

Contingency Management: Definitions and Mechanisms

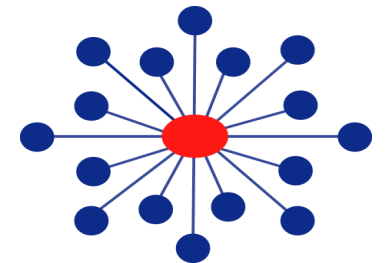
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Steven Shoptaw PhD

Director, UCLA Dept Fam Med: Center for
Behavioral and Addiction Medicine

Director, UCLA CHIPTS P30MH058107

MPI, Big South/West Node, NIDA CCTN
UG1DA020024



Objectives



- **What It Is**
 - Define contingency management and provide two examples
- **How Well it Works**
 - Understand the size of effect for contingency management for methamphetamine and cocaine use disorders
- **Why it Works**
 - Understand basic neuroscience and behavioral economic factors that explain contingency management treatment

Contingency Management: What it Is

- Operant conditioning (Skinner, 1938)
- Initial concepts derived from work with delinquent boys (Yates, 1970)
- Early work in MMT clinics to encourage opioid abstinence (Stitzer et al, 1977)
- Application to cocaine dependence by Higgins' group (1993, 1994)

Fishbowl

- Urine results determine number of draws
- First negative = 3 draws with increases by 1 for each consecutive negative sample to a cap
- Prizes are:
 - 50 “good job”
 - 30 “low prize” (\$1-2)
 - 17 “medium prize” (\$5-10)
 - 3 “big prize” (\$50)

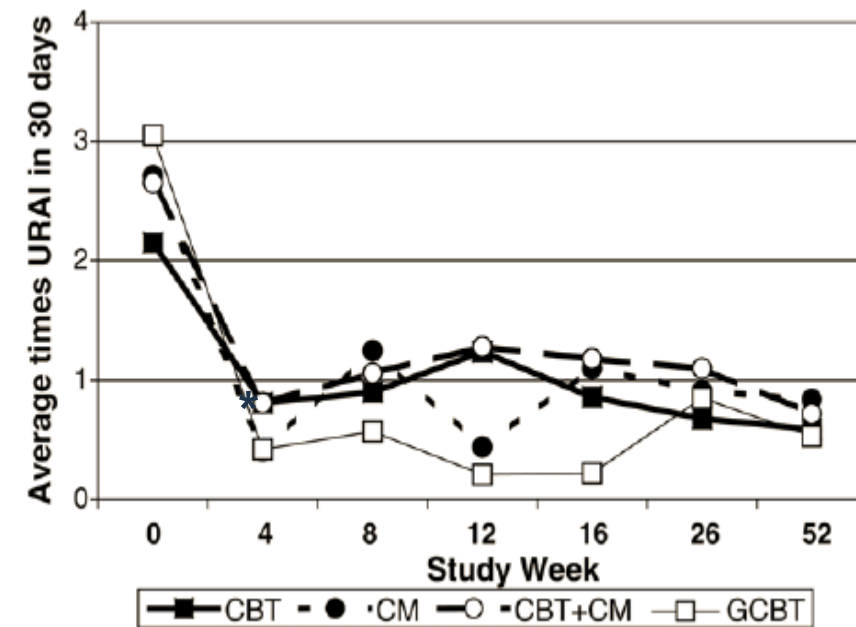
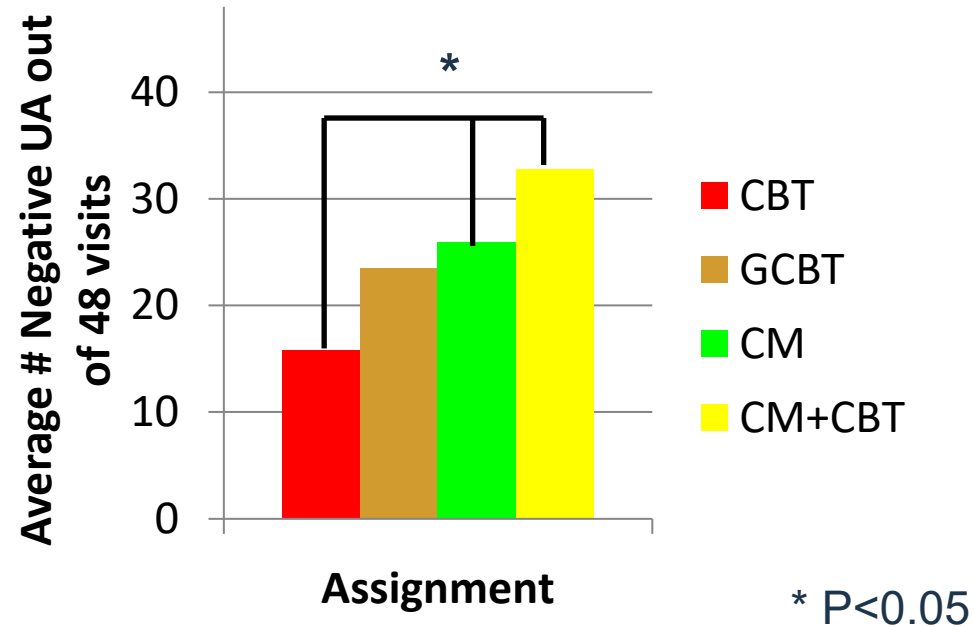


