CONFERENCE REPORT

CBRSS Experimental Social Science Conference, "Small Interventions with Large Effects: The Psychological Foundations of Effective Policies"

November 14, 2003, Gutman Conference Center, Harvard University

Part I: Conference Proceedings

This one-day conference, sponsored by the Center for Basic Research in the Social Sciences (CBRSS) at Harvard University and the National Institute on Aging (NIA), convened a multidisciplinary group of social scientists to explore the potential for small, inexpensive and non-coercive psychological and sociological interventions to influence human behavior in a range of policy settings. Changing human behavior, even for someone's own good, can be a huge undertaking. Many behavioral interventions in areas like nutrition, exercise, education, safety, medical compliance, saving for retirement, poverty abatement, and crime reduction cost a great deal and produce disappointing results. Sometimes policymakers resort to coercive interventions, such as forced personal savings in the Social Security system. The purpose of this interdisciplinary conference, featuring research from the fields of economics, social psychology, and public health, was to shed light on the particular mechanisms and conditions under which simple non-coercive psychologically-styled means of changing behavior can provide easier and possibly more effective ways of aligning good intentions with actions.

The conference highlighted six particular interventions that used psychological mechanisms to influence behavior related to sexual health, retirement savings, marketing, and sustainable public health in developing countries. Researchers presented papers and took questions from the audience. After they presented their work, the conference featured a round-table discussion, led by conference organizer David Laibson, in which participants addressed the potential impact of their research on individual and group behavior, as well as public policy.

The first speaker was Rochelle Shain, professor of obstetrics and gynecology at the University of Texas, who discussed a paper entitled "A Randomized, Controlled Trial of a Behavioral Intervention to Prevent Sexually Transmitted Disease among Minority Women," written jointly with Jeanna Piper, Edward Newton, Sondra Perdue, Reyes Ramos, Jane Dimmitt Champion, and Fernando Guerra. Shain presented results from a sexually transmitted disease (STD)-prevention study which revealed how sexual behavior can be influenced with interventions that are carefully designed to be relevant to the socio-cultural background of participants. In the study, African-American and Hispanic women with non-viral STDs were enrolled in a randomized trial of a sex- and culture-specific behavioral intervention. The principal outcome variable was subsequent STD infection. The design of the intervention was based on the AIDS Risk Reduction Model and ethnographic data on the study populations, and targeted three stages of risk reduction: recognizing one's risk, making a commitment to reduce risk, and following through on that commitment. The intervention consisted of three small-group sessions of three to four hours each designed to help women recognize personal susceptibility, commit to changing their behavior, and acquire necessary skills. The control group received standard counseling about sexually transmitted diseases.

The researchers concluded that a risk-reduction intervention consisting of small-group sessions specifically tailored to the cultural backgrounds of participants significantly decreased the rates of chlamydial and gonorrheal infection among Mexican-American and African-American women at high risk for sexually transmitted disease. Rates of subsequent infection were significantly lower in the intervention group than in the control group during the first 6 months, and over the entire 12-month study period. Shain emphasized that the study's key lesson for public policy interventions was the importance of understanding the cultural [dynamics of the target population. To achieve this, Shain and her colleagues spent 18 months gathering ethnographic data from subjects before designing the prevention program. From this work, she was able to incorporate such culturally-relevant details as emphasizing the value of protecting one's family among Hispanic women, and emphasizing the importance of cleanliness and survival by one's wits among African Americans. Shain and her colleagues concluded that tailoring the interventions in this manner to address participants' belief systems and cultural values made the lessons of the program more salient

and helped motivate change among women in the treatment group.

The next two conference speakers discussed altering the framing of choices in order to influence retirement savings decisions. First, James Choi presented a paper about eliminating passivity from the choice set to raise savings rates, entitled "Active Decisions: A Natural Experiment in Savings," co-written with David Laibson, Brigitte Madrian, and Andrew Metrick. The paper studied a company where employees were required to either affirmatively elect to enroll in the 401(k) plan or affirmatively elect not to enroll in the 401(k) plan. This "active decision" mechanism stands in contrast to the standard enrollment mechanism where employees have the option of being passive, which results in a default of non-enrollment.

The researchers found that the active decision mechanism yields participation rates that are up to 25 percentage points higher than those under the standard enrollment mechanism. In addition, the active decision mechanism increased average savings rates and asset accumulation with no increase in the rate of attrition from the 401(k) plan. Choi contrasted these results with those of automatic enrollment, where passivity is an option that results in enrollment rather than non-enrollment. Automatic enrollment results in near-universal participation at the cost of a high degree of homogeneity in plan elections. Active decision does not raise participation as much as automatic enrollment but preserves choice heterogeneity. Choi emphasized to the audience that these results provided important evidence that the design of choice sets matters substantially for behavior. He concluded by presenting a theoretical framework for determining which choice mechanism (active decision or automatic enrollment) is optimal for a given setting.

