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Cross-Disciplinary Perspectives on Money Management by Addicts

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Abstract

How addicts manage their funds can be understood from studies of the neurobiology of impulsive spending, contingency management, self-reported expenditures, behavioral economics and anthropology. To show how these differing perspectives can provide theoretical explanations for observed behavior, they were applied to the question of when extra “windfall” funds are spent on substances of abuse. The treatment implications of Behavioral Economic and related approaches include targeting behavioral mechanisms of substance use with money management-based interventions, configuration of reinforcers other than substance use, and therapeutically framing the choice between abstinence and alcohol use.

Introduction and Overview

The use of an abused drug or alcohol can be viewed as a financial decision: a choice to spend money to obtain a substance of abuse instead of making an alternative purchase. There are several clinical treatments for substance abuse that directly target how an addict manages funds. One is case management, which has shown some efficacy as a treatment for substance abuse alone (1), and in conjunction with other services as part of Assertive Community Treatment (2, 3). Another bundled money management-based intervention is the assignment of a representative payee to manage SSI and/or SSDI payments for patients who are judged incapable of managing their own funds. Beneficiaries are frequently assigned payees to restrict their substance use (4, 5), and both quasi-experimental (6) and clinical trial data (7) suggest that properly-implemented payee programs can reduce substance use.

A voluntary money management intervention, Advisor-Teller Money Manager (ATM) (8) was well-accepted in a randomized clinical trial among 85 veterans with recent substance use, in that three-quarters of veterans assigned to ATM at some point voluntarily turned a checkbook or ATM card over to the study therapist to store but substance use was ameliorated in both the ATM and control groups (9). A second clinical trial of ATM at a community mental health center was more compelling. Among a population with disabling psychiatric illnesses, participants assigned to ATM had significantly higher rates of toxicology-verified abstinence from cocaine than patients assigned to a workbook control intervention (10). Even clinical treatments without an explicit financial focus, such as Cognitive Behavioral Therapy, address financial issues in that patients are given case management assistance, taught what expenditures to make, and practice dealing with the drug cravings induced by having extra money.

The integration of money management approaches into substance abuse treatment has arisen concomitantly with other trends fostering increasing attention to financial matters in experimental research. Health Services Research has elucidated the importance of treatment reimbursement in the delivery of substance abuse treatment services (11), and a corollary of this research is that financial factors are also important in treatment participation and response. There has also been an explosion of interest in the nexus between psychology and economics, Behavioral Economics. Behavioral Economics is the application of operant models to the understanding of how people allocate their time, effort and money to maximize their utility (pleasure, material advantage). Behavioral Economic principles have been applied to the choice between substance use and abstinence. More recently, in vivo studies of brain function have illuminated the neural correlates of the choice-making described by Behavioral Economic theory (12).

Individual differences in money management can be understood from perspectives of neurobiology, contingency management, self-reported expenditures, Behavioral Economics and anthropology. In this issue of the American Journal of Drug and Alcohol Abuse, authors from these disparate fields each bring complementary expertise to bear on the question of how addicts manage their funds. Hamilton and Potenza (13) describe how expenditures by addicts relate to other aspects of impulsivity. Key principles of Behavioral Economics are reviewed by Chivers and Higgins, and applied to contingency management and money management treatments of substance abuse (14). Dallery and Raiff (15) summarize what contingency management studies can teach about how different types of reinforcers are valued (e.g. cash, vouchers), and how the context within which reinforcement is delivered impacts its effect. This clinical perspective is also taken by Festinger and Dugosh (16), who describe how addicts reported spending money earned by study participation. Dr. Carpenter-Song (17) reminds us that how people manage their money is influenced by cultural norms, and that these norms influence how patients feel about money management interventions.

In this paper, I will first give an example of the usefulness of considering money management from several different perspectives by considering the problem of when windfall income is spent on substances of abuse. Second, I will describe the implications of these perspectives for understanding how money management-based substance use interventions work. Third, I will describe the importance of the Behavioral Economic insights in designing other substance abuse treatments.