Vouchers/Cash

Week	M/Tu	Th/F	Bonus	Week Total
Week 1	\$5.00	\$7.50	\$10.00	\$22.50
Week 2	\$10.00	\$12.50	\$10.00	\$32.50
Week 3	\$15.00	\$17.50	\$10.00	\$42.50
Week 4	\$20.00	\$22.50	\$10.00	\$52.50
Week 5	\$25.00	\$27.50	\$10.00	\$62.50
Week 6	\$30.00	\$30.00	\$10.00	\$70.00
Week 7	\$30.00	\$30.00	\$10.00	\$70.00
Week 8	\$30.00	\$30.00	\$10.00	\$70.00
Week 9	\$30.00	\$30.00	\$10.00	\$70.00
Week 10	\$30.00	\$30.00	\$10.00	\$70.00
Week 11	\$30.00	\$30.00	\$10.00	\$70.00
Week 12	\$30.00	\$30.00	\$10.00	\$70.00
Totals				\$702.50

Behavioral treatment approaches for methamphetamine dependence and HIV-related sexual risk behaviors among urban gay and bisexual men

Steven Shoptaw^{a,b,d,*}, Cathy J. Reback^{a,b,c,d}, James A. Peck^b, Xiaowei Yang^{a,b},
Erin Rotheram-Fuller^{a,b,d}, Sherry Larkins^{a,b,d}, Rosemary C. Veniegas^{b,d},
Thomas E. Freese^b, Christopher Hucks-Ortiz^{a,b,d}



Key Points

- You get what you pay for – lower limits of CM efficacy ~\$200 (or a \$300 program)
 - Average payout is about 66% of total
- Use a signed contract to explain the program
- No arguments. No tolerance for “emergency”
- Rapid Reset – If a positive or missed sample:
 - Returns to initial value for next negative sample (i.e., \$5);
 - After consecutive negative samples, return to place in schedule continue escalation

Considerations

- Must achieve first reward; if you don't CM won't work
 - People with very heavy meth use not great candidates
- Sample integrity –strong chain of custody of urine samples required
- Linkages to talk therapy or medications nice, but not required
- Reinforcements (including verbal) are positive; no preachy/teachy.
- Consistent with brain disease for addiction model

