

Contingency Management

Part 1: An Evidenced-Based Approach to Positive Change

"Without inspiration the best powers of the mind remain dormant. There is a fuel in us which needs to be ignited with sparks."

~Johann Gottfried Von Herder (1744 –1803)

Patients in treatment are often intimately familiar with pain and punishment. This is one reason motivational incentives – positive reinforcements provided for taking incremental steps on a long, often arduous path of recovery – can be a powerful approach.

Additionally, the clinical use of motivational incentives (also called contingency management) has been honed through decades of research, resulting in a powerful intervention shown to improve patient retention and engagement, increase abstinence, and enhance overall recovery experiences in substance abuse treatment. It can also transform treatment environments. Since implementing motivational incentives, says Martin Gaffney, Director of Elmhurst Hospital Center in New York, "the whole environment, the whole ambience of the clinic has essentially changed in the last five years." (Motivational Incentives Suite [video], NIDA/SAMHSA-ATTC, 2011).

Although the use of motivational incentives has a long and consistent track record of effectiveness, implementation has not been as widespread as expected. In part this is due to resistance, which often shifts with increased understanding of the theory and principles supporting clinical application of motivational incentives, and through direct experience with its power to initiate change. In fact, armed with new knowledge, practitioners can often immediately begin improving and augmenting the ways in which they use incentives.

This three-part series will provide an introduction to motivational incentives (hereafter called M-Inc), including a discussion of benefits and challenges, supporting research, core concepts and principles that govern clinical use, and stories from an ongoing national campaign to help providers consider and implement M-Inc.

Raising Awareness of Motivational Incentives

M-Inc is one of several evidence-based interventions the Addiction Technology Transfer Network features in training and technical assistance. In 2007, however, the Network increased its focus on M-Inc by joining the National Institute of Drug Abuse in launching a national campaign to raise awareness, knowledge, and interest in using incentives as an adjunct therapy to treat substance abuse disorders. The campaign featured a new toolkit of resources: Promoting Awareness of Motivational Incentives (PAMI).

Following a groundswell of interest from the field, and rich feedback and lessons learned, the PAMI toolkit was re-designed and updated, and two companion products added, to create a more advanced suite available at no charge to the field. The suite is the most recent offering from the National Institute of Drug Abuse (NIDA) "Blending Initiative", which partners Addiction Technology Transfer Center experts and NIDA researchers to develop and disseminate evidence-based tools for the field. The Motivational Incentives Suite includes three core parts: 1) the PAMI toolkit (2nd edition, 2011); 2) MI: PRESTO a self-paced, interactive on-line course designed to help providers implement and customize M-Inc; and, 3) MIIS (Motivational Incentives Implementation Software). For more details, and internet links, see "Resources" below.

This series will draw from the new Motivational Incentives Suite, which features a low-cost approach to using incentives shown to be effective through the most widespread research project on M-Inc conducted to date (discussed at the end of this article).

Defining Motivational Incentives

Recovery is a long, often difficult journey and the M-Inc program helps tip the balance (decision scale) by providing positive reasons to make next steps a little bit easier. A M-Inc program is used as a supplement to other therapeutic clinical methods. It restructures the motivational environment by providing immediate positive reinforcement (e.g., vouchers, goods, or privileges) to patients for reaching concrete targeted behaviors. Research has shown that this helps ambivalent patients move toward the changes treatment requires.

Motivational Incentives and Contingency Management. Contingency management (CM) approaches were first used in the 1960s, based on B. F. Skinner's work (1953, 1983). Skinner, who coined the term operant conditioning, proposed that reinforced behaviors are more likely to re-occur. His idea was that behavior can be learned and changed through the use of reinforcement or punishment (i.e., a stimulus-response pattern is reinforced and the individual is conditioned to continue to do the reinforced behavior, or if punished lessen punished behavior). The strategic nature of operant conditioning is highlighted in a comparison to classical conditioning, which refers to an involuntary or automatic response (behavior) to a stimulus. For example, patients with substance use disorders are often automatically triggered to crave alcohol or drugs by stimuli in their environment.