Varying Effects of Windfall Funds on Substance Abuse

Money is a well-recognized cue for substance use (18). But whether extra funds are misspent on substances of abuse has varied considerably across studies. Two studies, one in a methadone maintenance program (19) and another in a residential substance abuse treatment program (20), documented worse adherence to substance abuse treatment after patients received large, lump-sum Social Security payments. In both studies, discontinuation of substance abuse treatment was likely related to relapse to drug use. Although not an unexpected windfall, disability checks and other income received at the beginning of the month is associated with increased substance use. A New England Journal of Medicine article described a cohort of veterans with schizophrenia whose cocaine positive urines, psychotic symptoms, and psychiatric hospitalizations were all more likely during the beginning of the month than in the middle (21). This so-called “check effect” has been demonstrated in a study of United States’ death certificates related to substance use (22), in people whose income is not from disability payments (23, 24) and in people using drugs other than cocaine (22, 25).

However, windfall payments have not been associated with extra drug use in several controlled studies. David Festinger and colleagues directly addressed the issue of whether people who recently used illicit drugs would use drugs when given windfall payments in two prospective, random-assignment studies (26, 27). In these studies, people who had recently sought treatment for substance use showed no greater substance use after days on which they received large amounts of cash and cash equivalents than after days in which they did not receive any money. In fact, they reported using the cash payments to make unremarkable purchases, most often using the money to pay household expenses. A similar finding in which extra cash payments did not appear to worsen an existing substance abuse problem was described by Raiff and Dallery in their review article (28). In one study they cite, reinforcement for abstinence from cocaine did not increase use of other substances and in fact was associated with less opiate use, demonstrating that the reinforcement money was not diverted to an alternative drug (29).

Under What Circumstances are Extra Funds Misspent on Substances of Abuse? Reconciling the Disparate Findings

The mental accounting perspective

Mental accounting is the idea that money budgeted or thought of as being for a particular account will be saved and spent as if such funds were in a discrete account. Mental accounting is evidenced when someone wealthy keeps eating bad food that was paid for instead of buying new food because the wealthy person does not want to pay for food twice (30). The reason the wealthy person does not buy more food is that the mental “food account” is considered depleted because the person already paid for the bad food. It is interesting that the participants in Festinger’s studies were able to indicate how they spent study payments. Because money is fungible, it is arguable whether the study payment specifically was used to make any identifiable purchase, but that is how it was mentally accounted.

How the participants in Festinger’s studies spent the windfall was likely influenced by how they mentally accounted for it. One-time extra earnings such as bonus store credits are typically spent on more whimsical purchases than ordinary income (31), which would be expected to predispose participants to purchase drugs. However, one-time “windfall” payments are less likely to be spent than permanent, stable income increases (32). In one study of homeless people followed for up to 12 months as part of a homeless outreach program, increased spending by SSI/SSDI recipients on drugs did not occur after an initial payment, but a small increase in drug use was observed among beneficiaries who had received disability payments for longer (33).

Neurobiological Perspective

There may be some biological basis for money being a cue to drug use, above and beyond the conditioned association some addicts developed between money and drug use. In vivo neuroimaging of volunteers completing a delay discounting choice between an immediate smaller reward or a delayed larger reward demonstrated activation of limbic and paralimbic areas when the immediate reward was chosen (34). In another study, the anticipation of immediate payment during a delay discounting choice in healthy volunteers selectively activated the nucleus accumbens (35), the brain region activated by drugs of abuse. Anticipated gain during a monetary incentive delay task was also associated with sub-cortical activity (in the ventral striatum, caudate and insula) (36).

Anthropological/Clinical Perspective

The anthropological perspective considers social aspects of drug purchases that are not addressed by the other perspectives. It is noteworthy that the studies in which windfalls were not misspent involved general substance abuse treatment settings, but many studies in which windfalls were spent on drugs targeted people receiving Social Security payments for disabling psychiatric conditions. Social factors may have more impact on spending windfalls among people with severe mental illnesses than among those without concomitant mental illness. The most common reason mentally ill people give for drug use is to socialize (37). Two of the patterns of social substance use described in an ethnographic study were largely transactional modes of interaction and were given financial names: “the user syndicate” in which substances, money and favors are traded among people; and “entrepreneurial substance providers” whose role was to buy, sell and distribute drugs (38).

Mechanisms By Which Money Management Impacts Substance Use

Money management interventions generally involve several components: case management, help with planning and sticking to a budget, restrictions in patients’ access to their funds, and sometimes real or perceived coercion. Some theoretical modes by which these components may act are presented below.