The third speaker was Sheena Iyengar of Columbia Business School, who presented research related to another aspect of the role of framing of choices in decision-making – the number of options presented to the decision-maker. Iyengar began her presentation by discussing results from an experimental study of the "choice overload phenomenon", in which more choice leads to decreased probability that individuals choose to choose. In experimental studies using inexpensive consumer products, she and her colleagues found that introducing a greater number of choices to consumers lowered the likelihood that they participated in a voluntary food tasting promotion.

Iyengar proceeded to discuss whether the choice overload phenomenon also exists in a non-experimental setting of defined-contribution retirement savings, based on research from a paper entitled, "How more Choices are Demotivating: Impact of more Options on 401(K) Investment," co-written with Wei Jiang. Using records of 401(k) participation and contribution allocation for nearly 800,000 eligible employees from Vanguard, she and her co-author found that for every ten funds added to the choice menu, the average employee's participation probability is lowered by about 2%, the contribution allocation to safe funds is 5.4 percentage points higher, and the contribution allocation to stock funds is 7-9 percentage points lower. Iyengar concluded that her evidence supported predictions of the choice overload hypothesis that more choices can de-motivate choosing and that under such conditions individuals may resort to simplifying decision-making heuristics.

The first afternoon speaker was Sendhil Mullainathan of Massachusetts Institute of Technology, discussing the paper "How Much Does Marketing Matter in Major Decisions? Preliminary Evidence from South Africa." Mullainathan discussed results from an experimental intervention conducted by himself and colleagues Dean Karlan, Marianne Bertrand, Eldar Shafir, and Jonathan Zinman, which measured the importance of a number of different psychological influences on people's decisions to apply for a loan. The particular decision-making "biases" explored included framing of decisions in losses or gains, increasing the choice set, and the role of subtle identity cues such as pictures or phrases. Mullainathan and his colleagues were primarily interested in testing whether these psychological phenomena observed in laboratories translate into real-world contexts, and if so, how large are these phenomena in choices relative to traditional factors considered by researchers, such as prices.

To answer these questions, they performed a field experiment in South Africa in which bank clients were sent letters inviting them to apply for a loan. The letter varied the interest rate offered to the individual in addition to numerous psychologically relevant factors such as gain/loss framing and identity manipulations. The authors used interest rate variation as a bench-mark in order to measure the importance of the various psychological factors in a market setting. Preliminary findings from the experiment provided mixed evidence that the psychological letter characteristics influenced take up of the loan. Mullainathan and some participants from the audience suggested that psychological

influences may be more important barriers to entry among those that are presently excluded from the banking sector, whereas their study was confined to a population of bank clients.

The following presenter was Edward Miguel of the University of California at Berkeley, presenting a paper co-written with Michael Kremer on "The Illusion of Sustainability." The researchers studied a de-worming program in schools in a poor, rural area of Kenya, where intestinal worms constitute a serious and widespread public health problem. They offered subjects free drugs and compared this treatment with three "sustainable" approaches to combating intestinal worms: health education, a cost-sharing model that shifted only a small percentage of the cost of drugs onto families, and improving water and latrine facilities. In addition, they investigated whether requesting a verbal commitment from subjects beforehand would increase take-up of the drug. They found that worm prevention education did not decrease infection rates and a commitment intervention based on ideas from social psychology was ineffective in increasing de-worming drug take-up. However, take-up was highly sensitive to drug cost: a small absolute increase in cost led to an 80 percent reduction in take-up relative to free treatment.

Miguel framed his results largely in the context of the "sustainability" movement in public health and economic development policy. The sustainability movement stresses the importance of pushing local communities toward independence and self-reliance in order to perpetuate relief after foreign aid withdraws. The sustainability movement emphasizes community mobilization, education, and cost-recovery. However, in the case of de-worming, due to the high cost of education and water and latrine improvements and the low effectiveness of the cost-sharing and verbal commitments, Miguel concluded that sustainability was not a worthy alternative to the donor-funded drug treatment.