Contingency Management: How Well it Works

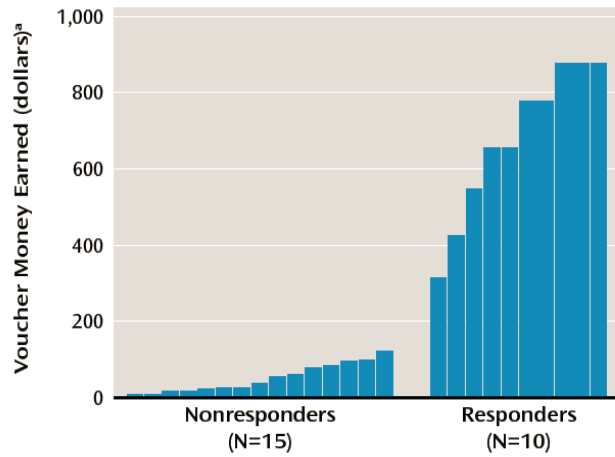
Meta Analyses of Contingency Management

- $d=0.46$ (Benishek et al., **2014**, *109*:1426-1436) – Prize based only
- $d=0.58$ (Dutra et al., **2008**, *Am J Psychiatry* *165*:179-187)
- $d=0.52$ (Griffith et al., **2000**, *Drug Alc Dep* *58*:55-66)
- $d=0.40$ (Prendergast et al., **2006**, *Addiction* *101*:1546-1560)

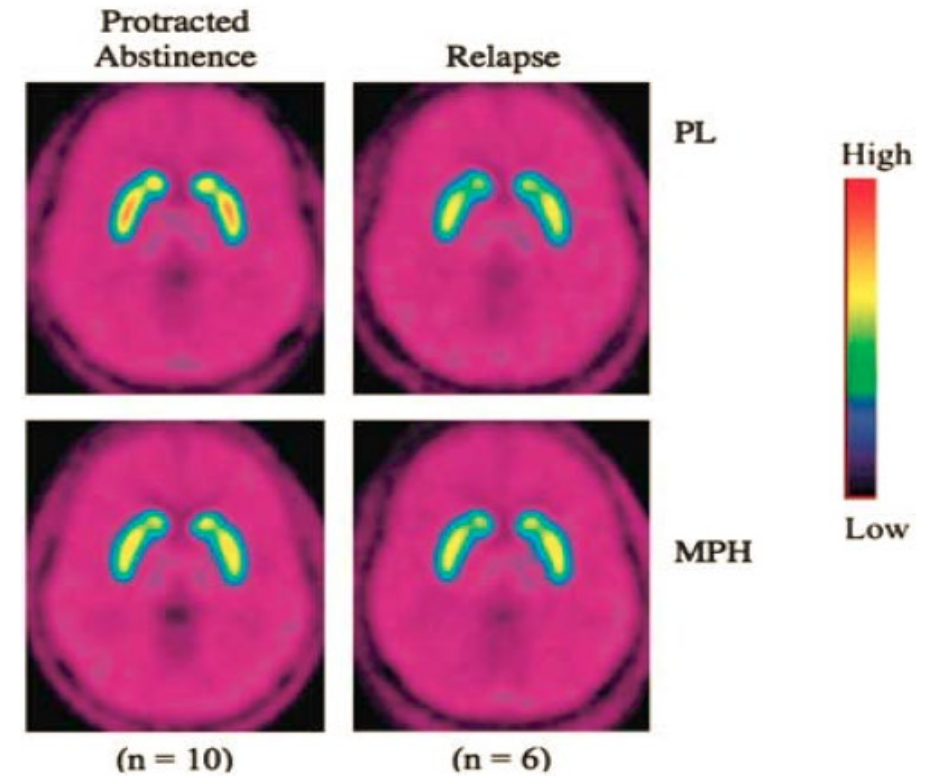
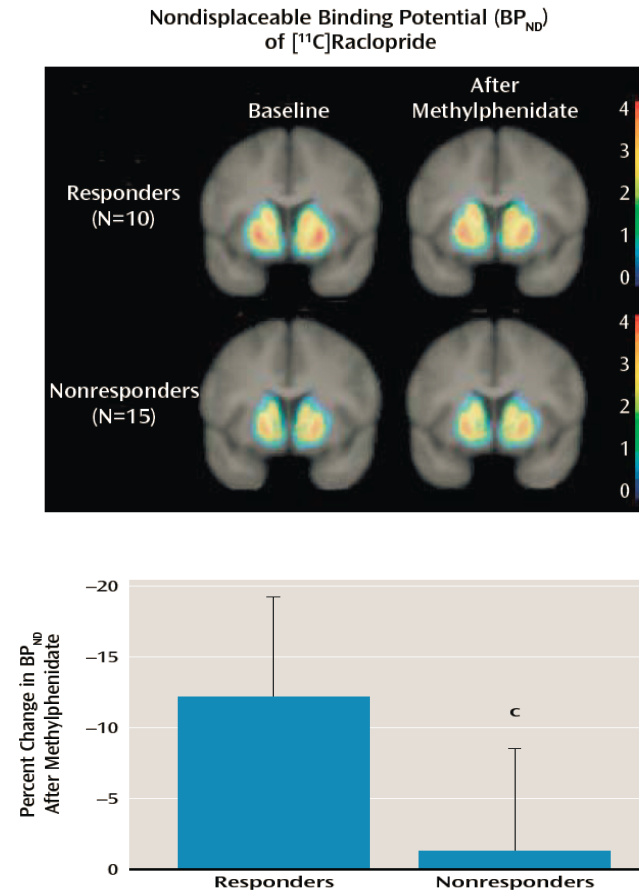
**If Contingency Management were a medication
it would be standard of care**