Money Management Uses Money as an Alternative Reinforcer

Money has great potential as a reinforcer that can compete with substance use. In fact, money may be compulsively acquired and saved, instead of being compulsively spent. It has been asserted that there is an innate and evolutionarily adaptive drive for people to store or hoard surplus valuables (39). Attempting to answer the question, “Why are people so interested in money?,” Lea and Webley argue convincingly that the drive to acquire and retain money is not explained simply by its utility for making purchases (40). They argue that money’s allure is drug-like in that under many circumstances, people value their money itself more than what the money can purchase. This over-valuing of money has been well-established and is referred to as the “money illusion” (41, 42). It is possible that money’s value above and beyond its purchasing power is attributable to money being a proxy for social status (43) or to money’s ability to facilitate social contact because money facilitates bartering. Money management treatments and other effective substance abuse treatments help patients retain and use more of an immediate and potent reinforcer---saved money.

Money Management Alters Reward Perspective

Money management-based interventions may make the choice of non-drug expenditures more reinforcing by making them more tangible. Adolescents with less focus on their future plans were found to be more likely to have recently used drugs (44). Money management counters addicts’ tendency to forego longer-term planning and engage in short-term thinking because money management involves focusing on longer-term budgeting, and planning for longer-term goals. Financial goals are typically concrete and tangible. In a recently-completed clinical trial of ATM, a money management-based substance abuse treatment, patients participants’ tendency to discount future rewards was assessed up to four times over a 32-week period (45), using the Delay Discounting Questionnaire, in which participants made a series of choices between immediate smaller payments and larger, delayed payments (46). Over time, ATM participants had less preference for smaller immediate rewards compared to delayed larger rewards than control patients. Although this likely reflected increased response to future-focused budget training, alternative explanations include that delay discounting was reduced by greater abstinence in the ATM participants, or that general cognitive training can reduce discounting of future rewards (47).

The finding that money management increases preference for delayed rewards can be explained by Temporal Construal Theory (48, 49). According to this theory, events, including reinforcers, that are going to be delivered in the distant future are imagined less precisely than those that will occur immediately. For example, someone who has been told that he will receive a dinner the next night is more likely to imagine the ambience and food than someone told he will receive a dinner next year, who is more likely to imagine the idea of a dinner. Importantly for the weighting of the choices, the dinner in the future is also imagined as less certain to occur, and events judged less likely to occur are less valuable, a phenomenon known as probability discounting (50). Fortunately, the devaluing of future benefits can be countered. College students judged a future event more likely to occur when it was described to them more concretely than when it was described more vaguely (Bilgin and Brenner, 2008). Thus, money management may make future benefits more tangible, which makes future events be perceived to be more likely to occur, and in turn, they are more reinforcing.

Money management alters mental accounting

Budgeting is one way to counter misspending. Considerable research by economists suggests that budgeting money for one goal makes it less likely that the money will be spent on extraneous items (51). Money budgeted for one item (e.g. rent) is not really different from money budgeted for another item (e.g. a gift), in that money is fungible, but peoples' "Mental Accounting" considers these pools of money separately (30). Expenditures for drugs may seem acceptable if they are in the mental account for "fun" but not if they are in the mental account for "living expenses" or "child's clothing."

Implications of Behavioral Economic Findings for Substance Abuse

Treatments

As noted at the beginning of this paper, the use of an abused drug or alcohol can be viewed as a financial decision: a choice to spend money to obtain a substance of abuse instead of making an alternative purchase. Applying Behavioral Economic findings to this financial choice perspective suggests ways to weight the choice to favor abstinence.

Increase the salience of alternative reinforcers

An emerging line of Behavioral Economic research has described studies in which participation in reinforcing activities unrelated to substance use is associated with less substance use. A survey of past-month participation in various categories of reinforcing activities, including those activities related to substance use, has been used to rate the extent to which someone engages in non-drug related activities (52). The ratio of non-substance to substance-related activities predicted 6-month abstinence among women college students who had received a brief intervention, even when other measures of alcohol use severity were accounted for in the analyses (53).