The final conference presenter was Richard Thaler, of the University of Chicago Graduate School of Business, who spoke about "Experimental Evidence for Libertarian Paternalism." Thaler stressed in his presentation that it is both possible and legitimate for private and public institutions to affect behavior while also respecting freedom of choice as long as people's choices are distorted by psychological influences such as default rules, framing effects,

and starting points. According to Thaler, in these circumstances, a form of paternalism cannot be avoided. Hence, the idea of libertarian paternalism is to attempt to steer people's choices in welfare promoting directions without eliminating freedom of choice based on an understanding of behavioral findings of bounded rationality and bounded self-control. To back up these claims, Thaler presented a wide range of empirical evidence indicating that in many settings people's preferences are indeed ill-formed and seemingly heavily swayed by framing effects and other psychological influences. For instance, Thaler presented results from two experiments in different work settings in which employees were asked to rank the investment portfolio they had constructed themselves when compared to the average or median portfolio of their co-workers. In both cases, he concluded that most participants do not gain much by being able to choose their own portfolio since many find the median portfolio more attractive than their own portfolios, and most prefer the portfolio selected for them by an expert. He presented further evidence based on participation in an employee savings plan designed by Thaler and Schlomo Benartzi, called Save More Tomorrow (SMarT). In their empirical evaluation of the program's influence on savings behavior, the authors found that the average savings rate of employees at a company that implemented the SMarT program jumped from 3.5% to 13.6% in 40 months.

Thaler emphasized several key psychological lessons from the SMarT results. First, the SMarT program was successful because it increased an employee's contribution rate both gradually and automatically, so that myopic decision-makers felt more comfortable with larger commitments and passive decision-makers were more likely to stay with the automatic contribution rate. Similarly, employees were informed about the SMarT plan months before their savings rates were increased, which likely increased participation since it is easier for people to delay *future* consumption than it is for people to reduce their disposable income immediately. Finally, the savings rates were automatically increased one to three percentage points each year at the same time the company hands out raises. Thus, even though more money was diverted to the retirement account, the nominal paycheck might still have been larger, especially when the tax benefits were factored in. This forestalled the shock of less take-home pay. Thaler concluded by emphasizing the importance of designing interventions that take these basic psychological factors into account.

Roundtable on Psychological Policy Interventions

Panel members:

- James Choi
- David Laibson
- Ted Miguel
- Sendhil Mullainathan
- Sheena Iyengar
- Rochelle Shain
- Richard Suzman
- Richard Thaler

After the presentations concluded, conference participants, joined by conference organizer David Laibson and Richard Suzman of the NIH, convened for a round-table discussion of the role of psychological interventions in policy-making. Audience members posed questions to the panel of speakers, while panel members also had the opportunity to pose questions to each other regarding where the future research agenda lies.

The roundtable began with a discussion of the inherent risks of manipulation in place of coercion involved in using psychological mechanisms to influence behavior. Laibson raised the question of how to design policies to ensure positive outcomes and prevent government or private interests from using these approaches in a malevolent way. Mullainathan pointed out that much of the research about decision-making and how to use psychology to improve policy could actually have a net negative consequence in the hands of profit-maximizing firms who can use knowledge of psychological responses to "gouge" consumers.

The roundtable then moved on to the broader topic of how generalizable are the results of the studies presented in the conference. The presenters were asked to comment on whether their research can provide more general insights into appropriate and effective behavioral modification strategies. In response, Thaler emphasized the benefits of increasing immediate relative to long-term

gains in order to address dynamic inconsistency. Laibson suggested the importance of distinguishing between high frequency and low frequency decisions, and how the efficacy of various self-control devices may differ in low frequency versus high frequency situations. Choi raised the point that there may be a great deal of cases for policies in which you can make use of people's inertia and tendency to choose the path of least resistance.

The next topic of the roundtable discussion centered on how to bring these psychological insights into the design of public health policy. Suzman raised concern over the "very narrow spectrum" of approaches among public health initiatives aimed at particular topics of behavior including alcohol abuse and smoking. He discussed the large research costs invested in health interventions that have frequently not proven to be successful, and asked the conference participants how best to introduce more innovative strategies into the arena of public health and health behavior. Suzman stressed that, while there are many large and expensive interventions, most large interventions fail. Instead of throwing large amounts of money at interventions that have not proven to be effective, he suggested that policy-makers in the area of public health should focus on identifying habits that can be changed with small interventions. To do so, he asked the panel how well they thought that these economic applications such as savings plans transfer to issues of health, which seem to be more intractable.

Thaler that it is often the case that if you correctly identify the reasons people are not doing what is in their interest, it is for reasons that have nothing to do with incentives.

Mullainathan then stated that one important message from the conference was that the factors that convince people to change their behavior are often very different from those emphasized in common sense or economic models. He stressed the importance of remembering that we have a broader set of tools to work with than the standard set, including many important psychological tools that can influence the efficacy of existing interventions. To illustrate this point, Mullainathan pointed out that it is the salience of information and not just its availability that determines behavior, so it is critical what one does to make information salient. He criticized existing interventions for placing too much emphasis on providing more information, without paying attention to whether or not this

information is salient.

