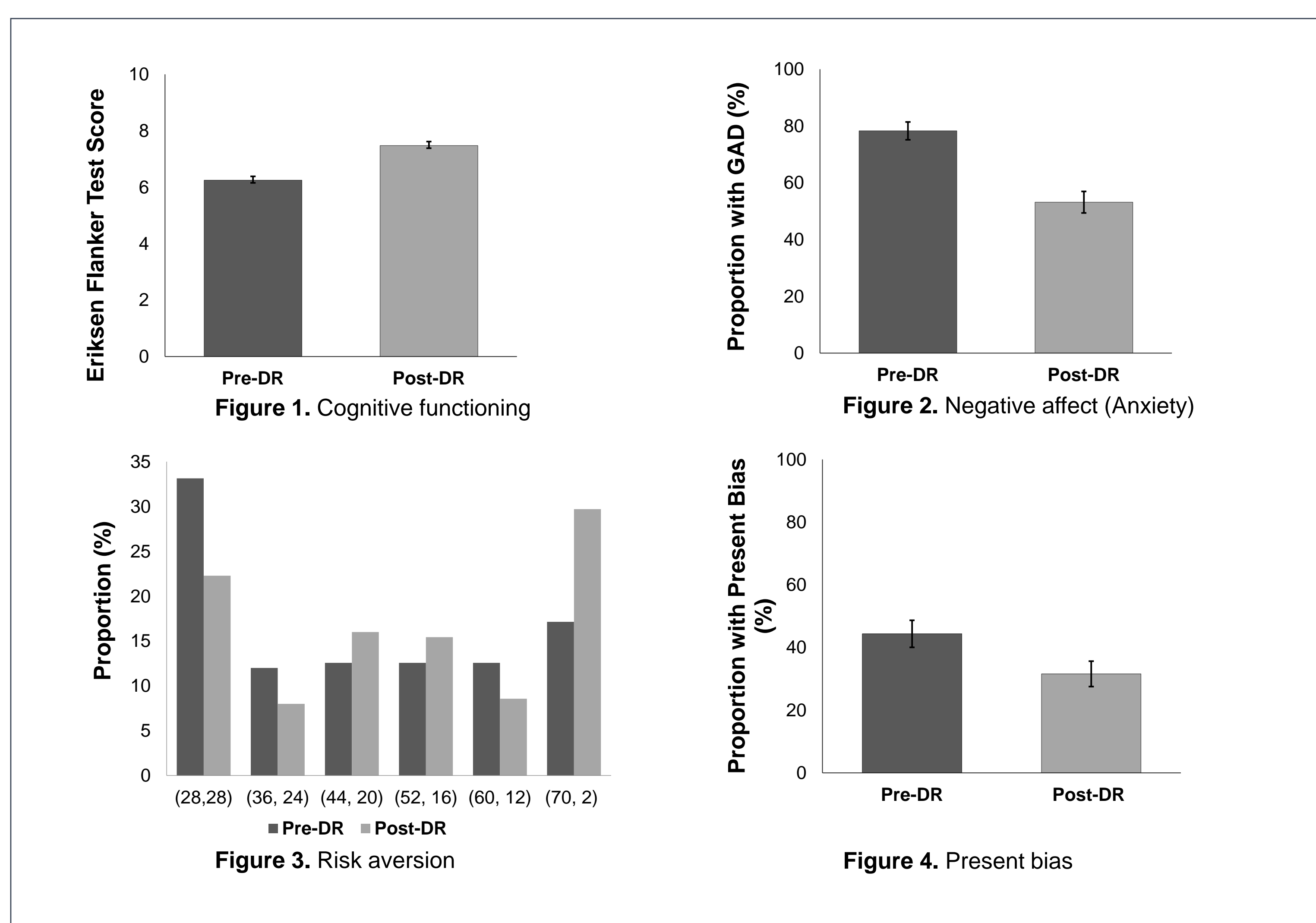


Figure 1 is based on the Eriksen Flanker Task measuring the inhibition control component of executive function (9); Figure 2 is based on the eight-question diagnostic battery for Generalized Anxiety Disorder (10); Figure 3 is based on an incentivized risk choice task (11); Figure 4 is based on time discounting choices made via two incentivized multiple price lists (12-13).

	Cognitive Functioning Response Time			CRRA Parameter	
	Our study	Mani et al.	Carvalho et al.	Our study	Carvalho et al.
<b>Before Debt Relief</b>	0.256*** (0.046)			0.916*** (0.303)	
<b>Before Harvest</b>		0.19*** (0.036)			
<b>Before Payday</b>			0.020 (0.029)		-0.10 (0.152)
<b>Constant</b>	3.399*** (0.023)	7.49*** (0.011)	8.06*** (0.031)	1.919*** (0.222)	1.66*** (0.110)
<b>Observations</b>	350	902	20,206	350	1,064
<b>Number of id</b>	175	451	1056	175	532

**Cognitive Functioning Response Time:** Fixed effects models except OLS for "Carvalho et al."; "Our study" d.v. is log of Flanker task total response time. "Mani et al." d.v. is log of Stroop task total response time. "Carvalho et al." d.v. is log of individual Flanker trial response time. **CRRA Parameter:** Interval regression model. "Our study" and "Carvalho et al." d.v. is CRRA parameter interval.

