

Neuroeconomics and addiction: funding opportunities at NIDA

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Substance use disorder (SUD) and “decision neuroscience”

- SUD is unique among other diseases and disorders because the key diagnostic criteria pertain to *decisions*
 - Taking drugs despite some awareness of adverse physical, social, and legal consequences
 - Decisions to use more drug than intended

NIDA has a strong programmatic interest in biological underpinnings of normative and aberrant decision-making

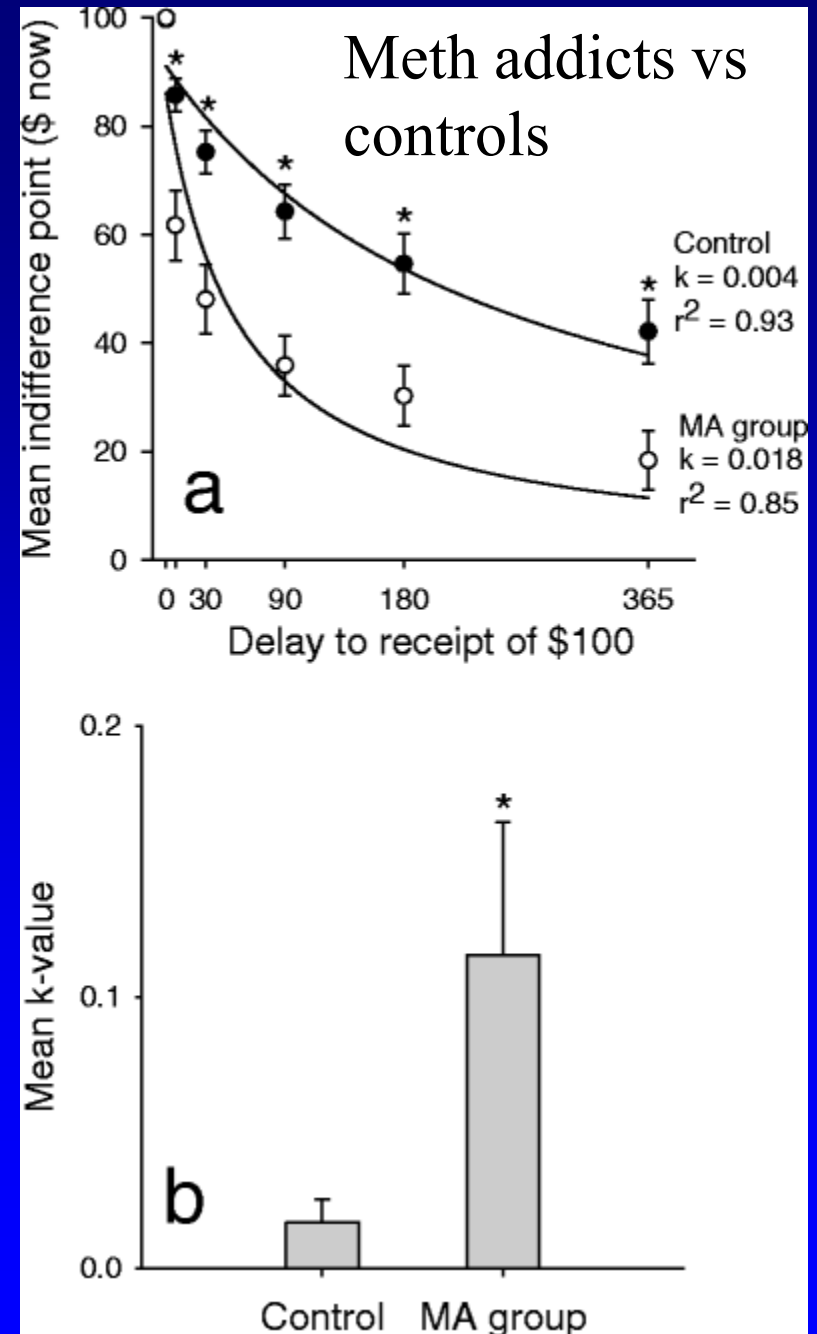
Developmental differences in decision-making

- Substance use and abuse peaks in adolescence and young adulthood
- Neurodevelopmental differences in:
 - risk appraisal?
 - reward sensitivity?
- Individual differences in:
 - children at psychosocial or genetic risk
 - resilient children

The classic behavioral economic finding in drug abuse:

Drug abusers show an increased *general* preference for immediate rewards over larger but delayed rewards

Hoffman et al (2006) *Psychopharmacology*



Therapeutic Workplace Software: Trainee Home Page

SEND MESSAGE CD PLAYER

Hide Account Info (Click this checkbox to hide/unhide your account information.)