The discussion then moved on to address whether interventions should be designed only to be effective, or to also reveal something about human behavior. An audience member raised the point that many of the interventions presented in the conference along with other existing studies implement several changes at once, such that it is difficult to disentangle effective from ineffective strategies. In response, Choi counseled restraint in studying interventions in order to gain a better understanding of why successful strategies work. Thaler added that appropriate policy for good academic research, in which the goal is finding the smallest possible manipulation that will produce statistically significant results, is very unlikely to alter behavior. On the other hand, if many interventions are implemented simultaneously in order to produce an effect, it is impossible to extrapolate to other settings. Thaler suggested that we "intervene and investigate with different hands" in order to identify basic principals that might be used in multiple instances.

The discussion then moved on to the issue of why the market does not facilitate the emergence of psychologically-styled interventions. A conference participant asked in particular whether a company that designed a smart savings plan would be able to pay lower wages. Thaler responded that, while people will hopefully recognize the benefits of these plans over time, the trick to designing successful interventions in the short run is to remain aware of the fact that people are myopic and loss averse, and generally susceptible to a range of psychological influences. Awareness of these psychological effects can then be incorporated into designing interventions like Smart Plan that will be both sustainable and profitable for companies in the long run. An audience member also raised the point that interventions designed to address social ills such as crime, violence, and pollution, may have more of a market given that people are adversely affected by these behaviors.

In his closing comments, David Laibson raised a final point that, while all interventions are built around incentives, the default is to try to appeal to the same basic hedonic motive, while in reality people may have a lot of other less obvious motives. He cited as a motivating example that people are often as heavily invested in their identities as they are in their retirement portfolios, so very small interventions can be successfully built around identity effects. Iyengar brought up the

importance of other features of small interventions such as cognitive dissonance manipulation, a strategy that has proved effective in influencing criminal behavior. She also brought up as success stories interventions designed to change people's incentives to pollute, which revealed the importance of making social norms salient to people in order to influence their behavior.

Part II: Psychological Lessons from Small Interventions - A Meta Analysis

The goal of this meta-analysis of experimental interventions was to identify studies that demonstrate effective methods of inducing behavioral change through psychological influence in a wide spectrum of program areas, including preventative health behaviors, addiction, technology adoption and reproductive health. The objective was to generate a guide for researchers and policy-makers in all areas of behavioral intervention that would help incorporate psychological principals learned from past studies of behavior change in the design of future interventions. The studies included in the meta-analysis were gathered from extensive literature searches on each behavior, using a variety of academic and professional databases including MEDLINE, EconLit and the Cochrane Evidence-based Central Register of Controlled Trials. Studies were included in the meta-analysis if they: involved a behavioral modification intervention, used a randomized controlled trial design or a pretest/post-test comparison, and their results demonstrated a statistically significant effect of the stated intervention on behavior. Particular attention was given to studies that did not include economic incentives or coercive means to achieve behavioral modification. However, a few studies with creative designs that did not meet the inclusion criteria are briefly discussed because they suggest future research directions.

In addition, a great deal of emphasis was placed on the psychological factors influencing high frequency decisions. For instance, behavioral challenges discussed in this paper in the area of health include preventative and promotive health behaviors such as physical activity, obesity, sunscreen use, oral hygiene, and mammography utilization/breast self-examination as opposed to relatively isolated events that do not require daily decision-making such as vaccine utilization. This was done for two central reasons: First, the most interesting behaviors from an interventionist's perspective may be those that require daily decision-making processes to be affected, simply because they are often the most important and generally the most challenging behaviors to address with small policy interventions. As opposed to the paradigmatic small interventions for encouraging 401(k) plan savings (for example, changing the default to "active enrollment"), in which target actors need make only one decision and the plan managers can then

implement a wide range of savings programs completely beyond the day-to-day attention of the actor, researchers face a more daunting problem in treating high frequency behaviors such as addiction and health care that occur at the very center of the actor's life.

High frequency behaviors are the most challenging to address with small policy interventions because they typically require several stages of intervention, to completely disrupt habit formation and re-emerging sets of disincentives to comply. In many contexts of human decision-making, including addiction, powerful social and biochemical forces are constantly working to undermine permanent change. Furthermore, and in contradiction to simple reinforcement models of addiction, actors who choose to abstain for even several months will generally relapse at some point over the next few years. As a result, practitioners of behavioral interventions in some of the most critical areas will need to choose their levers very carefully to create even a small effect. As more knowledge is gained about how to make use of psychological constructs to encourage behavioral change, researchers may be able to identify lower-cost, reliable alternatives for influencing behavior.

The following report outlines five broad categories of psychological phenomena gleaned from the results of past experimental research that have direct implications for policy design.

