

Self-Control

Modeling self-control: hyperbolic discounting

Self-control and savings

Financial incentives and exercise

Financial incentives and smoking

Financial incentives and weight loss

Modeling Self-Control: Hyperbolic Discounting (Laibson QJE 1997)

“Quasi-hyperbolic” discounting model:

$$U_t = u(c_t) + [\beta \zeta^1 u(c_{t+1}) + \beta \zeta^2 u(c_{t+2}) + \dots + \beta \zeta^{T-t} u(c_T)]$$

t = period t

T = number of periods

$\zeta = 1/(1+r)$, where r is the discount rate.

β = present-bias parameter

$\beta = 1$; standard exponential discounting (time consistent preferences).

$0 < \beta < 1$; present bias preferences (time-inconsistent preferences)

Marginal rate of substitution between periods $t+1$ and $t+2$:

At time t : $u'(c_{t+1})/(\zeta u'(c_{t+2}))$

At time $t+1$: $u'(c_{t+1})/(\beta \zeta u'(c_{t+2}))$

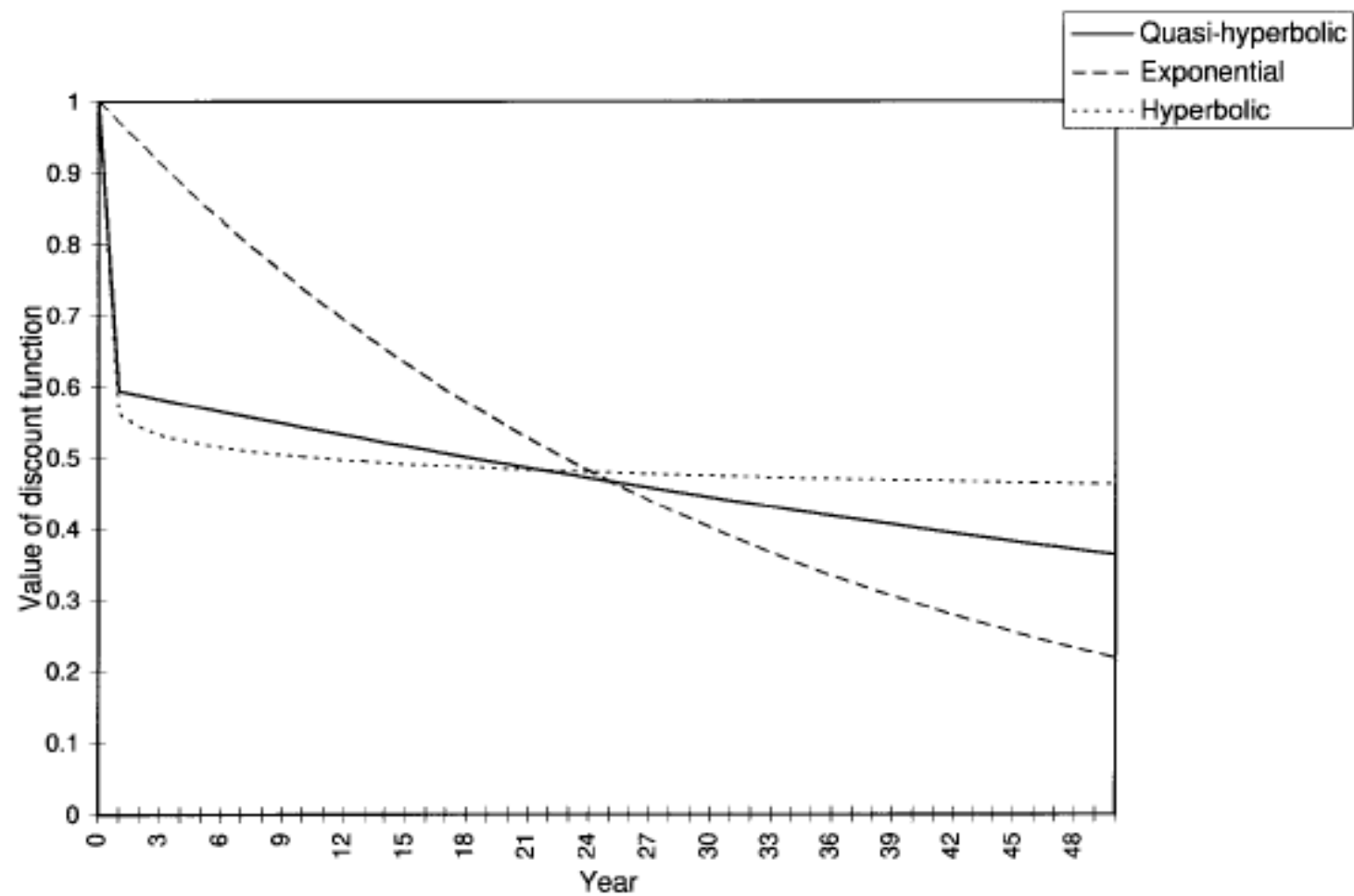


FIGURE I
Discount Functions

Self-Control and Commitment Technologies (Laibson QJE 1997)

Analyzing behavior with “dynamically-inconsistent preferences”: The consumer is modeled as a sequence of “temporal selves” making choices in a dynamic game; assuming that the consumer is “sophisticated” (consumers foresee that they will have self-control problems in the future).

This implies that individuals will demand “commitment technologies” (technologies that constrain the choices of “future selves”).

Laibson argue that illiquid assets (e.g. pension plans, houses) is a form of commitment technology and analyze a model where the individual can save in liquid or illiquid assets with the same return (a sale of an illiquid asset has to be initiated one period before the actual proceeds are received). Consumers use the illiquid asset to prevent future selves from consuming “too much”.

Applications of the Laibson Model: Increased Access to Instantaneous Credit (Credit Cards) (QJE 1997)

The 1980s was a period of rapid expansion in the US consumer credit market (increased availability of credit cards giving access to instantaneous credit).