Clinical interventions have been effective that treat substance abuse by fostering involvement in activities other than substance use. In a prospective randomized controlled trial among 105 college students who recently drank alcohol, students instructed to spend more time exercising and engaging in creative activities drank alcohol on fewer days than those in the control condition (54). An important implication of this work is that simply urging students not to use drugs is not likely to be effective unless alternative reinforcing activities are available (55). In an innovative clinical trial conducted at a substance abuse treatment program, patients assigned to reinforcement for completing treatment-related activities they negotiated with their clinicians were more likely to be abstinent than patients who were simply reinforced for abstinence (56). A second clinical study found that

rewarding activity engagement was more effective than standard treatment but in that study, directly reinforcing abstinence was even more effective than reinforcing attendance at activities (57).

Frame Choices Therapeutically

The popular book “Nudge” describes the importance of how choices are framed in determining what decision is made (58). It is possible to use irregularities in how people judge value to manipulate choices to favor abstinence over drug use. For example, people tend to be disproportionately impacted by a choice involving a small probability of a very large gain compared to a choice involving a moderate probability of a moderate gain (59). The disproportionate weight of rare large gains can be utilized in designing contingency management schedules to reinforce abstinence so that an extremely valuable reinforcer is provided, even if it is provided rarely. For example, when reinforcement is provided in the form of draws from a fishbowl for a prize, a valuable but rarely awarded prize is made available to make the draws more desirable (60, 61).

Decisional balance exercises, in which substance users weigh the pros and cons of substance use and abstinence, are opportunities to frame the choice in a way that favors abstinence. One framing device is to indicate that a con of substance use includes the opportunities lost when drinking or using drugs---pointing out such opportunity costs can alter the choice made in an experimental setting (12). It may also be useful to indicate, accurately, that there is a wide range of possible outcomes associated with continued substance use. This takes advantage of a general aversion to choices with large unknowns, called Ambiguity Aversion (62).

Choice Bundling

Choice bundling involves combining a single immediate decision with the expectation that the same choice will be made at subsequent times in the future, so that the immediate selection is “bundled” with the same selection when the choice is presented in the future. A clinical example described by Monterosso (63) is the choice a recovering alcoholic makes between drinking (with associated pleasure but feeling badly the next day) and abstinence (no intoxication pleasure and feeling better the next day) tonight. Choice bundling occurs if the addict believes that the choice to drink one night makes it more likely the same choice will be made in future nights (“one drink a drunk”) and that therefore the choice is between many nights of drinking versus many nights of abstinence. The immediate pleasure of intoxication that night is less likely to be chosen when the choice of many nights are bundled together because the future rewards of intoxication are steeply (hyperbolically) discounted; bundling adds choices in the distant future when the discounted intoxication is less valuable than the discounted good feeling the next day. The effect of choice bundling to favor the larger and later rewards has been shown experimentally in a study in which college students were given a choice between a smaller immediate and a larger delayed reward on five separate weeks (64). The students selected the larger delayed reward more frequently when they were given the bundled choice between the two alternatives for all five weeks in a single session than when the students were given the same choices on each of five weeks.

Summary

In this paper, I have attempted to show the value of multiple money management perspectives for understanding the choice to use substances, and in designing effective treatments. Treatments that draw upon multiple perspectives---neurobiological, behavioral, clinical and qualitative—are richer for it.