1. Intervention Timing

Most successful interventions involve influencing individual behavior over some range of time and hence addressing the dynamic nature of decision-making. Because of psychological factors, overcoming dynamic inconsistency becomes particularly important in determining the level of effectiveness of a particular intervention. For instance, myopic behavior makes it difficult for people to commit to permanent changes in high frequency decisions over the long-run. As described by Epstein (1998), "A … general principle is that choice depends in part on the delay between choosing and receiving the alternatives. In many choice situations, the outcomes are delayed from the responses. When human subjects are provided a choice of two reinforcers immediately available, subjects reliably choose the more valuable reinforcer. But as

the more valuable reinforcer is delayed, subjects may switch from the more valuable delayed reinforcer to the less valuable reinforcer that is immediately available." On account of such psychological phenomenon, small differences in the timing and dynamic design of interventions can have a large impact on their effectiveness in changing behaviors. Key lessons related to the timing of interventions are outlined below.

1.1 Point of Decision Prompts

One key lesson from past experimental interventions is that it is far more effective to prompt people at the precise moment when they are making a decision, or to identify similar "teachable" moments for behavioral change. For instance, a Task Force on Community Preventive Services review (2002) indicates that there is strong evidence to support the use of point-of-decision prompts that encourage physical activity in place of all other standard intervention types, including mass media campaigns, family-based social support, and classroom-based interventions focused on solely on information provision. Similarly, an observational study at a Midwest regional airport examining the effect of positive ("Keep Heart Healthy, use stairs") and negative ("Please limit use of the escalator to those who need it") prompts to encourage people to use stairs over escalators found that a significantly higher fraction of people utilized stairs when either prompt was present. A related study by Brownell (1980) observed 45,000 point-of-choice decisions in various public places and found that use of stairs doubled when a heart-healthy prompt was mounted, and declined to baseline after removal of the prompt.

Past studies also reveal that interventions can easily fail if they do not take into account study subjects' imperfect recall of commitments or desires, possibly stemming from the same psychological influences that drive responses to point of entry prompts. In particular, one study (Schapira 1992) found that giving women a plastic reminder card was highly successful at getting them to return for subsequent mammograms. Seventy-two percent of women who had a reminder card returned, versus only 39.8% of women who received traditional reminders. In contrast, Personal Health Record Booklets, developed using behavioral change theories and

including latest evidence-based guidelines for various screening tests, were unsuccessful at increasing the use of screening tests (Newell 2002). Further evidence of the importance of targeting interventions either at the point of decision or with built-in reminders comes from experimental approaches to cancer screening. Ferris (1996) randomized 907 women to receive oral contraceptive pill packs with a breast self-exam prompt or not. Those who received the prompt were more compliant with self examinations at three months.

These findings suggest a wide range of intervention areas in which people already consider behavior change to be important, but act accordingly only when prompted. This phenomenon indicates that simple, well-positioned reminders may be more effective than providing more information about adverse consequences of current behaviors or additional incentives to change.

1.2 Stage of Readiness

The effectiveness of an intervention at a given moment is not only a function of the ease of commitment to change, but is also a function of one's psychological state of mind. Hence, past experimental research suggests that interventions are more likely to succeed if they tailor not only the timing of interventions but also the content of intervention materials according to participants' level of "readiness for change." For instance, decision prompts on staircases are more likely to succeed among those who have already made preliminary efforts to increase their level of exercise.

The existence of differences across individuals in psychological stage of readiness for change also implies that even in interventions involving only the distribution of information psychological lessons can be incorporated to increase the salience of new information. In particular, one approach that has been shown to raise the effectiveness of standard information-based methods of intervention is to tailor materials to participants' overall stage of psychological readiness for change. To do so, several recent studies have focused on the transtheoretical model of behavior change (TTM), which involves an assessment of one's readiness for change, often

using a decisional balance. Subjects are asked questions to identify their stage of readiness to change as either precontemplation, contemplation, preparation, maintenance, action, or relapse, and intervention materials are then tailored in terms of both content and timing to an individual's particular stage. For example, working with a sample of recent callers to a smoking quitline, Borland et al. (2004) randomly sent one group tailored advice timed strategically while the control group received standardized printed self-help materials at the beginning of smoking cessation. In this case, the intervention group received both tailored content and tailored timing. The intervention led to a 20% rate of sustained abstinence at 6 months among the treatment group compared to a 12% rate for the control group.