This can be modeled as removing the illiquid asset from the Laibson model (i.e. the potential credit equals the illiquid asset that can now be instantaneously converted to cash; rather than converted with a one-period lag as in the original model).

Removing the commitment technology will reduce savings and the capital-output ratio (which was also observed in the 1980s in the US). The effect on the interest rate and the capital-output ratio for the US is estimated by comparing the steady states of the model with and without the illiquid asset.

The welfare effects of instantaneous credit is also estimated: the minimum one-time payment which would induce the representative consumer (from the perspective of self t) to switch from an infinite horizon “golden eggs” economy to an infinite horizon instantaneous credit market (two welfare effects: the current self can increase consumption which increase the welfare of the current self; future selves can consume too much from the perspective of the current self which reduce the welfare of the current self).

TABLE I
STEADY STATE INTEREST RATES AND CAPITAL-OUTPUT RATIOS IN ECONOMIES WITH
AND WITHOUT PARTIAL COMMITMENT

	With commitment (i.e., no instantaneous credit)		Without commitment (i.e., instantaneous credit)	
	r	$\frac{K}{Y}$	r	$\frac{K}{Y}$
$\beta = 0.2$	0.040	3.00	0.119	1.81
$\beta = 0.4$	0.040	3.00	0.070	2.40
$\beta = 0.6$	0.040	3.00	0.053	2.70
$\beta = 0.8$	0.040	3.00	0.045	2.88
$\beta = 1.0$	0.040	3.00	0.040	3.00

TABLE II
 PAYMENTS TO INDUCE INDIFFERENCE
 BETWEEN GOLDEN EGGS ECONOMY
 AND INSTANTANEOUS CREDIT ECONOMY

	Payment as percent of output
$\beta = 0.2$	69.6
$\beta = 0.4$	29.5
$\beta = 0.6$	9.0
$\beta = 0.8$	1.6
$\beta = 1.0$	0.0

Self-Control and Savings: The “Save More Tomorrow” Program (Thaler and Benartzi JPE 2004)

Lack of self control may decrease savings, and lead to a demand for “commitment technologies” to increase savings.

A program was designed to help employees to save more for retirement: the “Save More Tomorrow” plan. The plan has four ingredients.

1. Employees decide whether to increase their savings a considerable time before a pay increase (to mitigate the self-control problem).
2. If employees join their contribution is increased beginning with the first paycheck after the raise (to avoid loss aversion).
3. The contribution rate continues to increase on each scheduled raise until the contribution reaches a preset maximum (inertia and status quo bias work toward keeping people in the plan).
4. The employee can opt out of the plan at any time (knowledge about this will make employees more comfortable about joining).

First Implementation of the Save More Tomorrow Program (Thaler and Benartzi JPE 2004)

In 1998 at a midsize manufacturing company that suffered from low participation rates as well as low saving rates. The company hired an investment consultant and offered his services to every employee eligible for the retirement savings plan. On the basis of information that the employee provided the consultant estimated a desired saving rate.

Those employees that were not willing to accept the advice were offered a version of the “Save More Tomorrow” plan as an alternative, proposing that they increase their saving rates by three percentage points each year (until the maximum tax-deferred contribution is reached; which would typically be within four years), starting with the next pay increase. The next pay increase was scheduled to occur about three months after the advice was being given.

TABLE 1
PARTICIPATION DATA FOR THE FIRST IMPLEMENTATION OF
SMarT

Number of plan participants prior to the adoption of the SMarT plan	315
Number of plan participants who elected to receive a recommendation from the consultant	286
Number of plan participants who implemented the consultant's recommended saving rate	79
Number of plan participants who were offered the SMarT plan as an alternative	207
Number of plan participants who accepted the SMarT plan	162
Number of plan participants who opted out of the SMarT plan between the first and second pay raises	3
Number of plan participants who opted out of the SMarT plan between the second and third pay raises	23
Number of plan participants who opted out of the SMarT plan between the third and fourth pay raises	6
Overall participation rate prior to the advice	64%
Overall participation rate shortly after the advice	81%

TABLE 2
AVERAGE SAVING RATES (%) FOR THE FIRST IMPLEMENTATION OF SMarT

	Participants Who Did Not Contact the Financial Consultant	Participants Who Accepted the Consultant's Recommended Saving Rate	Participants Who Joined the SMarT Plan	Participants Who Declined the SMarT Plan	All
Participants initially choosing each option*	29	79	162	45	315
Pre-advice	6.6	4.4	3.5	6.1	4.4
First pay raise	6.5	9.1	6.5	6.3	7.1
Second pay raise	6.8	8.9	9.4	6.2	8.6
Third pay raise	6.6	8.7	11.6	6.1	9.8
Fourth pay raise	6.2	8.8	13.6	5.9	10.6

* There is attrition from each group over time. The number of employees who remain by the time of the fourth pay raise is 229.

Second Implementation of the Save More Tomorrow Program (Thaler and Benartzi JPE 2004)

In 2001 at a large midwestern steel company (Ispat Inland). Ispat had heard about the plan and expressed an interest in increasing the saving rates among its 5,000 unionized employees. Employees received a letter sent jointly by the human resources department and the union inviting them to join the Save More Tomorrow program.

The annual increase to the savings contribution rate was set at two percentage points every time they got a pay rise, with a cap on contribution rates set at 18% of the salary. The first pay raise was scheduled about two months after the solicitation letter was sent out.