Contingency Management: Why it Works

Dopamine D2-D3 Availability Predicts Outcomes for Contingency Management (and Talk Therapies)!



Martinez et al., *Am J Psychiatry*. 2011. 168: 634-641



Wang GJ et al., *Molecular Psychiatry*, 2012. 17: 918-925

Spend Today, Clean Tomorrow: Predicting Methamphetamine Abstinence in a Randomized Controlled Trial

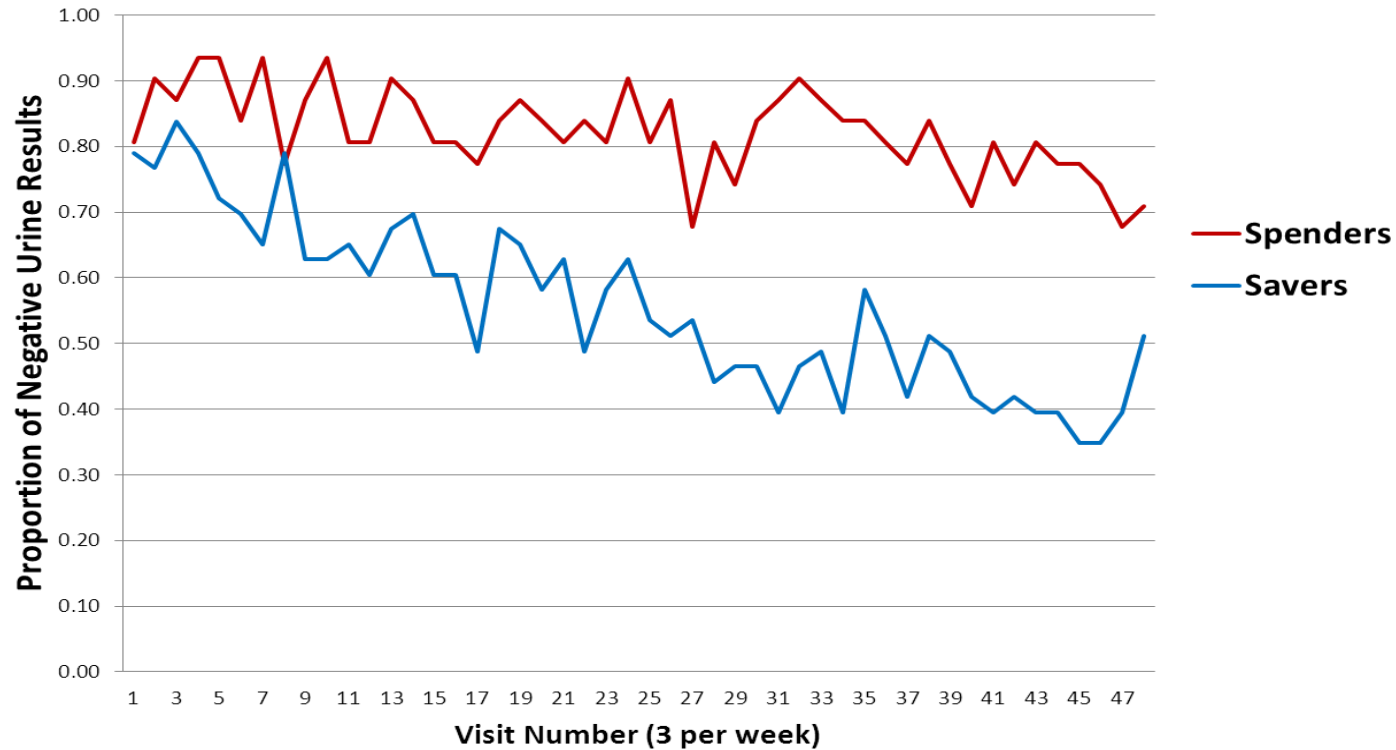
Kimberly Ling Murtaugh
University of California, Los Angeles