As with point of entry interventions, more direct use of behavioral change theory has been minimally invoked in mammography utilization studies. Rakowski (1998) showed that stage-matched materials were more effective than standard materials or no materials at increasing use of mammography. Similarly, Champion (1995) uses a version of TTM, comparing stage-matched individually-tailored counseling to standardized information and to a combination of the two. The combination group was more than twice as likely to have obtained a mammogram one year post-intervention. In the area of dental hygiene, one study incorporated TTM by comparing the effects of a general oral hygiene promotion intervention with an intervention matched to stage of readiness for change. Both groups received four 40-minute sessions of new information related to dental care. The stage-matched intervention group showed significantly greater flossing self-efficacy when compared to control or educational groups (Stewart, 1996).

Prochaska et al. also work with a TTM model, in which a key component of their smoking cessation treatment is to evaluate each client's readiness to quit before matching them with 2-3 pages of self-help materials geared to various stages. The reports described the subject's stage of change, reviewed and critiqued their self-reported pros and cons of quitting, provided feedback on their use of up to six change processes, and compared the subject both to comparable subjects and to the same subject at a previous assessment. The self-help materials also offered advice for resisting smoking in tempting situations and taking small steps, such as

delaying the first cigarette in the morning for an extra 30 minutes. New materials were distributed to participants to match their new stage of readiness at three and six months post-evaluation. Both treatment subjects and controls were assessed at 0, 6, 12, 18, and 24 months. At 24 months, the TTM system had attained a 25% point prevalence abstinence rate (12% prolonged abstinence, compared to 7.7% in a randomized control group). Moreover, the difference between the treatment and control groups was increasing over time, the opposite of the usual pattern for more intensive treatments.

Finally, as a general rule, past studies reveal that interventions targeted before behavior begins are generally more effective in influencing change than are strategies that target behavior after it begins. Furthermore, a low cost way to improve the absorption of new information is to identify "teachable moments" that coincide either with other changes in a person's life that ease transition, or with other moments in an individual's life at which they are particularly open to change of a particular nature. For instance, individuals may be more responsive to smoking cessation interventions that coincide with a residential move or change of jobs. Likewise, individuals are more likely to successfully change their diet immediately after a family member suffers a heart attack. Hence, targeting a nutrition intervention program soon after such an incident is likely to me more effective than invoking this memory several years after the event.

1.3 Short-run Emphasis

A related psychological lesson can be drawn from past interventions that introduce information designed to discourage behaviors with negative consequences. Here the lesson from experimental studies is that such interventions are far more effective if they emphasize short-run costs instead of long-run consequences. Presumably, myopic individuals more readily internalize short-term costs into behavioral decisions. This lesson has been found to be particularly important for younger people, for whom the time horizon of consequences is shorter.

Evidence of this comes from several research studies that have examined media campaigns, a common form of intervention aimed at young people. For instance, both Pechmann

et al. (2003) and Rust (1999) present experimental evidence on appropriate content for youth-targeted antismoking ads, emphasizing short-run social cost ads over ads that emphasize the long-run health costs of smoking, which can actually be counterproductive. Sowden and Arblaster (2003) find mixed results in a review of six controlled studies of media campaigns. Similarly, Pechmann (1997) reviews the history of media campaigns in the US and Canada from 1970-1996; such campaigns have primarily occurred in 5 states, with mixed results. While results are mixed, the most successful campaigns are those aimed at youth markets, those in which there are links to school-based antismoking programs, and those in which social status and popularity are emphasized over health effects.

In the area of addiction, past studies reveal that more complicated interventions can be successfully designed to ease tentative quitters through early contemplation stages of quitting. These so-called "don't scare them off" strategies emphasize immediate benefits of quitting instead of focusing on the most important gains. Such strategies, which appear to be an important aspect of intervention, might be considered a way around the pessimism effect plaguing sophisticates in inter-temporal self-control problems, a major issue in the underlying behavioral economic theories of addiction. Other programs that emphasize a short-term view of abstinence include Alcoholics Anonymous and the Community Reinforcement Approach (CRA). One particular small framing tool that CRA emphasizes is "sampling." Alcohol patients are urged to "sample" sobriety for a brief period, and, having done so, are asked to sample for "an additional limited period," and target dates for these samples are set individually for each client (see Smith and Meyers 2001).

2. Self Control

In situations in which preferences are time varying, interventions that facilitate self-control may be dramatically more effective. Once again, in the area of addictive behaviors, self-control is likely to be a particularly important determinant of behavioral change since

physiological responses to chemical substances produce temporary shifts in preferences at key decision-making moments.

2.1 Verbal Commitments

Past research has shown that simple psychological commitment mechanisms can be surprisingly effective in encouraging people with imperfect self-control to follow through with long-term behavioral change. For instance, even simple verbal commitments, such as reporting goals and progress to others, can influence the likelihood of following through with initial goals. One study by Noland (1989) about an 18-week exercise intervention investigated whether there is a difference between recording one's own exercise and reporting it to another person. The study found that subjects who had to report to another person had slightly better VO_2 max, exercise heart rate, and self-reported frequency of exercise per week.