TABLE 3
AVERAGE SAVING RATES FOR ISPAT INLAND (%)

	EMPLOYEES WHO WERE ALREADY SAVING ON MAY 31, 2001		EMPLOYEES WHO WERE NOT SAVING ON MAY 31, 2001		ALL ELIGIBLE EMPLOYEES (N=5,817)
	Joined SMarT (N=615)	Did Not Join SMarT (N=3,197)	Joined SMarT (N=165)	Did Not Join SMarT (N=1,840)	
Pre-SMarT (May 2001)	7.62	8.62	.00	.00	5.54
First pay raise (October 2001)	9.38	8.54	2.28	.26	5.83

NOTE.—The sample includes 5,817 employees who are eligible to participate in the 401(k) plan and have remained with the company from May 2001 through October 2001. The sample includes 414 employees who were already saving at the maximum rate of 18 percent, although they were not allowed to join the SMarT program. The reported saving rates represent the equally weighted average of the individual saving rates.

Third Implementation of the Save More Tomorrow Program (Thaler and Benartzi JPE 2004)

In 2002 at two divisions at Philips Electronics (Division A and O); the remaining 28 divisions of Philips served as a control. In January invitation letters were sent out to 815 “non-highly compensated” employees whose saving rates were below 10%. Everything was done the same way at the two divisions except the following: employees at Division A were given the option of attending educational seminars devoted to retirement savings (including a description of the new Save More Tomorrow plan), but were not offered any one-on-one meetings. For the employees at Division O attendance at the financial education seminar was strongly encouraged, and the employees in Division O were also offered the opportunity to have a one-on-one meeting with a certified financial planner.

Employees were told that if they joined the plan, their saving rates would go up on April 1 each year whether or not they received a pay raise (pay raises tended to occur at April 1, but it was not guaranteed). Employees were able to choose if their savings would increase with one, two, or three percentage points per year (those who joined the plan, but did not choose a rate, were assigned a two percentage points increase). The annual increases would stop once the participant reached a saving rate of 10 percent.

TABLE 4
AVERAGE SAVING RATES (%) FOR PHILIPS ELECTRONICS

DATE	EMPLOYEES WHO WERE ALREADY SAVING IN DECEMBER 2001		EMPLOYEES WHO WERE NOT SAVING IN DECEMBER 2001		ALL EMPLOYEES
	Joined SMarT	Did Not Join SMarT	Joined SMarT	Did Not Join SMarT	
A. Control Group					
Observations		7,405		7,053	14,458
Pre-SMarT (December 2001)		5.65		.00	2.90
Post-SMarT (March 2002)		5.76		.70	3.29
B. Test Group (Divisions A and O Combined)					
Observations	180	339	36	260	815
Pre-SMarT (December 2001)	5.26	5.38	.00	.00	3.40
Post-SMarT (March 2002)	6.83	5.72	5.03	1.55	4.61
C. Division A					
Observations	66	190	10	163	449
Pre-SMarT (December 2001)	5.47	5.48	.00	.00	3.12
Post-SMarT (March 2002)	7.32	5.97	6.80	1.54	4.38
D. Division O					
Observations	114	149	26	77	366
Pre-SMarT (December 2001)	5.14	5.25	.00	.00	3.74
Post-SMarT (March 2002)	6.55	5.41	4.35	1.58	4.89

NOTE.—The 'test' group consists of individuals at Divisions A and O.

TABLE 5
PARTICIPATION RATES IN THE SMarT PROGRAM AT PHILIPS ELECTRONICS

Explanatory Variable	Total Number of Employees	Number of Employees in the Test Group	Number of Employees Joining SMarT	SMarT Participation Rate (%)
Entire sample	15,273	815	216	26.5
Sex:				
Missing	9,355	430	92	21.4
Female	2,191	146	51	34.9
Male	3,727	239	73	30.5
Age:				
Missing	3,598	134	33	24.6
20s	1,880	162	46	28.4
30s	3,990	264	66	25.0
40s	3,944	178	49	27.5
50s	1,861	77	22	28.6
Tenure (in years):				
0–1	1,953	103	17	16.5
2–3	3,096	200	58	29.0
4–5	2,064	137	49	35.8
6–10	3,087	262	69	26.3
11+	5,073	113	23	20.4
Income:				
Missing	4,207	10	0	.0
<\$25,000	1,786	155	56	36.1
\$25,000–50,000	4,296	362	106	29.3
\$50,000–75,000	2,386	134	27	20.1
\$75,000+	678	53	11	20.8
Saving rate (prior to SMarT):				
0%	7,351	296	36	12.2
1–5%	1,914	162	62	38.2
6%	4,931	304	101	33.2
7–9%	1,079	53	17	32.1
Division:				
A	449	449	76	16.9
Control	14,458	0	0	
O	366	366	140	38.3
Participated in education seminar:				
No	389	389	20	5.6
Yes	426	426	196	46.0
Met with financial advisor:				
No	213	213	16	7.5
Yes	153	153	124	81.0
Registered Web user:				
No	12,161	663	162	24.4
Yes	3,112	152	54	35.5

NOTE.—The initial sample included 46,873 individual-year observations (excluding highly compensated employees). We first required that all the individuals be present before and after the implementation of the SMarT program, which reduced the number to 20,122 individuals. Next, we eliminated those who switched between the test and control groups, leaving us with 20,103 individuals. We also eliminated those saving more than 10 percent of their pay because they were not allowed to join SMarT, resulting in 15,274 individuals. Of the remaining 15,274 individuals, most are in the "control" group, and they were not offered the SMarT program. The "test" group consists of individuals at the A and O Divisions.

TABLE 6
MEDIAN INCOME REPLACEMENT RATIOS (%)

INCOME	AGE			
	25	35	45	55
A. Pre-SMarT				
\$25,000	57	57	56	55
\$50,000	51	51	51	54
\$75,000	48	49	46	43
B. Post-SMarT				
\$25,000	108	90	75	63
\$50,000	98	83	70	62
\$75,000	90	77	63	50

NOTE.—The table displays the median income replacement ratios for different age and income profiles, using investment advice software by Financial Engines. The projections are based on the following assumptions: no defined-benefit pension, statutory social security benefits, employee saving rate of 4 percent before SMarT and 14 percent thereafter, employer match of 50 cents on the dollar up to 6 percent, portfolio mix of 60 percent stocks and 40 percent bonds, and retirement age of 65.