Activities and Earnings: 4/14/01 [print voucher](#)

Account Balance:	\$2.49	Excused Lates:	0
Personal Days:	5	Late-Not-Resets:	5

Base Pay

Pay Rate	Break Min.	Hrs. Worked	Paid Hrs.	Earnings*
\$2.00	28	4.80	5.23	\$10.47

Administrative

Note	Amount
SUBTOTAL	\$0.00

Training

Program	Earn for Correct	Lose for Error	# Correct	# Errors	Bonus	Earnings**
Typing	\$0.03 per 10	\$0.01 per 1	784	18	\$0.00	\$2.35
Keypad	\$0.03 per 10	\$0.01 per 1	79	10	\$0.00	\$0.14
SUBTOTAL						\$2.49

Data Entry

Job ID	Batch SKU	Earn per Batch	Lose for Error	# Batches	# Errors	Earnings
SUBTOTAL						\$0.00

TODAY'S TOTAL \$12.96

XX51's Inbox

delete

Typing Training Program

Subjects see future earnings NOW, after every few data-entry keystrokes

Image courtesy Ken Silverman, Johns Hopkins University

Clinical studies that DCNBR funds:

1. Decision/motivation/cognitive processes in healthy subjects only
2. Decision/motivation/cognitive processes in casual users of a drug
3. Decision/motivation/cognitive processes in persons addicted to a drug
4. Neurobiological signatures and behavioral predictors of treatment and recovery

1. Characterize decision/motivation/cognitive processes in healthy subjects only

- The burden is on YOU to sell the drug abuse relevance of the (normative) process you are proposing to study to:
 - CSR receipt and referral officers
 - **Reviewers**
 - NIDA program and Director

2. Study decision/motivation/cognitive processes in casual users of a drug

- Plan for referral for treatment of study applicants with clinically significant use
- Careful characterization and toxicology monitoring of alcohol and other drug use
- Acute administration effects of drug vs placebo (DSMP needed)
- Groupwise differences from controls
 - Chicken or egg? Premorbid differences versus chronic drug effects

3. Study decision/motivation/cognitive processes in subjects addicted to a drug

- Plan for care of study applicants whose use is clinically significant (clinical collaborator)
- Careful characterization and toxicology monitoring of alcohol and other drug use
- Clinical interview for all psychiatric disorders
- Be clear and provide rationale for:
 - Treatment-seeking versus non-treatment-seeking
 - Selecting for abuse of a single drug versus allowing comorbid use or abuse of another drug

Make sure your conceptualization of drug abuse is not facile

- Are drugs/cues always positively hedonic?
Not so fast!
- During drug experimentation or casual use, drug deliveries can be rewarding
- Once addicted, drug use may be primarily negatively-reinforced
 - to terminate the aversiveness of withdrawal
 - “wanting” but not “liking”
- During therapy, drug cues may be aversive or conflict-eliciting in some patients
- Smokers may smoke to improve cognition

Review articles of the major motivational theories of addiction

- Incentive-sensitization hypothesis
 - Robinson and Berridge
- Reward deficiency syndrome hypothesis
 - Blum
- “Striatal spiral” hypothesis
 - Everitt and Robbins
- Allostasis/antireward hypothesis
 - Koob

Get clinical addiction expertise on your investigative team

- Peer reviewers (NPAS, RPIA, BRLE) will be aware of special issues in characterizing drug users or abusers
- Helps fit neuroeconomics in drug abuse context
- Clinical perspective on behavioral tendencies of addicts may inform or inspire task design
 - Co-PI (most solid)-complimentary roles
 - Co-I with significant time investment
 - Consultant (with strong letter)
 - Most dicey- maybe OK with smokers
 - Can be helpful to help frame or interpret normative studies

Omnibus program announcement on the Neuroscience of Drug Abuse

- No set-aside money, but will route your application to NIDA
 - Has bullet point on neuroeconomics!
 - R01 version (PA-10-268)
 - R21 version (PA-10-269)
 - R03 version (PA-10-270) *
- * For neuroimaging R03, consider an I/Start (PA-09-073)
- Bigger budget than parent R03
 - Special review study panel convened by NIDA

Proposed merger of NIDA and NIAAA into a single addiction institute

- For decades, NIAAA has funded alcohol research, while NIDA has funded non-alcohol drug research
 - For historical perspective on ATOD, see this [paper](#)
- Changing political climate
- More recent genetic and neuroscience data suggest that risks for addiction to alcohol versus other drugs, as well as addiction mechanisms, are more similar than different
- High comorbidity between use of alcohol and other drugs
- The NIH [Scientific Management Review Board](#) voted 12-3 to [recommend to NIH director that NIAAA and NIDA be dissolved and a new addiction institute formed](#), including smoking portfolio from NCI and pathological gambling from NIMH, with new search for director