2.2 Default Decision Rules

A central lesson from the meta-analysis is that interventions that provide precise decision rules that can be set as individual "defaults" are more effective than those that provide only information or encouragement. This is also known as skills-based as opposed to information-based training. The relative effectiveness of skills-based training may operate through greater understanding of information provided in the form of concrete skills, or may operate through the additional value of providing people with permanent decision strategies to follow through with behavioral goals when preferences are time variant.

A good example of this comes from a 1999 study by Leermakers, comparing the effects of an "exercise-focused" with a "weight-focused" maintenance intervention. All subjects, 67 obese adults, had participated in a 6-month behavioral group weight loss program (Fuller, 1998) and were asked to participate in a maintenance study for an additional twelve months. All subjects were instructed to follow a low-calorie diet (1200 kcal/d for women, 1500 kcal/d for men) and to walk 30 minutes per day at least five days per week. The "exercise-focused" group

attended biweekly supervised group exercise sessions and had intergroup competitions and prizes. They were given comprehensive information about relapse triggers but no training in implementing relapse prevention strategies. They were also given minimal monetary contingencies: $1 for attendance, $2 for completion of a self-exercise record. In contrast, the "weight-focused" group received no contingencies or direct exercise supervision, but simply attended therapist-led sessions on how to implement problem-solving strategies. During months 7-18, the weight focused group performed significantly better in maintaining weight loss; they maintained 90.8% of their initial weight loss, an average of 8.8 kg, whereas the exercise-focused group with contingencies maintained only 54.2% of their initial losses, regaining 4.4 kg on average. This study suggests that therapist-led problem-solving-oriented interventions, in which individuals learn precise methods in how to overcome self-control problems, are more effective than supervised exercise at helping people maintain weight loss, even when supervised exercise is accompanied by monetary incentives.

A closer look at the role of default rules in weight-loss maintenance may be found in a study by Perri *et al.* (2001). This study compared relapse prevention training (RPT) to problem solving therapy (PST), each provided in biweekly sessions for one year. RPT included identifying high-risk situations for lapsing, actually practicing at restaurants and at a party, using problem-solving techniques, training in cognitive-coping strategies, and planning for long-term prevention. All sessions included RPT handouts and written behavioral homework assignments. PST included developing problem-solving techniques including identifying problems, generating alternatives, decision-making, considering consequences, and implementation. While the differences in initial weight reduction were insignificant, both groups were far more successful than "standard behavioral therapy" (SBT) controls at maintaining weight loss. In particular, 35% of the PST group lost more than 10% of their body weight, while only 6% of people in standard behavioral therapy lost greater than 10% of body weight. These results indicate that some form of problem-solving instruction is critical to helping people achieve long-term change. A related study by Sevick *et al.* (2000) compares a lifestyle intervention with problem-solving and self-management skills to a structured supervised exercise intervention at a fitness center. Though in this case the lifestyle intervention was approximately as effective as the supervised exercise

intervention based on seven-day physical activity recall, peak oxygen consumption, lipid profile, blood pressure, and body composition, the lifestyle intervention was far more cost-effective.

In another study involving default rules but no problem solving techniques, Wing *et al.* (1996) compared for distinct types of weight-loss interventions: (1) standard behavioral treatment (SBT), (2) SBT plus structured meal plans and grocery lists, (3) SBT plus meal plans and grocery lists, plus food provision with subjects sharing cost, and (4) SBT plus meal plans and grocery lists, plus free food provision. Groups 2-4 lost significantly more weight than the SBT group and maintained significantly more weight loss one year later, while groups 2-4 experienced and maintained roughly the same amount of weight loss. Hence, the authors concluded that the most important intervention was structured meal plans and grocery lists, not actual food provision or monetary incentives.

With respect to altering reproductive health behaviors, skills-based interventions have proven to be overwhelmingly more successful than information campaigns. For instance, Weisse et al (1995) report that skills-based interventions to reduce the spread of sexually-transmitted diseases (STDs) yield longer-term and more consistent change than education-only interventions. Fisher et al (1996) report successfully inducing change in both reported behavior and rates of HIV incidence from skills-based intervention relative to standard health education. Wilson et al (1992) report an intervention in Zimbabwe in which again skills-based interventions were more successful than education-only interventions for changing sexual behaviors and reducing rates of STD transmission.