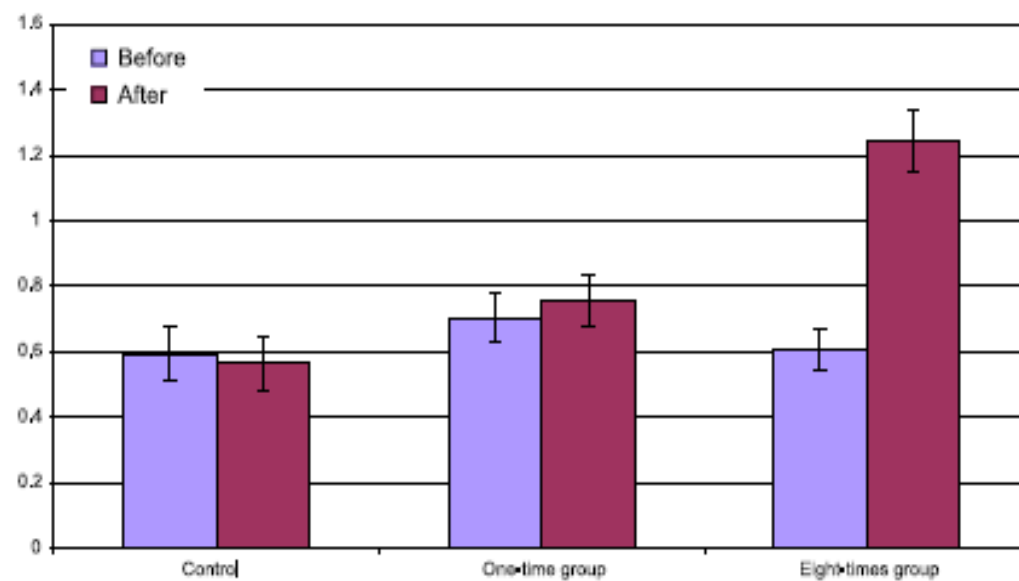
Financial Incentives to Exercise (Charness & Gneezy Econometrica 2009)

Study 1: All subjects (120 students) received a handout about the benefits of exercise and the gym visits on the campus gym was recorded 8 weeks before the intervention, during the intervention, and 7 weeks after the intervention. Subjects were randomly allocated to the following treatments:

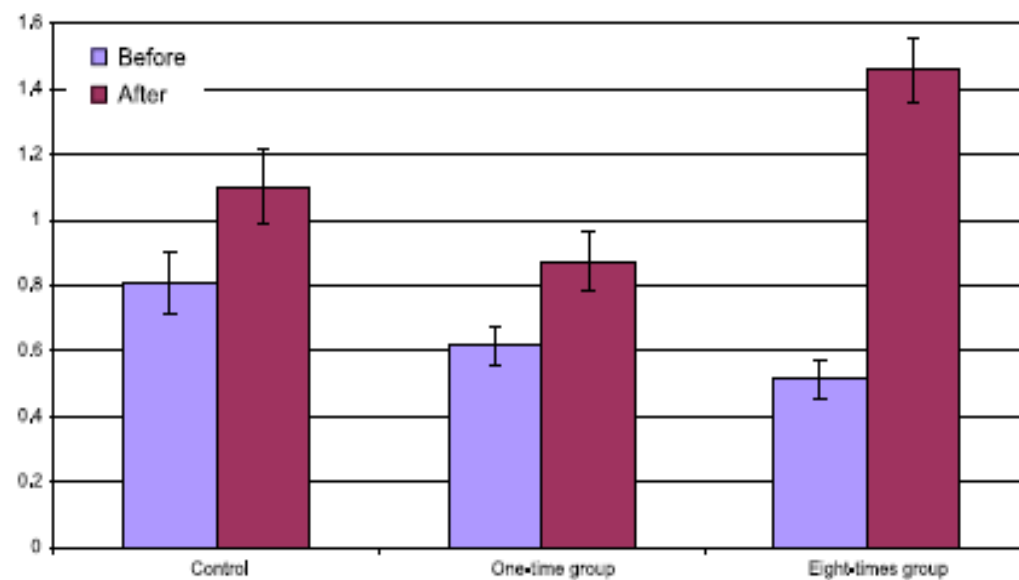
1. A control group without incentives
2. Subjects in this group were paid \$25 to visit the gym at least once during the following week.
3. Subjects in this group were paid \$25 to visit the gym at least once during the following week and an additional \$100 for attending the gym at least 8 times during the following four weeks.

Study 2: Subjects (168 students) were invited to a first meeting to take biometric measures (height, weight, body fat percentage, waist, pulse, and blood pressure) and paid \$75 for this part; they were invited to come twice more to take biometric measures (after one month and after 5 months) and paid \$50 for each of these meetings. All subjects received a handout about exercise and were asked to keep an exercise log for five weeks and to complete a questionnaire. The gym visits on the campus gym was recorded 12 weeks before the intervention, during the intervention period, and 13 weeks after the intervention. Subjects were randomly allocated to the following treatments:

1. A control group with no additional requirements.
2. Subjects in this group were required to attend the gym at least once during the one-month intervention period.
3. Subjects in this group were required to attend the gym at least 8 times during the one-month intervention period.



(a) Study 1



(b) Study 2

FIGURE 1.—Average weekly gym visits. Error bars reflect 1 standard error.