Maxine Stitzer, a pioneer in the application of behavioral analysis and behavioral therapy principles to drug abuse, offers a clear description of operant conditioning in the new video included in the Motivational Incentives Suite (NIDA/SAMHSA-ATTC, 2011): "(In) the very, very basic operant conditioning model you have a target behavior; you have a reinforcer; you link them together through a contingency; and, as B.F. Skinner had shown, you can increase the frequency of that behavior you're reinforcing." This is the basis of Contingency Management.

More recently the term motivational incentives is being used to emphasize that incentives are used to promote desirable or positive behaviors and to address client ambivalence. While the terms CM and M-Inc are often used interchangeably, they differ in that a CM program may include different types of contingent responses to target behaviors (including punishment and negative reinforcement), whereas M-Inc refers to a model that uses positive reinforcement, as defined below.

The Importance of Positive Reinforcement

According to Scott Kellog, et al (2007) "While all kinds of models have been tried in addiction treatment settings, positive reinforcement schedules are increasingly the norm. In large part, this is the case because they are therapeutic and enjoyable for both patients and staff. Negative reinforcements and punishments, while effective at times, are unpleasant to use and may result in patient dropout (Stitzer et al, 1984) and other forms of resistance (Kazdin, 1994). Punishment, in general, has not been a very effective method in substance abuse treatment (McLellan, 2001)." Therefore, to understand M-Inc, it is important to understand what is meant by positive reinforcement, and how it compares to other types of behavior modification tools.

Reinforcement versus Punishment. The core difference between reinforcement and punishment is not so much whether it is pleasant or unpleasant, but whether the goal is to

increase or to decrease the likelihood of a behavior. The goal of reinforcement is to increase the occurrence of a behavior, while the goal of punishment is usually to decrease the occurrence of a behavior. Also, punishment frequently involves the presentation of some kind of aversive stimuli when the undesired behavior occurs (e.g., getting a speeding ticket or a drug court sanction).

Positive versus Negative Reinforcement. Positive reinforcement involves the presentation of a stimuli (such as a voucher, tangible desired object, or clinic privilege) after a behavior occurs. Negative reinforcement involves the removal of a stimuli after a behavior occurs, usually associated with loss or pain (e.g., verbal reprimands being stopped after an adolescent cleans his room, or the repetitive "ding ding" sound a car makes until a seatbelt is fastened, or the frequency of submitting urine samples is decreased after a period of submitting all negative samples).

In summary, positive reinforcement strategies are designed to increase the occurrence of a specific, desired behavior by breaking a larger goal down into smaller steps and reinforcing each of the steps. Furthermore, reinforcers are often given at a high rate of frequency for small, manageable instances of behavior change, and as close in time to the occurrence of a target behavior as possible, with the intent to make the behaviors easier to learn. For example, in a treatment setting, a patient might receive an incentive for attending each group session rather than needing to attend all group sessions before reinforcement is provided.

Ambivalence and Deprivation

Motivational Incentives versus Motivational Interviewing. M-Inc is often confused with Motivational Interviewing (MI), another evidence-based practice. A commonality they share is that both aim to address a patient's ambivalence about extinguishing or reducing alcohol and other drug use – e.g., on the one hand patients may be experiencing some of the negative consequences of using (such as legal difficulties, family stress, and health problems), while on the other hand they still feel the lure of the excitement, pleasure, and reduction of psychic pain associated with drug use. While both M-Inc and MI work on this ambiguity, their methods and goals differ.

With motivational interviewing – a set of therapeutic skills that needs to be developed and practiced by a clinician over time and under clinical supervision – a therapist aims to work with a patient's ambivalence to create inner conflict (dissonance) in order to help him or her make a decision to pursue a path toward recovery.