## Introduction

Recent studies challenge the conventional view that entrenched poverty stems from structural factors and patterns of rational but sub-optimal decision making.

- Scarcity itself may impair decision making, by reducing cognitive bandwidth resources and causing stress and anxiety (1-7).
- Risky and impatient decisions made by the poor may be rooted in scarcity-driven deficits in cognitive and psychological functioning (8).

Understanding whether and how scarcity harms psychological functioning is important for informing interventions to alleviate poverty.

- Current evidence is mixed. While the rural poor exhibit significant impairment to cognitive functioning over the annual harvest cycle (4), no such effects are found in the urban poor over the payday cycle (6).
- Is the impact of scarcity on functioning generalizable?

We address this question by studying the effects of a significant and unanticipated positive wealth shock provided by a one-off debt relief program targeted at highly indebted low-income households in Singapore.

- Low-income households often owe extensive debts for daily living expenses such as rent and utilities.
- The average household in our study owed more than two months' household income in arrears.
- Debt relief (up to SGD \$5000) generated a sharp quasi-experimental change in financial resources worth several months' household income.

## Discussion

Bandwidth taxes may impede the poor more severely than material scarcity, especially in developed countries. Benefits from welfare programs aimed at material scarcity may have ceiling effects if nothing is done to reduce bandwidth tax.

Eliminating debt accounts cuts bandwidth taxes and improves functioning. This contrasts with the neoclassical economic view that (a) debt mental accounting behaviours are counterproductive because they increase overall economic costs (14), and (b) that untargeted cash transfers are more efficient than targeted interventions.

While cognitive bandwidth taxes are a significant cause of impaired functioning and decision making, we find little support for the hypothesis that shock-driven improvements in inhibition control and anxiety explain changes in risk attitudes and present bias. Other cognitive pathways need to be tested.



## References

- Bertrand, M., Mullainathan, S., & Shafir, E. (2004). A behavioral-economics view of poverty. *The American Economic Review*, 94(2), 419-423.
- Baier, J. C., Kim, M., & Wilkenthal, B. (2012). Is it generalized anxiety disorder or poverty? An examination of poor mothers and their children. *Child and Adolescent Social Work Journal*, 29(4), 345-355.
- Shah, A. K., Mullainathan, S., & Shafir, E. (2012). Some consequences of having too little. *Science*, 338(6107), 682-685.
- Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty impedes cognitive function. *Science*, 341(6149), 976-980.
- Haushofer, J., & Fehr, E. (2014). On the psychology of poverty. *Science*, 344(6186), 862-867.
- Carvalho, L. S., Meier, S., & Wang, S. W. (2016). Poverty and economic decision-making: Evidence from changes in financial resources at payday. *The American Economic Review*, 106(2), 260-284.
- Dean, E. B., Schilbach, F., & Schofield, H. (2017). Poverty and Cognitive Function. In *The Economics of Asset Accumulation and Poverty Traps*. University of Chicago Press.
- Lawrance, E. C. (1991). Poverty and the rate of time preference: evidence from panel data. *Journal of Political Economy*, 99(1), 54-77.
- Zelazo, P. D., Anderson, J. E., Richler, J., Wallner-Allen, K., Beaumont, J. L., & Weintraub, S. (2013). II. NIH Toolbox Cognition Battery (CB): Measuring executive function and attention. *Monographs of the Society for Research in Child Development*, 78(4), 16-33.
- Liebowitz, M. R. (1996). Generalized anxiety disorder (includes overanxious disorder of childhood). In T. A. Widiger (Ed.), *DSM-IV sourcebook volume 2* (2nd ed., pp. 432-436). Washington, DC: American Psychiatric Association.
- Eckel, C. C., & Grossman, P. J. (2002). Sex differences and statistical stereotyping in attitudes toward financial risk. *Evolution and human behavior*, 23(4), 281-295.
- Harrison, G. W., Lau, M. I., & Williams, M. B. (2002). Estimating individual discount rates in Denmark: A field experiment. *The American Economic Review*, 92(5), 1606-1617.
- Meier, S., & Sprenger, C. D. (2015). Temporal stability of time preferences. *Review of Economics and Statistics*, 97(2), 273-286.
- Amar, M., Ariely, D., Ayal, S., Cryder, C. E., & Rick, S. I. (2011). Winning the battle but losing the war: The psychology of debt management. *Journal of Marketing Research*, 48(SPL), S38-S50.