TABLE I
MEAN WEEKLY GYM ATTENDANCE RATES^a

		Ex ante Regular Attendees			Ex ante Nonregular Attendees		
		Before	After	Change	Before	After	Change
Study 1	Control	1.844 (0.296)	1.774 (0.376)	-0.070 (0.206)	0.058 (0.036)	0.046 (0.023)	-0.012 (0.020)
	One required visit	1.866 (0.165)	1.827 (0.211)	-0.040 (0.204)	0.077 (0.040)	0.181 (0.094)	0.104 (0.106)
	Eight required visits	1.644 (0.127)	1.571 (0.304)	-0.073 (0.264)	0.102 (0.044)	1.085 (0.234)	0.983 (0.231)
Study 2	Control group	2.433 (0.419)	2.677 (0.465)	0.244 (0.417)	0.250 (0.047)	0.560 (0.168)	0.310 (0.160)
	One required visit	2.051 (0.191)	2.491 (0.583)	0.440 (0.537)	0.193 (0.039)	0.395 (0.079)	0.202 (0.080)
	Eight required visits	1.901 (0.402)	1.706 (0.786)	-0.195 (0.411)	0.204 (0.038)	1.405 (0.170)	1.201 (0.171)

^aStandard errors are in parentheses.

The incentives ("eight required visits") affected gym attendance only in the group "ex ante nonregular attendees" (who visited the gym less than once a week in the period before the intervention); this is reasonable as the other group ("ex ante regular attendees") visited the gym about twice a week on average already before the intervention.

TABLE III
BIOMETRIC DATA AVERAGES AND CHANGES OVER TIME—STUDY 2^a

	Control (G1)		One-Time (G2)		Eight-Times (G3)		Difference-in-Difference (Wilcoxon-Mann-Whitney Test)		
	First	Δ	First	Δ	First	Δ	G1-G2	G2-G3	G1-G3
Body fat %	25.7 (1.54)	1.41 (0.42)	21.6 (1.07)	0.29 (0.33)	26.9 (1.09)	-0.78 (0.21)	1.12 [*] [0.088]	-1.07 ^{***} [0.000]	-2.19 ^{***} [0.000]
Pulse rate	78.0 (1.86)	3.90 (2.08)	81.8 (1.56)	-1.75 (1.45)	80.2 (1.47)	-1.25 (1.78)	5.65 ^{***} [0.030]	-0.50 [0.974]	5.15 ^{***} [0.040]
Weight (kg)	61.8 (2.03)	0.57 (0.55)	59.8 (1.60)	0.59 (0.21)	64.0 (1.54)	-0.34 (0.25)	-0.02 [0.560]	0.93 ^{***} [0.005]	0.91 ^{***} [0.006]
BMI	22.7 (0.64)	0.23 (0.19)	21.7 (0.45)	0.22 (0.07)	23.2 (0.40)	-0.12 (0.09)	0.01 [0.560]	0.34 ^{***} [0.005]	0.35 ^{***} [0.006]
Waist (in.)	34.3 (0.63)	0.07 (0.36)	33.0 (0.47)	-0.10 (0.27)	35.0 (0.42)	-0.72 (0.23)	0.17 [*] [0.790]	0.62 ^{***} [0.045]	0.79 [*] [0.068]
Systolic BP	122 (1.82)	5.23 (1.71)	121 (2.01)	2.32 (1.88)	122 (1.90)	1.78 (1.99)	2.91 [*] [0.084]	0.54 [0.897]	3.45 [*] [0.090]
Diastolic BP	74.0 (1.22)	2.87 (1.22)	75.8 (1.44)	1.07 (1.23)	74.7 (1.07)	2.58 (1.33)	1.80 [0.160]	-1.51 [0.654]	0.29 [0.535]

^aStandard errors are in parentheses, Two-tailed *p*-values are in brackets. Body mass index (BMI) is calculated using the formula: BMI = (weight in kilograms)/(height in meters)². "First" refers to the first measurement, which was taken in the initial week, and "Δ" indicates the change from the initial level as determined using the final measurement, taken 20 weeks later.

Financial Incentives to Quit Smoking (Volpp et al New England Journal of Medicine 2009)

Employees at a multinational company in the US who were smokers (at least five cigarettes per day) participated in the study. All participants were followed for at least 12 months; those who quit smoking (smoking cessation) as confirmed by a biochemical test were followed an additional 6 months. Subjects were randomized to two treatments:

1. A control group: subjects received information about smoking-cessation programs (information about community-based smoking-cessation resources within 20 miles of their work site as well as information about the standard health benefits provided by the firm).
2. Subjects received information about smoking-cessation programs plus financial incentives (\$100 for completion of a smoking-cessation program; \$250 for cessation of smoking within 6 months after study enrollment (as confirmed by a biochemical test); and \$400 for abstinence for an additional 6 months after the initial cessation (as confirmed by a biochemical test)).

