

## My Mind & My Money Executive Summary

FIU College of Business and Center for Imaging Science  
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### **Overview:**

The My Mind & My Money (MMMM) study investigated the relationship between personality metrics, laboratory behavior and real-life financial behaviors among individuals with low socioeconomic status (low-SES). This preliminary study was conducted in Miami, FL, where there is substantial income inequality among residents, and conclusions should therefore generalize to other cities with high levels of income inequity. The MMMM study was funded by JPMC, and carried out by scientists from Florida International University (FIU) in partnership with Catalyst Miami.

### **Research design and Methods:**

We recruited and collected data from 27 individuals in the study. Participants (12 male, 15 female) were young and middle-aged adults (mean age=41.22 ± 12.65 years), had fewer years of education (18% had High School Diploma, 30% Associates, and 52% Some College), with low-income (mean=\$13,872, ± \$8020.43), and had financial dependents in their household. The sample was racially and ethnically diverse: 14 participants were African-American, 13 Caucasian; 18 participants self-identified as Hispanic, and 9 as Non-Hispanic.

Participants completed eight self-report surveys to characterize their cognitive pre-dispositions including: Barrat impulsivity scale (BIS), Temperament and Character Inventory (TCI), Delay Discounting Questionnaire (DDQ), State-Trait Anxiety Inventory (STAI), Attitude Towards Risks Questionnaire (ATR), Cognitive failure questionnaires (CFQ), Toronto Alexithymia Scale (TAS), and Behavioral Inhibition system/Behavioral Activation system (BIS/BAS). These surveys provide the measures of impulsivity, goal directed behavior, emotional processing, state and trait anxiety, and preferences for reward magnitude.

Participants also completed (played) a widely used risky decision-making task called the Balloon Analogue Risk Task (BART). This task provides a laboratory-based behavioral measure of risk taking commonly adopted in behavioral and neuroimaging research. BART game helps gauge individuals' risk-taking tendency. In this game, participants are presented with a "virtual" balloon for which they must guess the number of pumps it will withstand. The balloon inflates and if it does not pop (i.e., balloon withstands the number of pumps guessed by the participant), then participants win an amount of money associated to the number of pumps the balloon was able to withstand. In particular, each pump withstood by the balloon corresponds to one cent of earnings for the participant. Thus the higher the number pumps guessed (or bet) the higher the potential earnings out of each trial. However, each pump also confers greater risk, as the higher the pumps bet the higher the likelihood that the balloon will pop (just as with any real balloon). Participants bet on each balloon being able to withstanding anywhere from 1 to 120 pumps using a scroll device. The number of pumps bet is chosen either by scrolling upwards (to increase the number of pumps) or scrolling downwards (to decrease the number of pumps).

Participants have a limited amount of time to make their decision and place their pump bet. Once the participants scroll to their desired number of pumps, they must press the scroll button in order to lock in their bet. If participants take more than the allowed time to enter a decision, then they receive a "timeout" message, and that particular BART trial is allocated to missed response count

(and no money is earned or loss in these instances). Subsequently, for each trial, participants get feedback indicating whether the balloon popped or, if it does not, by how much money they managed to increase their earnings. If they win, the corresponding amount is added to the accumulated total which remains visible on the screen. However, if the balloon pops, no money is won or lost and the next trial continues with a new balloon. In essence, the number of pumps bet is a measure of risk taking, and it is essential to balance risk taking with self-control decision-making mechanisms in order to win at the BART game. Similarly, timeouts indicate a form of indecisiveness (or decision conflict that could not be resolved), an inability to recognize or engage with a financial opportunity. Previous research has demonstrated that riskiness in BART is positively correlated with self-reported measures of sensation seeking and impulsivity, as well as to real-life risky-behaviors such as drug use. In this study, we used this task to predict financial (asset building) behavior in low-SES population.

In addition, we collected financial behavior data stemming from a real-world, 6-month savings program that involved monthly matches, and a final reward for completing the savings program without any interim withdrawals. This savings program incorporated an intervention based on behavioral economics (e.g., nudging, or text message reminder to meet the saving goals). We randomly assigned 27 subjects (24 with savings accounts)<sup>1</sup> into 2 groups: 1) a control group that did not receive any nudging; 2) a treatment group that received monthly nudging (i.e., reminders) about the need to deposit money into their account in order to receive matches, and increase their overall earnings/savings. All subjects received a default first deposit and a corresponding match into their accounts as they started the savings program.