M-Inc, which generally requires less training and practice, is used adjunctively with the therapeutic relationship and other treatment interventions. It uses positive incentives aimed at modifying a specific behavior; offering an immediate and tangible reward for engaging in health-promoting behavior helps a patient resolve his or her ambivalence about continued use. According to Kellog et al (2007): "Contingency management treatments ... seek to reach this end by reducing the relative value of the contingencies that support drug use through increasing the incentives that support abstinence. As abstinence grows in attractiveness, drug-using behavior should diminish in desirability."

More specifically, M-Inc not only focuses on resolving ambivalence, but during a crucial time in recovery where other forms of positive reinforcement may be sorely lacking.

Scott Kellog and his colleagues (2007) state: "A number of writers have emphasized the importance of making treatment attractive and reinforcing (Bickel et al., 1998; Marlatt &

Kilmer, 1998). This may be particularly important if, as Greaves (1974) has argued, addictive people frequently have disturbances in their ability to feel and experience pleasure. For many, it may be a deficit in pleasure... which is the force that drives addictive behavior. Certainly patients seem to respond when a general culture of affirmation and support is integrated into a program that uses incentives. One of the reasons why this is important is because the recovering person may, in fact, be in a state of deprivation. That is, many of the benefits of recovery do not immediately come to those who have stopped using. In fact, they may have given up what they perceived as the benefits of using, only to find that are now faced with a whole new array of difficulties. Ultimately, the goal is for patients to find naturally-occurring reinforcers."

A Humanizing History

"While aversive or punitive methods have been used to reach goals, the systematic use of positive reinforcements, or pleasurable consequences, has been associated with humanistic efforts to improve problematic individual or social conditions."
(Kellog et al, 2007)

An early example of incentives used in a humanizing effort can be found in mid-19th century Australia, where a reformer named Alexander Maconochie used a system of positive reinforcements and points to transform part of a prison complex, at a time Australian jails were known for brutality (Kazdin, 1978; ElectricScotland, 2005). Despite favorable results, and praise by some for his benevolence and humanity, Maconochie faced constant resistance and was eventually transferred to another prison, where he was criticized for his methods and unjustly dismissed. Maconochie's methods went on to have an immense impact on Western penology; and although he came to be known as the "Father of Parole", he died in ill health still campaigning against resistance for reform.

For more about the history of M-Inc, and the decades of research that support its effectiveness, please see the text box "Motivational Incentives: History and Research – Decades of Evidence" at the end of this article.

The MIEDAR Study

Following many decades of research, present day studies continue to find positive results through the use of M-Inc. Most recently, the NIDA Clinical Trials Network (CTN), a nationwide collaboration between addiction researchers and community-based treatment programs (CTPs), completed a study entitled *Motivational Incentives to Enhance Drug Abuse Recovery*. MIEDAR was based on Nancy Petry's work (Petry, 2000; Petry & Martin, 2002), which explored methods of delivering incentives that would reduce costs without sacrificing demonstrated effectiveness. In older voucher-based incentive delivery systems, for example, patients always received a tangible reinforcement immediately following a target behavior. Petry altered this methodology with her "Fishbowl" technique, which provides intermittent reinforcement, an approach that is both cost effective and improves outcomes (Petry, 2000; Petry et al, 2000).

The primary aim of MIEDAR was to study the use of lower-cost M-Inc for reducing stimulant use among patients receiving treatment at either methadone clinics (one arm of the study) or medication-free outpatient settings (the second arm). In all, about 800 patients were enrolled in both arms of the study, making MIEDAR the largest, multi-site trial of M-Inc conducted to date. The study yielded several positive findings, with the main outcomes generalized, as follows (PAMI 2nd Edition, 2011 [Trainer Guide]):

- *Incentives improve patient retention.* Petry et al (2005) published an article from the CTN study reporting on 400 patients who reported cocaine, methamphetamine, or amphetamine use and were randomly assigned to psychosocial treatment as usual (TAU), or TAU plus abstinence-based incentives. The study found that incentives improved retention in treatment; 49% of the patients receiving TAU plus abstinence-based incentives were retained at 12 weeks compared with 35% of the patients receiving only TAU.
- *Incentives improve patient outcomes.* Patients who met criteria for methamphetamine use disorders and received incentives submitted more stimulant- and alcohol-negative samples than patients who only received treatment as usual. (Roll et al, 2006)
- *Lower Cost Incentives Improve Stimulant Abstinence for Patients in Methadone Maintenance Treatment.* Patients in MMT reduced their alcohol and stimulant use when given lower-cost incentives, submitting more alcohol- and stimulant-negative samples than patients who only received TAU. The cost of incentives averaged \$120/per participant over 12 weeks. (Pierce et al, 2006).