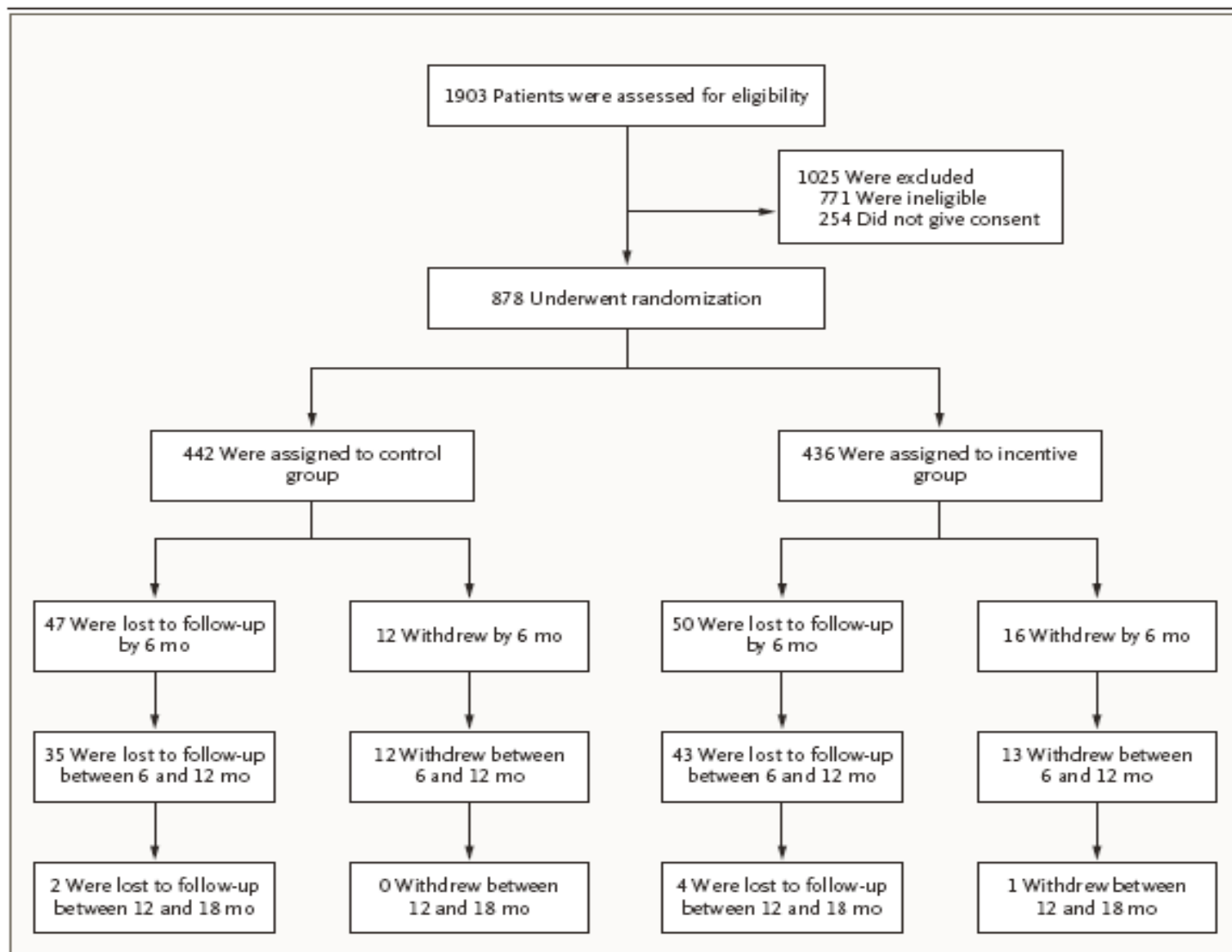


Figure 1. Assessment for Eligibility, Randomization, and Follow-up.

Table 2. Smoking-Cessation End Points According to Group Assignment.*

End Point	Control Group (N = 442)	Incentive Group (N = 436)	P Value
	<i>no. (%)</i>		
Enrollment in smoking-cessation program			
Participation in program	24 (5.4)	67 (15.4)	<0.001
Completion of program	11 (2.5)	47 (10.8)	<0.001
Smoking cessation at 3 or 6 mo			
Self-reported	62 (14.0)	102 (23.4)	<0.001
Confirmed	52 (11.8)	91 (20.9)	<0.001
No sample submitted	9 (2.0)	9 (2.1)	0.79
Positive sample submitted	1 (0.2)	2 (0.5)	0.56
Smoking cessation at 3 or 6 mo with continued abstinence through 9 or 12 mo			
Self-reported	27 (6.1)	66 (15.1)	0.002
Confirmed	22 (5.0)	64 (14.7)	<0.001
No sample submitted	5 (1.1)	2 (0.5)	0.06
Positive sample submitted	0	0	
Self-reported relapse	21 (4.8)	21 (4.8)	0.96
Continued abstinence at 15 or 18 mo among participants who quit at 3 or 6 mo and remained abstinent through 9 or 12 mo			
Self-reported	17 (3.8)	47 (10.8)	<0.001
Confirmed	16 (3.6)	41 (9.4)	<0.001
No sample submitted	1 (0.2)	6 (1.4)	0.03
Positive sample submitted	0	0	
Self-reported relapse	3 (0.7)	12 (2.8)	0.02

* Smoking cessation was confirmed by means of a negative result on a cotinine test.