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References

1. Jerrell JM, Ridgely MS. Comparative effectiveness of three approaches to serving people with severe mental illness and substance abuse disorders. *Journal of Nervous & Mental Disease*. 1995 Sep; 183(9):566–76. [PubMed: 7561818]
2. Drake RE, McHugo GJ, Clark RE, Teague GB, Xie H, Miles K, et al. Assertive community treatment for patients with co-occurring severe mental illness and substance use disorder: a clinical trial. *American Journal of Orthopsychiatry*. 1998; 68(2):201–15. [PubMed: 9589759]
3. Essock SM, Mueser KT, Drake RE, Covell NH, McHugo GJ, Frisman LK, et al. Comparison of ACT and standard case management for delivering integrated treatment for co-occurring disorders. *Psychiatric Services*. 2006 Feb; 57(2):185–96. [see comment]. [PubMed: 16452695]
4. Conrad KJ, Matters MD, Hanrahan P, Luchins DJ, Savage C, Daugherty B. Characteristics of persons with mental illness in a representative payee program. *Psychiatric Services*. 1998; 49(9): 1223–5. [PubMed: 9735967]
5. Rosen MI, McMahon TJ, Rosenheck R. Does assigning a representative payee reduce substance abuse? *Drug & Alcohol Dependence*. 2007 Jan 12; 86(2–3):115–22. [PubMed: 16839710]
6. Ries RK, Comtois KA. Managing disability benefits as part of treatment for persons with severe mental illness and comorbid drug/alcohol disorders. A comparative study of payee and non-payee participants. *American Journal on Addictions*. 1997; 6(4):330–8. [PubMed: 9398931]
7. Conrad KJ, Lutz G, Matters MD, Donner L, Clark E, Lynch P. Randomized trial of psychiatric care with representative payeeship for persons with serious mental illness. *Psychiatric Services*. 2006 Feb; 57(2):197–204. [PubMed: 16452696]
8. Rosen M, Bailey M, Rosenheck RR. Alcohol & drug abuse: principles of money management as a therapy for addiction. *Psychiatric Services*. 2003 Feb; 54(2):171–3. [PubMed: 12556596]
9. Rosen MI, Carroll KM, Stefanovics E, Rosenheck RA, Rosen MI, Carroll KM, et al. A randomized controlled trial of a money management-based substance use intervention. *Psychiatric Services*. 2009 Apr; 60(4):498–504. [Research Support, NIH, Extramural Research Support, Non-US Gov't]. [PubMed: 19339325]
10. Rosen MI, Rounsaville BJ, Ablondi K, Black AC, Rosenheck RA. Advisor-Teller Money Manager (ATM) Therapy for Substance Use Disorders. *Psychiatr Serv*. July 1; 2010 61(7):707–13. [PubMed: 20592006]
11. Compton WM, Stein JB, Robertson EB, Pintello D, Pringle B, Volkow ND. Charting a course for health services research at the National Institute on Drug Abuse. *Journal of Substance Abuse Treatment*. 2005; 29(3):167–72. [PubMed: 16183465]
12. Loewenstein G, Rick S, Cohen JD. Neuroeconomics. *Annual Review of Psychology*. 2008; 59(1): 647–72.
13. Hamilton KR, Potenza MN. Relations among delay discounting, substance abuse and money mismanagement: implications and future directions. Under Review.
14. Chivers LLHS. Some observations from behavioral economics for consideration in promoting money management among those with substance use disorders. Under Review.
15. Dallery J, Raiff B. Monetary-based consequences for drug abstinence: methods of implementation and implications for allocation of finances in substance abusers. *American Journal of Drug & Alcohol Abuse This Issue*.
16. Festinger DS, Dugosh KL. Paying substance abusers in research studies: where does the money go? Under Review.
17. Carpenter-Song E. Anthropological perspectives on money management: considerations for the design and implementation of interventions for substance abuse. *American Journal of Drug & Alcohol Abuse This Issue*.