An area where more research is needed is the duration of time incentives need to be used to ensure positive impacts achieved are maintained once incentives are stopped. According to Donald Calsyn, a Professor of Psychiatry and Behavioral Sciences at the University of Washington, and a researcher for the Pacific Northwest Node of the NIDA Clinical Trials Network: "In many CM studies, but not all, the positive effects from CM disappear when the incentives go away. It is not clear if one needs to plan on providing incentives indefinitely, or if the length of the CM intervention in most studies was inadequate to get long term effects with incentives removed.... This does argue for selecting target behaviors that affect more short term goals such as incentivizing attending orientation sessions or IOP sessions, since these are time limited goals that have structured end dates after which incentives would no longer be provided."

Conclusion

M-Inc, with deep historical roots in behavior analysis and operant conditioning, are part of the advancements in evidence-based treatment for substance abuse and mental health disorders. The use of incentives, when implemented correctly, is supported by decades of effectiveness research. The large-scale NIDA CTN MIEDAR study was pivotal in demonstrating that M-Inc could be delivered at a significant reduction in cost without a corresponding loss in effectiveness. This has resulted in M-Inc being more accessible – and acceptable – to treatment programs.

The successful outcomes of the MIEDAR Study led to the creation of the original PAMI toolkit, followed by the updated Motivational Incentives Suite (NIDA-SAMHSA-ATTC, 2011) featured in an ongoing NIDA/ATTC national awareness campaign to help practitioners understand and consider adopting evidence-based M-Inc interventions.

Per Kellogg et al (2007): In what may be seen as an example of principle-based dissemination, one of the central goals of the NIDA/ATTC awareness project is to familiarize clinicians and administrators with the core principles involved in designing and implementing a motivational incentives program. The concept is that if treatment centers are willing to design interventions that incorporate the seven principles... then they are on a path toward creating an effective program."

Part 2 of this series will review the seven core principles of M-Inc, including how they play out in different types of M-Inc programs, and considerations for implementation.

Series Author: Lynn McIntosh, BA

Series Editor: Traci Rieckmann, PhD, NFATTC Principal Investigator, is editing this series. The Addiction Messenger's monthly article is a publication from Northwest Frontier ATTC that communicates tips and information on best practices in a brief format.

Northwest Frontier Addiction Technology Transfer Center

3181 Sam Jackson Park Rd. CB669

Portland, OR 97239

Phone: (503) 494-9611

FAX: (503) 494-0183

A project of OHSU Department of Public Health & Preventive Medicine.

Motivational Incentives: History and Research – Decades of Evidence

The scientific foundation for the modern use of positive reinforcements can be found in the work of E.L. Thorndike (Dewsbury, 1998; Thorndike, 1998) and B.F. Skinner (1953, 1983), both who were involved in pivotal work that explored the basic principles of learning. Skinner, whose classic scientific studies focused on how learning takes place in animals and humans, coined the term operant conditioning, which is based on modern day contingency management techniques (see "Defining Motivational Incentives" above).

1950s and 1960s. During this era Skinner began to apply his behavior modification principles to the treatment of a variety of serious conditions, including long-term schizophrenia, developmental disability, and juvenile delinquency (Kazdin, 1978). Their efforts took the form of what was later termed "token economies" (Kazdin & Bootzin, 1972). Beginning in the 1960s, addictive disorders became a focal point. As researchers recognized that drug use was maintained in part by the positively reinforcing effects of the drug itself, they began to systematically apply operant conditioning principles to reinforce abstinence and other behaviors that competed with drug use.