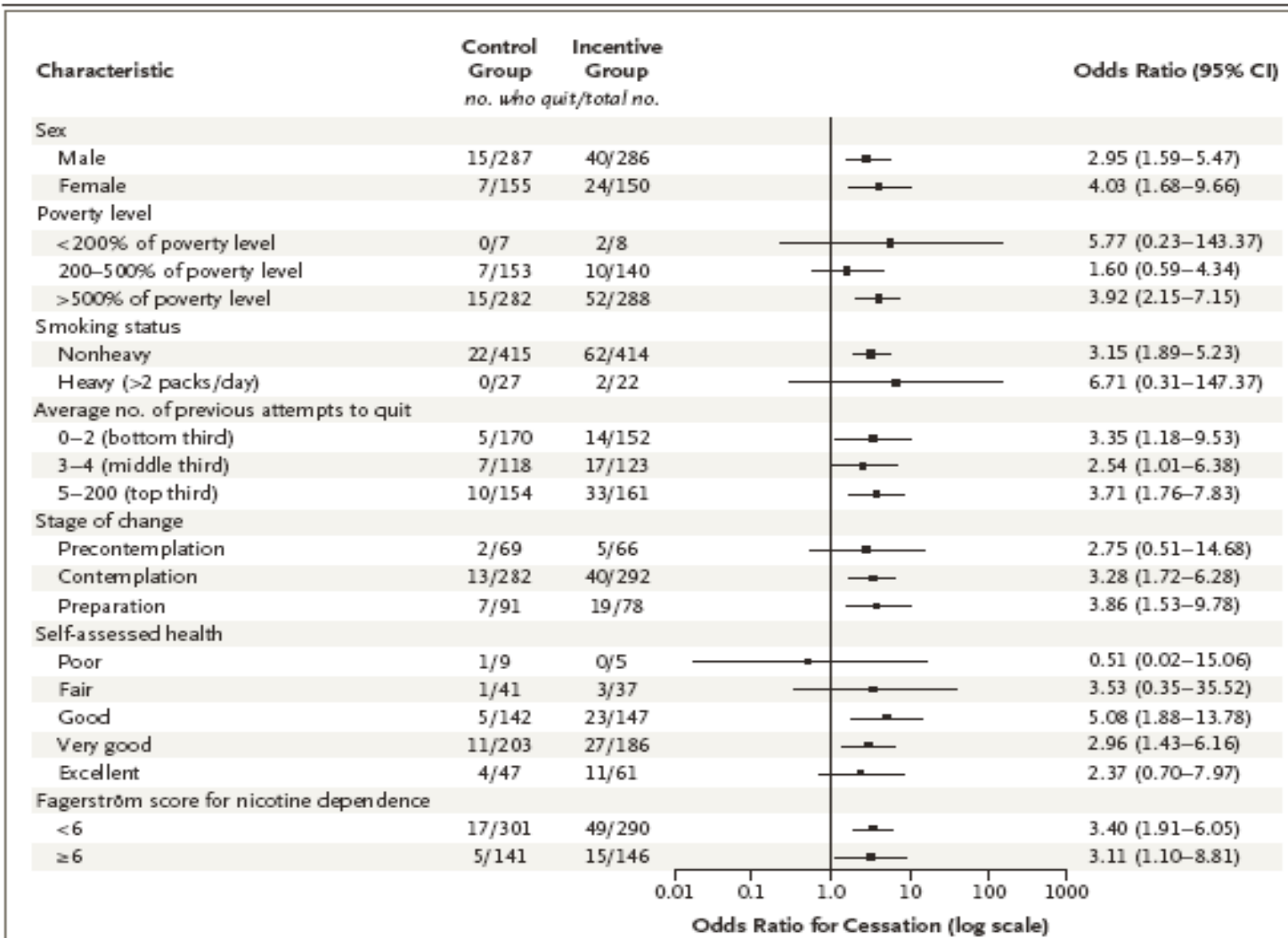


Figure 2. Rates of Smoking Cessation in Various Subgroups at 9 or 12 Months.

Stage of change refers to the smoker's readiness to quit, as defined by DiClemente et al.¹⁶ and Prochaska et al.¹⁷ The Fagerström Test for Nicotine Dependence¹⁴ has a range of 0 to 10, with higher scores indicating greater nicotine dependence; a score of 6 or more was used to classify participants as highly dependent on nicotine.¹⁵

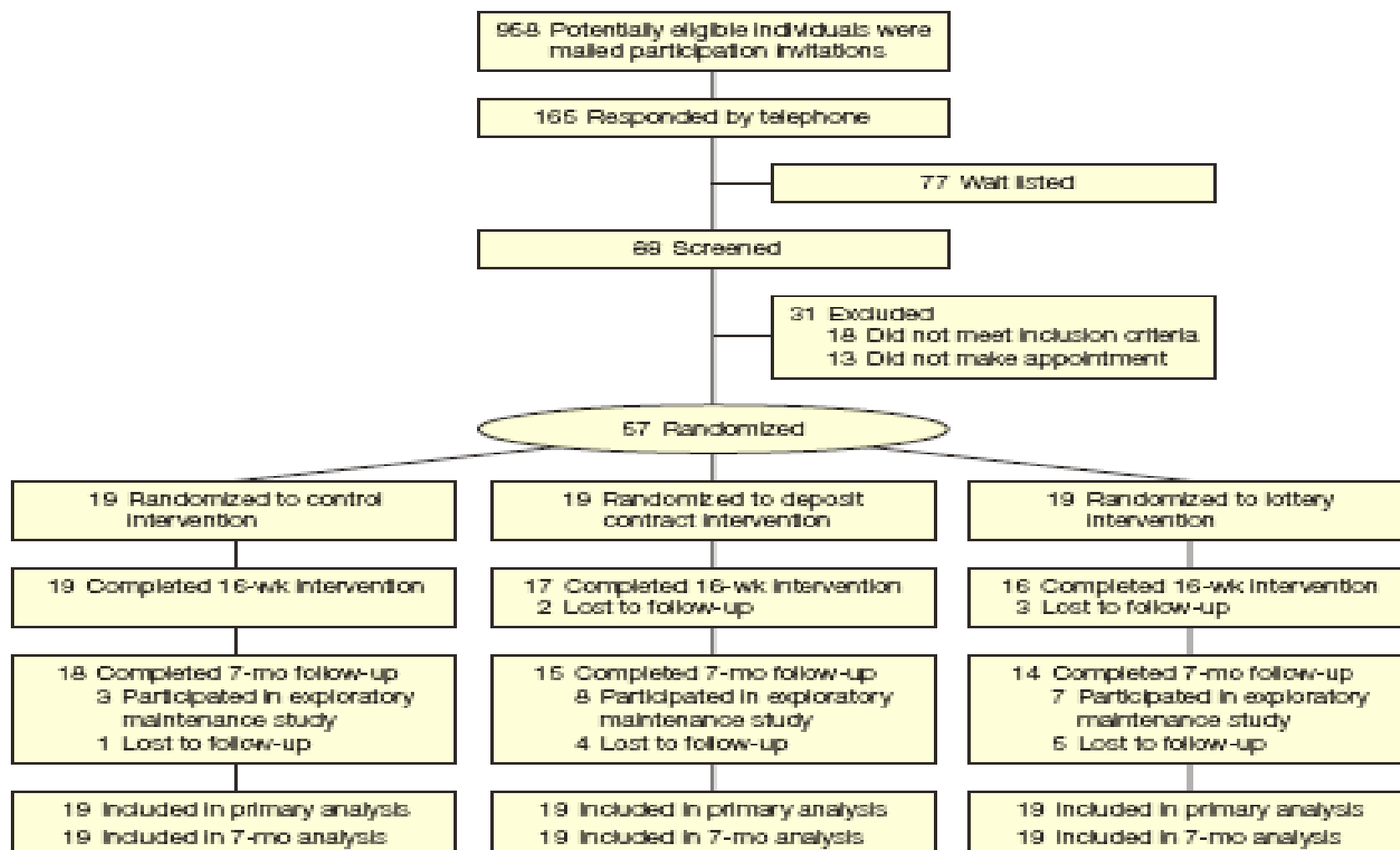
Financial Incentives for Weight Loss (Volpp et al Journal of the American Medical Association 2008)