18. O'Brien C, Childress AR, Ehrman R, Robbins S, McLellan AT. Conditioning mechanisms in drug dependence. *Clinical Neuropharmacology*. 1992; 15(Suppl 1 Pt A):66A–7A.
19. Herbst MD, Batki SL, Manfredi LB, Jones T. Treatment outcomes for methadone clients receiving lump-sum payments at initiation of disability benefits. *Psychiatric Services*. 1996; 47(2):119–20. [see comment]. [PubMed: 8825244]
20. Satel S, Reuter P, Hartley D, Rosenheck R, Mintz J. Influence of retroactive disability payments on recipients compliance with substance abuse treatment. *Psychiatric Services*. 1997 Jun; 48(6):796–9. [PubMed: 9175188]
21. Shaner A, Eckman TA, Roberts LJ, Wilkins JN, Tucker DE, Tsuang JW, et al. Disability income, cocaine use, and repeated hospitalization among schizophrenic cocaine abusers -a government-sponsored revolving door. *New England Journal of Medicine*. 1995 Sep 21; 333(12):777–83. [PubMed: 7643886]
22. Phillips DP, Christenfeld N, Ryan NM. An Increase in the Number of Deaths in the United States in the First Week of the Month -An Association with Substance Abuse and Other Causes of Death. *New England Journal of Medicine*. 1999; 341(2):93–8. [PubMed: 10395634]
23. Catalano R, McConnell W. Psychiatric emergencies: the check effect revisited. *Journal of Health and Social Behavior*. 1999; 40:79–86. [PubMed: 10331323]
24. Rosenheck R, Frisman L. Do public support payments encourage substance abuse. *Health Affairs*. 1996; 15(3):192–200. [PubMed: 8854526]
25. Li X, Sun H, Marsh DC, Anis AH. Impact of welfare cheque issue days on a service for those intoxicated in public. *Harm Reduction Journal*. 2007 ;4.
26. Festinger DS, Marlowe DB, Croft JR, Dugosh KL, Mastro NK, Lee PA, et al. Do research payments precipitate drug use or coerce participation? *Drug and Alcohol Dependence*. 2005 Jun 1; 78(3):275–81. [PubMed: 15893158]
27. Festinger DS, Marlowe DB, Dugosh KL, Croft JR, Arabia PL, Festinger DS, et al. Higher magnitude cash payments improve research follow-up rates without increasing drug use or perceived coercion. *Drug & Alcohol Dependence*. 2008 Jul 1; 96(1–2):128–35. [Comparative Study]. [PubMed: 18395365]
28. Dallery J, Raiff B. Monetary-based consequences for drug abstinence: methods of implementation and implications for allocation of finances in substance abusers. Under Review.
29. Silverman K, Wong CJ, Umbricht-Schneiter A, Montoya ID, Schuster CR, Preston KL. Broad Beneficial Effects of Cocaine Abstinence Reinforcement Among Methadone Patients. *Journal of Consulting and Clinical Psychology*. 1998; 66(5):811–24. [PubMed: 9803700]
30. Thaler RH. Mental accounting matters. *Journal of Behavioral Decision Making*. 1999; 12(3):183–206.
31. Milkman KL, Beshears J. Mental accounting and small windfalls: Evidence from an online grocer. *Journal of Economic Behavior & Organization*. 2009; 71(2):384–94.
32. Windfalls, Friedman M. the “Horizon,” and Related Concepts in the Permanent Income Hypothesis. *Measurement in Economics*. Stanford: Stanford University Press; 1963.
33. Rosen MI, McMahon TJ, Lin H, Rosenheck RA. Effect of Social Security Payments on Substance Abuse in a Homeless Mentally Ill Cohort. *Health Services Research*. 2006; 41(1):173–91. [PubMed: 16430606]
34. McClure SM, Laibson DI, Loewenstein G, Cohen JD. Separate Neural Systems Value Immediate and Delayed Monetary Rewards. *Science*. October 15; 2004 306(5695):503–7. [PubMed: 15486304]
35. Knutson B, Adams CM, Fong GW, Hommer D. Anticipation of Increasing Monetary Reward Selectively Recruits Nucleus Accumbens. *J Neurosci*. 2001 August 15.21(16):159RC. [PubMed: 11150332]
36. Beck A, Schlagenhauf F, Wüstenberg T, Hein J, Kienast T, Kahnt T, et al. Ventral Striatal Activation During Reward Anticipation Correlates with Impulsivity in Alcoholics. *Biological Psychiatry*. 2009; 66(8):734–42. [PubMed: 19560123]
37. Drake RE, Wallach MA, Alverson HS, Mueser KT. Psychosocial aspects of substance abuse by clients with severe mental illness. *Journal of Nervous & Mental Disease*. 2002; 190(2):100–6. [PubMed: 11889363]