### **Results Highlights:**

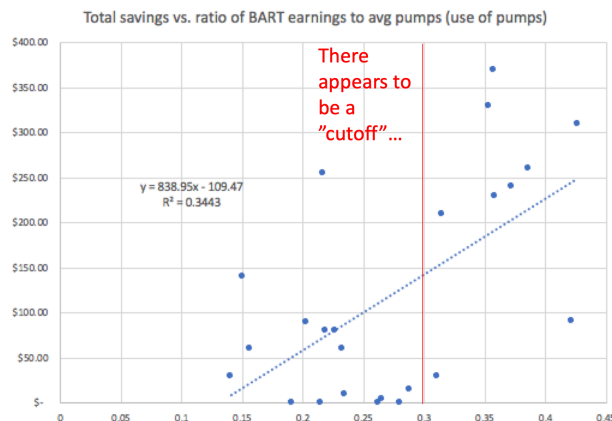
We found relationships between self-reported data that corroborated their validity, for example participants with higher goal orientation exhibited lower delay discounting (i.e., less likely to prefer smaller immediate rewards over larger delayed rewards). Similarly, we also found associations between personality metrics and laboratory risk-behaviors. Such as a positive correlation between self-reported measures of trait anxiety (constant nervousness) and time taken to place a bet while playing BART (indecisiveness).

Crucially, we corroborated an expected relation between laboratory behaviors and real-world financial (savings) behavior. When participants managed to obtain BART earnings out of at least 30% of their average pump bet (indicative of effective use of pumps, defined as obtaining more BART earnings out of average pump bets placed), the participant also tended to exhibit better asset building (savings) behavior (see Fig 1. below evidencing this robust positive linear relation).

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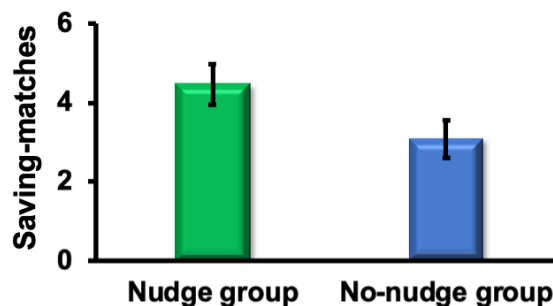
<sup>1</sup> Not all subjects recruited were able to open savings accounts.

In Fig 1. The y-axis plots the scatter of participants' total savings, and the x-axis plots the scatter of participants' ability to *get BART earnings from average pump bet placed* (or effective use of pumps bet). Effective use of average pump bet indicator combines two BART key performance indicators as the ratio of each participant's *total BART earnings to average pumps bet* in all BART runs. This new indicator helps characterize that participant's ability to place winning bets (i.e., obtain more BART earnings out of average pump bets placed).



Finally, we also found a significant positive impact of nudging on savings behavior such that participants that received nudging ended up having 40% higher average savings than those who did not receive nudging.

Fig 2. Intervention (nudge) related findings: Additionally, we found that the nudging group received significantly higher number of matches compared to the group that did not receive nudging [ $t(17)=1.63, p = 0.04$ ] indicating that the individuals in the nudge group consistently saved money throughout the savings program. These findings indicate that nudges are effective for promoting asset building behavior as expected and determined by previous research.



**Conclusion:**

Overall, this pilot study provides insights into ways of predicting real-world financial behavior based on individual's performance in a game (BART), which may be played in any smart device. Practitioners looking for ways of prioritizing impact, could use the indicator developed in this study to enhance the optimal allocation of limited funder resources. By initially focusing on low-SES individuals more likely to take advantage of matched savings programs (such as the one implemented by Catalyst in this study), practitioners would reduce their beneficiaries' financial vulnerability and thus help mitigate income inequality. We believe this is truly a low hanging fruit opportunity for practitioners working in cities mired by income inequality. BART performance might help identify individuals likely to readily take advantage of matched savings programs and therefore avoid the stipulation of unnecessary and expensive financial coaching programs to such individuals. Understanding the relationship between laboratory and real-world financial behaviors would not only permit the refining of asset building interventions, but also the development of improved and targeted behavioral change strategies for for those who do not perform well while playing BART.