Subjects with overweight (body mass index 30-40) were randomized to three weight loss plans with monthly weigh-ins during a 16 week period (there was also an additional follow-up after 7 months):

1. Control group: only monthly weigh-ins.
2. Deposit contract group: Subjects could contribute up to \$3 each day to a deposit contract (how much to contribute was decided in the beginning of each month); each day they reported a weight at or below the weight loss goal the experimenter matched the contribution of the subject and added a fixed payment of \$3 per day. If the weight at the monthly weigh-in was at or below the weight loss goal the subject received the money in the deposit (if they were above the goal the money was contributed to a pool of money that at the end of the study was evenly distributed among the subjects that lost more than 20 pounds after 16 weeks). The goal weight loss was 16 pounds after 16 weeks and a weight loss trajectory for each day was estimated based on this goal. All subjects who lost more than 20 pounds after 16 weeks received a bonus of \$50.
3. Lottery incentive group: Subjects participated in a daily lottery with an expected value of \$3 per day every day that they reported a weight at or below the weight loss goal (the weight loss goal was the same as in treatment 2). The lottery provided infrequent large payoffs (a 1 in 100 chance at a \$100 reward) and frequent small payoffs (a 1 in 5 chance at a \$10 reward). Lottery winnings were accumulated each month, and subjects only received the accumulated lottery awards if the weight at the monthly weigh-in was at or below the weight loss goal. All subjects who lost more than 20 pounds after 16 weeks received a bonus of \$50.

Subjects that lost at least 11 pounds after 16 weeks were offered to continue in an “exploratory maintenance study” where half the subjects were randomly assigned to receive further incentives for maintenance of weight loss for the following 6 months (18 subjects agreed to this extension; 3 in the control group; 8 in the deposit contract group; and 7 in the lottery group.) This complicates the interpretation of the results after 7 months follow-up.

Figure 1. Flow of Study Participants



The weight of participants lost to follow-up was assumed to be equal to the weight at randomization in the statistical analyses.

Table 2. 16-Week Weight Loss Measures by Group

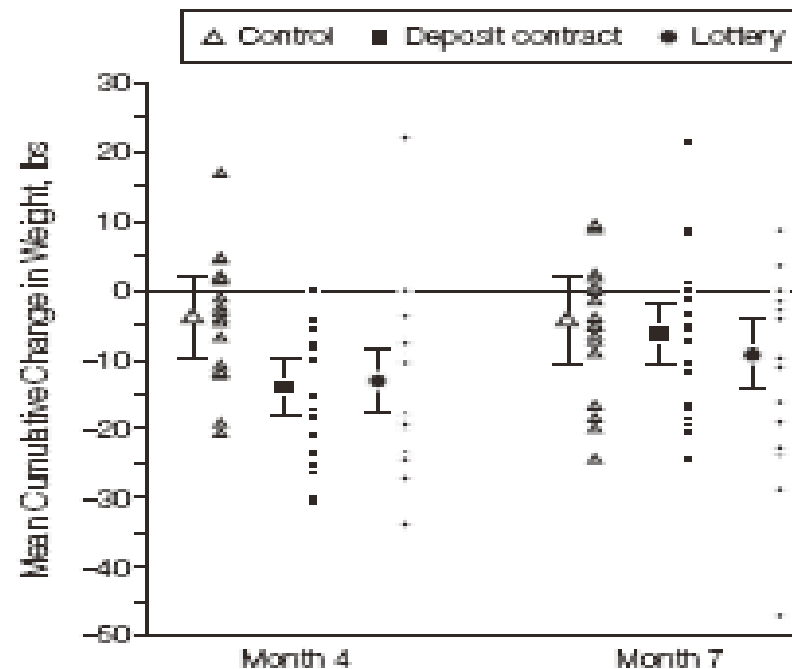
Measure	Control (n = 19)	Deposit Contract (n = 19)	Lottery (n = 19)
Total weight loss, lb			
Mean (SD)	3.9 (9.1)	14.0 (10.2) ^a	13.1 (12.6) ^a
95% CI	0.20-13.2	9.4-18.6	7.4-18.8
Met 16-lb weight loss goal,			
No./total (%)	2/19 (10.5)	9/19 (47.4) ^a	10/19 (52.6) ^a
95% CI	1.3-33.1	24.4-71.1	28.9-75.5
>20-lb loss			
No./total (%)	1/19 (5.3)	7/19 (36.8) ^a	5/19 (26.3) ^a
95% CI, %	0.1-26.0	16.3-61.6	9.2-51.2

Abbreviation: CI, confidence interval.

Conversion factor: To convert pounds to kilograms, multiply by 0.45.

^aDifference between incentive and control conditions significant at $P \leq .05$.

Figure 2. Weight Loss From Enrollment Through Intervention and 7-Month Follow-up



Participants in each group regained weight following the conclusion of the intervention. At 4 months, those in the incentive groups lost significantly more weight than those in the control group ($P = .02$ in the lottery group and $P = .006$ in the deposit contract group), but at the 7-month follow-up after enrollment, the weight difference between groups was no longer statistically significant ($P = .23$ for the lottery group and $P = .61$ in the deposit contract group). Nevertheless, those in the incentive groups experienced a net loss between enrollment and at the 7-month interval, whereas those in the control group did not. Error bars indicate 95 % confidence intervals.