Tamar Krishnamurti and Alexander L. Davis
Carnegie Mellon University

Cathy J. Reback
Friends Research Institute, Inc, Los Angeles, California and
University of California, Los Angeles

Steven Shoptaw
University of California, Los Angeles

Spenders have more negative urine results compared to savers



Making a purchase increased odds for next clinic visit free of methamphetamine

Each additional day of delaying reward was associated with a 6.26% **decrease** in the likelihood of providing a negative urine sample at the subsequent visit

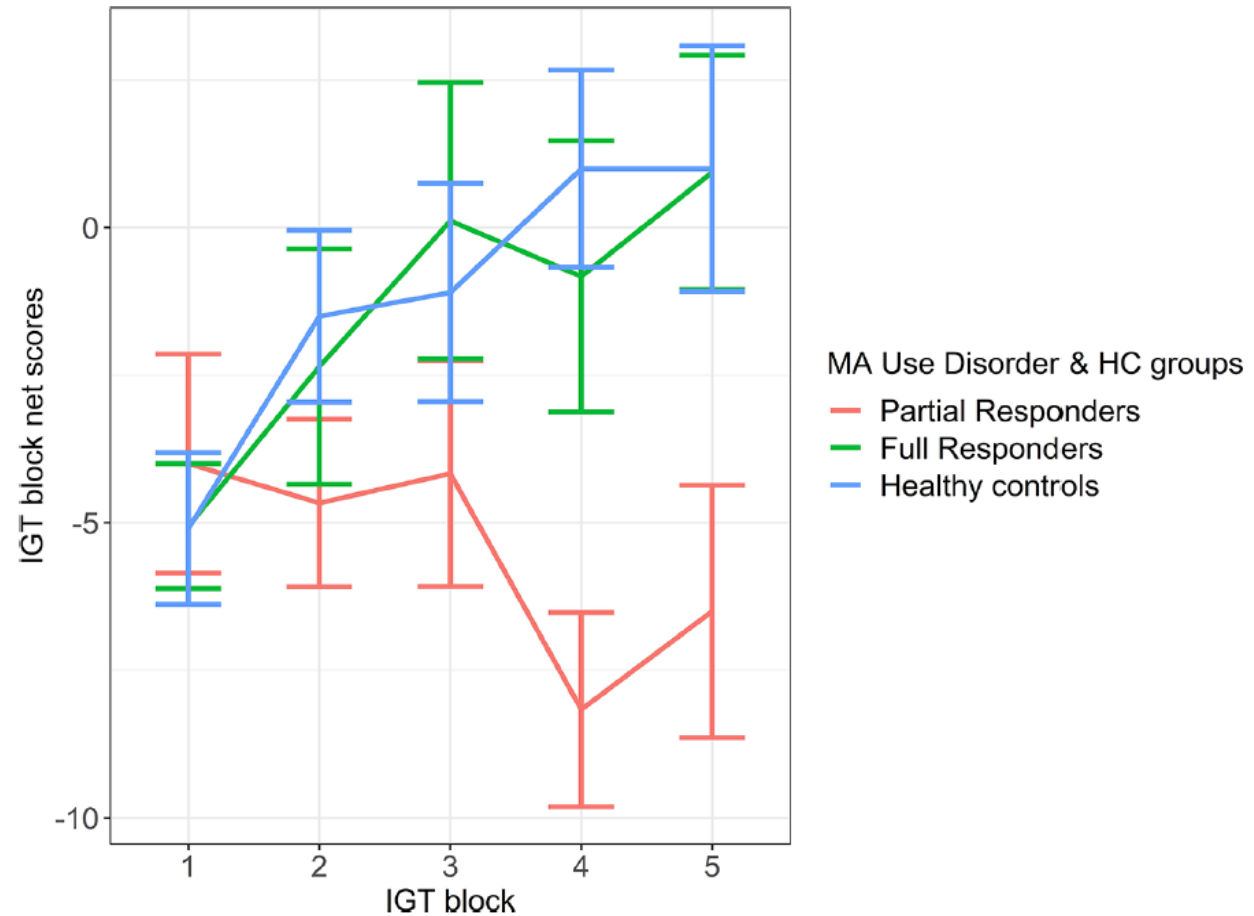
Cross-Cultural Replications on Contingency Management