This was also a time when a more humanizing element entered substance abuse treatment, per Kellogg et al (2007):

"It is interesting to note... that the early methadone studies at The Rockefeller University, which took place in the early 1960's, did embody many of the desirable aspects of the therapeutic milieu that is associated with contingency management (Kellogg et al., 2005; Kirby et al., 1999). In contrast to the harshness found in other drug treatment programs at that time, the staff and physicians approached the patients in a manner that was supportive and concerned. Progress was reinforced and setbacks were treated with encouragement. Take-home doses of methadone were available to patients who were maintaining abstinence from heroin. There was a culture of positive reinforcement; however, it was not a formally-instituted program of operant conditioning (Dole, Nyswander, & Kreek, 1966; M. J. Kreek, personal communication [with Dr. Kellogg], March 13, 2006)."

1970s. In this decade, the principles developed earlier were applied in a series of exciting studies focusing on how reinforcement principles could be applied in treating persons with alcohol use disorders. Studies conducted at Johns Hopkins University by Cohen, Liebson, and Bigelow (Bigelow & Silverman, 1999; Cohen, Liebson, Faillace, & Allen, 1971) showed positive results if appropriate contingencies were in place that supported non-alcoholic patterns of alcohol ingestion. During the same decade (also at John Hopkins) Maxine Stitzer used the principles of operant conditioning in systematic, controlled studies with opioid-dependent patients, and found the use of reinforcers improved patient retention, attendance, and abstinence while patients were enrolled in treatment (Stitzer et al, 1993).

Despite success of these early studies, the interventions weren't widely embraced by the addictions treatment field (Bigelow & Silverman, 1999; Higgins, Heil, & Lussier, 2004).

1980s. By the late 1980s, Dr. Stephen Higgins and colleagues initiated studies with patients engaged in treatment for stimulant dependence, using a method of reinforcing abstinence in which patients earned a voucher each time they submitted a drug-free urine screen. In one study, 75% of the patients who received the voucher incentive plus treatment as usual (TAU) were retained in the six-month study, vs. 40% of patients who received only TAU. Higgins also found significant differences in cocaine abstinence rates when vouchers were used to reinforce drug-free urine screens: 55% of patients who received incentives plus TAU achieved at least 10 weeks of continuous cocaine abstinence vs. 15% of those who received only treatment as usual. This led to major revitalization of interest in operant approaches (Higgins et al, 1994).

1990s. During this decade, Dr. Ken Silverman began research with inner-city populations on how the duration of incentive programs, and incentive magnitudes, impacted abstinence from secondary drug use when used with opioid-dependent patients. Findings demonstrated that the use of incentive programs helped patients maintain high levels of abstinence from cocaine and opioids (Silverman et al 1999, 1996). Also, between the 1970s and 1990s, a variety of other studies demonstrated that M-Inc procedures are also beneficial for reducing the use of marijuana, alcohol, and nicotine.

Resources

Motivational Incentives Suite (NIDA/SAMHSA-ATTC, 2011). Developed by NIDA/SAMHSA Blending Teams (2007, 2011), including NIDA researchers and staff from CSAT and ATTCs.

To view or download, visit: www.bettertxoutcomes.org, www.ATTCnetwork.org, or www.nida.nih.gov/blending, or <http://ctndisseminationslibrary.org/>.

1. Promoting Awareness of Motivational Incentives (PAMI, 2nd edition, 2011). An introductory training and package of resources first released in 2007, and revised and redesigned to incorporate feedback from the field, testimony, and lessons learned by regional ATTCs as they have used PAMI across the nation to raise awareness and help providers, clinical supervisors, policy makers and others understand and implement M-Inc. The PAMI toolkit is featured in three- to six-hour ATTC trainings, and provides a fundamental understanding of M-Inc, including its seven principles and an introduction to an effective-low-cost strategy for implementation. Including a redesigned video, a new comprehensive trainer guide, PowerPoints, articles, and more, PAMI serves as a foundation to the next two products.