38. Alverson H, Alverson M, Drake RE. Social Patterns of Substance-Use Among People With Dual Diagnoses. *Mental Health Services Research*. 2001; 3(1):3–14. [PubMed: 11508560]
39. Bouissac P. Hoarding behavior: a better evolutionary account of money psychology? *Behavior and Brain Sciences*. 2006; 29:181–2.
40. Lea SEG, Webley P. Money as tool, money as drug: The biological psychology of a strong incentive. *Behavioral and Brain Sciences*. 2006; 29(02):161–209. [PubMed: 16606498]
41. Shafir E, Diamond P, Tversky A. Money Illusion*. *Quarterly Journal of Economics*. 1997; 112(2): 341–74.
42. Franke GR. U.S. cigarette demand, 1961–1990: Econometric issues, evidence, and implications. *Journal of Business Research*. 1994; 30(1):33–41.
43. Kniffin KM. Show me the status: money as a kind of currency. *Behavioral and Brain Sciences*. 2006; 29:188–9.
44. Peters RJ, Tortolero SR, Johnson RJ, Addy RC, Markham CM, Escobar-Chaves SL, et al. The Relationship between Future Orientation and Street Substance Use among Texas Alternative School Students. *American Journal on Addictions*. 2005; 14(5):478–85. [PubMed: 16257885]
45. Black AC, Rosen MI. A money management-based substance use treatment increases valuation of future rewards. *Addictive Behaviors*. In Press, Corrected Proof.
46. Kirby KN, Petry NM, Bickel WK. Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology: General*. 1999; 128(1):78–87. [PubMed: 10100392]
47. Warren KB, Richard Y, Reid DL, Paul FH, Carole B. Remember the Future: Working Memory Training Decreases Delay Discounting Among Stimulant Addicts. *Biological Psychiatry*.
48. Trope Y, Liberman N. Temporal construal and time-dependent changes in preference. *Journal of Personality and Social Psychology*. 2000 Dec; 79(6):876–89. [PubMed: 11138758]
49. Trope Y, Liberman N. Temporal construal. *Psychological Review*. 2003 Jul; 110(3):403–21. [PubMed: 12885109]
50. Yi R, de la Piedad X, Bickel WK. The combined effects of delay and probability in discounting. *Behavioural Processes*. 2006; 73:149–55. [PubMed: 16759821]
51. Thaler RH, Shefrin HM. An economic theory of self-control. *Journal of Political Economy*. 1981; 39:392–406.
52. Holmes GR, Sakano Y, Cautela J, Holmes GL. Comparison of factor-analyzed adolescent reinforcement survey schedule (ARSS) responses from Japanese and American adolescents. *Journal of Clinical Psychology*. 1991; 47(6):749–55. [PubMed: 1757577]
53. Murphy JG, Correia CJ, Colby SM, Vuchinich RE. Using Behavioral Theories of Choice to Predict Drinking Outcomes Following a Brief Intervention. *Experimental and Clinical Psychopharmacology*. 2005; 13(2):93–101. [PubMed: 15943542]
54. Correia CJ, Benson TA, Carey KB. Decreased substance use following increases in alternative behaviors: A preliminary investigation. *Addictive Behaviors*. 2005; 30(1):19–27. [PubMed: 15561446]
55. Murphy JG, Correia CJ, Barnett NP. Behavioral economic approaches to reduce college student drinking. *Addictive Behaviors*. 2007; 32(11):2573–85. [PubMed: 17600631]
56. Iguchi MY, Belding MA, Morral AR, Lamb RJ, Husband SD. Reinforcing operants other than abstinence in drug abuse treatment: An effective alternative for reducing drug use. *Journal of Consulting and Clinical Psychology*. 1997; 65:421–8. [PubMed: 9170765]
57. Petry NM, Alessi SM, Carroll KM, Hanson T, MacKinnon S, Rounsaville B, et al. Contingency Management Treatments: Reinforcing Abstinence Versus Adherence With Goal-Related Activities. *Journal of Consulting and Clinical Psychology*. 2006; 74(3):592–601. [PubMed: 16822115]
58. Thaler, RH.; Sunstein, CR. *Nudge: Improving Decisions About Health, Wealth, and Happiness*. New Haven and London: Yale University Press; 2008.
59. Kahneman D, Tversky A. Prospect theory: an analysis of decision under risk. *Econometrica*. 1979; 47:263–91.

60. Petry NM, Peirce JM, Stitzer ML, Blaine J, Roll JM, Cohen A, et al. 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*. 2005; 62(10):1148–56. [PubMed: 16203960]
61. Petry NM, Martin B, Cooney JL, Kranzler HR. Give them prizes, and they will come: contingency management for treatment of alcohol dependence. *Journal of Consulting & Clinical Psychology*. 2000; 68(2):250–7. [PubMed: 10780125]
62. Ellsberg D. Risk, ambiguity and the Savage axioms. *Quarterly Journal of Economics*. 1961; 75:643–69.
63. Monterosso J, Ainslie G, Monterosso J, Ainslie G. The behavioral economics of will in recovery from addiction. *Drug & Alcohol Dependence*. 2007 Sep; 90(Suppl 1):S100–11. [Research Support, NIH, Extramural]. [PubMed: 17034958]
64. Kirby KN, Guastello B. Making choices in anticipation of similar future choices can increase self-control. *Journal of Experimental Psychology: Applied*. 2001 Jun; 7(2):154–64. [PubMed: 11477982]