Decision-Making by Patients With Methamphetamine Use Disorder Receiving Contingency Management Treatment: Magnitude and Frequency Effects

Marilyn T. Lake^{1,2*}, Steven Shoptaw^{1,3}, Jonathan C. Ipser¹, Sae Takada^{4,5},
Lara J. van Nunen¹, Gosia Lipinska², Dan J. Stein⁶ and Edythe D. London⁷

Post Hoc: As in Los Angeles study with MSM, Cape Town “spenders” outperformed “savers” in producing abstinence

Predictive: “Iowa Gambling Task” scores showed those who did not respond fully to CM (**red line**) compared to with full response (**green line**) or healthy controls (**blue line**)



CM and Stimulants Program in U.S. VA Health System

- Evaluation of ongoing implementation of CM within 94 VA settings, 2060 patients
- >2/3 of clinics used twice weekly, 12-weeks and 8 draw limits of a fishbowl method, using VA Canteen coupons



Table 3
Attendance & substance use outcomes.

	$\bar{X}$	SD
Patients treated ^a	21.9	20.7
Sessions attended per patient ^a	13.5	8.9
Proportion of sessions attended ^b	55.9%	19.1%
Samples provided ^a	296.3	294.0
Proportion of samples negative ^a	91.1%	11.2%

Summary

- Contingency management is the treatment with the greatest efficacy for methamphetamine (and other stimulant) use disorder. Period.
- As with other treatments, contingency management has brain-based mechanisms of action
 - Dopamine D2/D3 receptor status predicts outcome
 - Decision-making choices emphasizing immediate risk, especially following setting of loss, predicts outcome
 - During Contingency Management, frequent “spending” (as compared to “saving”) increases odds for drug abstinence at the next clinic visit
- Effective lever for studying biological processes due to methamphetamine (HIV, STIs); cannabis (pain)
- This treatment is ready for prime time!
 - System change within public funding
 - Changes in formulary in private health insurance

Thank You!

Steven Shoptaw PhD
Sshoptaw@mednet.ucla.edu