2. Motivational Incentives: Positive Reinforcers to Enhance Successful Treatment Outcomes (MI:PRESTO, 2011). A self-guided, interactive online course designed to help clinical supervisors and other behavioral health (BH) practitioners experience, utilize, and customize the use of M-Inc within the context of a community-based treatment organization. It includes a step-by-step interactive guide to implementation through each of the seven principles of M-Inc; takes about five hours to complete; and is free (or for a low fee of \$25 five NAADAC or NBCC CE credits are available).

3. Motivational Incentives Implementation Software (MIIS, 2011). A software platform developed by NIDA that provides the mechanism to accomplish two goals: 1) To assist researchers, clinicians, and counselors in utilizing and applying M-Inc for treating substance abuse patients; and, 2) To maintain information about clinic patients as well as in the implementation and calculation of incentives based on defined parameters. MIIS is secure, easy to use, and easy to understand. It consists of a user interface to enter pertinent information and parameters, and to manage patient activities. It also contains a database where patient information is stored. Information recorded by MIIS includes patient identification and demographics, attendance records, abstinence history, incentives (draws and prizes), and drugs of choice.

Other Sources

Bickel, W. K., Madden, G. J., & Petry, N. M. (1998). The price of change: The behavioral economics of drug dependence. *Behavior Therapy*, 23, 545-565.

Bigelow, G., & Silverman, K. (1999). *Theoretical and empirical foundations of contingency management treatments for drug abuse*. In S.T. Higgins & K. Silverman (Eds.), *Motivating behavior change among illicit-drug abusers: Research on contingency management interventions* (pp. 15-31). Washington, DC: American Psychological Association.

Cohen, M., Liebson, I. A., Faillace, L., A., & Allen, R.P. (1971). *Moderate drinking by chronic alcoholics. A schedule-dependent phenomenon*. *Journal of Nervous and Mental Disease*, 153, 434-444.

- Dewsbury, D. A. (1998). Celebrating E. L. Thorndike a century after *Animal Intelligence*. *American Psychologist*, *53*, 1121-1124.
- Dole, V. P., Nyswander, M. E., and Kreek, M.J., 1966. Narcotic blockade. *Archives of Internal Medicine*, *118*, 301-309.
- ElectricScotland (2005). *Significant Scots: Alexander Maconochie*. [On-line] Retrieved July 20, 2005, from www.electricscotland.com/history/other/maconochie_alexander.htm.
- Greaves, G. (1974). Toward an existential theory of drug dependence. *Journal of Nervous and Mental Disease*, *159*, 263-274.
- Higgins, S. T., Budney, A. J., Bickel, W. K., Foerg, F. E., Donham, R., & Badger, G. J. (1994). *Incentives improve outcome in outpatient behavioral treatment of cocaine dependence*. *Archives of General Psychiatry*, *51*, 568-576.
- Higgins, S. T., Heil, S. H., & Lussier, J. P. (2004). Clinical implications of reinforcement as a determinant of substance use disorders. *Annual Review of Psychology*, *55*, 431-461.
- Kazdin, A. E., & Bootzin, R. R. (1972). *The token economy: An evaluative review*. *Journal of Applied Behavior Analysis*, *5*, 343-372.
- Kazdin, A. E. (1978). *History of behavior modification*. Baltimore, MD: University Park Press.
- Kazdin, A. E. (1994). *Behavior modification in applied settings* (5th ed.). Pacific Grove, CA: Brooks/Cole Publishing Co.
- Kellogg, S. H., Burns, M., Coleman, P., Stitzer, M., Wale, J. B., & Kreek, M. J. (2005). Something of value: The introduction of contingency management interventions into the New York City Health and Hospital Addiction Treatment Service. *Journal of Substance Abuse Treatment*, *28*, 57-65.
- Kellogg S.H., Stitzer M.L., Petry N., and Kreek M.J. (2007), of New York University, Johns Hopkins, University of Connecticut School of Medicine, and The Rockefeller University (respectively). A publication written and produced specifically for the PAMI (Promoting Awareness of Motivational Incentives) NIDA/SAMHSA-ATTC Blending Product.
- Kirby, K. C., Amass, L., & McLellan, A. T. (1999). Disseminating contingency management research to drug abuse practitioners. In S. T. Higgins & K. Silverman (Eds.), *Motivating behavior change among illicit-drug abusers: Research on contingency management interventions* (pp. 327-344). Washington, DC: American Psychological Association.
- Marlatt, G. A., & Kilmer, J. R. (1998). Consumer choice: Implications of behavioral economics for drug use and treatment. *Behavior Therapy*, *29*, 567-576.
- McLellan, A. T. (2001). Moving toward a "third generation" of contingency management studies in the drug abuse treatment field: Comment on Silverman et al. (2001). *Experimental and Clinical Psychopharmacology*, *9*, 29-32.
- Peirce, J. M., Petry, N. M., Stitzer, M. L., Blaine, J., Kellogg, S., Satterfield, F., et al. (2006). *Effects of lower-cost incentives on stimulant abstinence in methadone maintenance*

treatment: A national drug abuse treatment clinical trials network study. Archives of General Psychiatry, 63, 201-208.

Petry, N. M. (2000). *A comprehensive guide to the application of contingency management procedures in clinical settings. Drug & Alcohol Dependence, 58, 9-25.*

Petry, N. M., Martin, B., Cooney, J. L., & Kranzler, H. R. (2000). Give them prizes and they will come: Contingency management for treatment of alcohol dependence. *Journal of Consulting and Clinical Psychology, 68, 250-257.*

Petry, N. M., & Martin, B. (2002). *Low-cost contingency management for treating cocaine- and opioid-abusing methadone patients. Journal of Consulting and Clinical Psychology, 70, 398-405.*

Petry, N. M., Peirce, J. M., Stitzer, M. L., Blaine, J., Roll, J. M., Cohen, A., et al. (2005). *Effect of prize-based incentives on outcomes in stimulant abusers in outpatient psychosocial treatment programs: A National Drug Abuse Treatment Clinical Trials Network study. Archives of General Psychiatry, 62, 1148-1156.*

Roll, J. M., Petry, N. M., Stitzer, M. L., Brecht, M. L., Peirce, J. M., McCann, M. J., et al. (2006). *Contingency management for the treatment of methamphetamine use disorders. American Journal of Psychiatry, 163, 1993–1999.*

Silverman, K., Chutuape, M. A., Bigelow, G. E., & Stitzer, M. L. (1999). *Voucher-based reinforcement of cocaine abstinence in treatment-resistant methadone patients: Effects of reinforcement magnitude. Psychopharmacology, 146, 128-138.*

Silverman, K., Higgins, S. T., Brooner, R. K., Montoya, I. D., Cone, E. J., Schuster, C. R., et al. (1996). *Sustained cocaine abstinence in methadone maintenance patients through voucher-based reinforcement therapy. Archives of General Psychiatry, 53, 409-15.*

Skinner, B. F. (1953). *Science and human behavior. New York: Macmillan.*

Skinner, B. F. (1983). *A matter of consequences. New York: Alfred A. Knopf.*

Stitzer, M. L., Bigelow, G. E., Liebson, I. A., & McCaul, M. E. (1984). Contingency management of supplemental drug use during methadone maintenance treatment. In J. Grabowski, M. L. Stitzer, & J. E. Henningfield (Eds.), *Behavioral intervention techniques in drug abuse treatment: NIDA monograph 46* (pp. 84-103). Rockville, MD: NIDA.

Stitzer, M. L., Iguchi, M. Y., Kidorf, M., & Bigelow, G. E. (1993). Contingency management in methadone treatment: The case for positive incentives. In L. S. Onken, J. D. Blaine, & J. J. Boren (Eds.), *Behavioral treatments for drug abuse and dependence: NIDA monograph 137* (pp.19-35). Rockville, MD: National Institute on Drug Abuse.

Thorndike, E. L. (1998). Animal intelligence. *American Psychologist, 53, 1125-1127.*