2.3 Cue Management

Another lesson from research on addictive behavior that can shed light on effective intervention strategies comes from Cue Management methods, which may be of particular interest to social scientists. According to the underlying cue theory, external cues trigger conditioned physiological responses, such as drug cravings. For example, for an abstinent client, seeing a vial of crack cocaine or returning to the site of previous drug use can create a strong

temptation to relapse. Cue Management therapists attempt to de-condition their patients, typically by simulating relevant cues within a treatment clinic, and training the patient to dis-associate that cue from substance use. Unfortunately, there is little robust evidence of the effectiveness of standard cue management interventions in clinical settings, and strong evidence that the results are rarely effective in the long run. In existing studies, patients' responses to stimuli show a disturbing ability to spontaneously re-emerge within the months following therapy. External cues appear to be extremely context-dependent such that breaking cues in a clinical setting may not carry over well into the client's daily life.

However, a few studies indicate that cue management methods may be incorporated more broadly into behavioral interventions. Pollack et al (2002) suggest targeting emotions as cues instead of external stimuli, with encouraging early results. Robbins et al (2000) also provide evidence of the role of emotions in cue-conditioned behavior, and the effectiveness of emotion-centered cue management therapy. There is also some preliminary evidence that one small intervention, "retrieval cues," such as a specific article of clothing worn during cue exposure sessions (and then worn when the client goes into different contexts), might help reduce cue re-emergence (see Havermans and Jansen, 2003) and increase the effectiveness of standard cue management therapy.

2.4 Self-Assessment

Another style of psychological intervention that has proven to be effective in certain areas of behavioral change is teaching people to reason their way around self-control problems with self-assessment and self-justification skills. A good example comes from Dilley et al (2002), who conducted a randomized controlled trial (single-session intervention) among gay male repeat HIV testers utilizing a novel intervention strategy focused on self-justifications. The authors report a significant decrease in the proportion of men reporting unsafe sexual behaviors. In the area of addiction, socio-behavioral therapies attempt to increase the client's motivation to quit through Motivational Interviewing to help clients sort through ambiguity (see Miller and Rollnick 2002).

Unfortunately, self-justification and assessment skills are often hampered by changing reference points that inhibit individuals' ability to accurately self-diagnose problems and recognize behaviors. These effects exacerbate commitment problem, and further lower the impact of many interventions over time. Interventions aimed at promoting weight loss face this problem more than others, as there is a great deal of psychological evidence that perceptions of weight loss or gain are highly dependent on speed of change (individuals systematically underestimate slow relative to rapid weight gain). Hence, unique interventions are necessary to treat obesity and related problems in which slow change, while generally desirable for long-term effectiveness, lowers the patients' ability to correctly assess their progress.

One lesson from past research is that interventions can mitigate dynamic inconsistency from time inconsistent self-diagnoses by designing interventions that fix reference points over time by reminding participants of past progress or future goals. For example, one study of 1396 children by Chomitz (2003) investigated the impact of "personalized report cards" that updated parents on their children's weight and fitness (PI), as compared to general health information (GI) and a non-intervention control group (CG). While parents in all groups had the same initial response to the intervention, parents who received report cards were more likely to plan weight-control measures and preventive behaviors such as obtaining medical help (PI 25%, GI 7%, CG 9%), changing diet (PI 19%, GI and CG < 5 cases), and exercise (PI 42%, GI 27%, CG 13%) throughout the course of the study. Furthermore, ninety-one percent of parents said that they would like to continue to receive personalized weight report cards.

3. Social Reinforcement

Much attention has been paid to the social structure of behavioral interventions, and the possible importance of language and culture in motivating behavioral change. Incorporating group reinforcement or cultural specificity into standard interventions can help achieve behavioral change in situations in which either communication barriers or psychological

responses to outsider intervention reduce the transmission of new information or otherwise inhibit individuals' ability to learn new behaviors.

3.1 Cultural Specificity

In areas related to reproductive health and family planning, cultural specificity appears to be particularly important in influencing the effectiveness of interventions. In a recent study in China, Wang et al (1998) report the results of an experimental intervention comparing the role of husbands in family planning behavior. They document that husband involvement improves results, backing up the lesson that couples are the best target for interventions related to sexual practice. Similarly, Guthrie et al (1984) describe the results of four small field trials on family planning in the Philippines between 1976 and 1981. They document the psychological factors contributing to contraceptive resistance, and demonstrate that an intervention aimed at those factors can be successful in increasing family planning acceptance. Finally, Seth (1987) studies the process by which nonliterate women process and assimilates new information in indigenous villages in India, and documents the importance of "women's talk" and the underlying principles of small-group: synergy, self-help and community participation. While this is not itself an intervention, the documentation supports the thesis that behavioral interventions could be successful in indigenous communities precisely by employing principles already common to village life.

3.2 Group Intervention

Group intervention as an intervention tool in and of itself may also be important, as interventions in group settings may reinforce people's belief in their ability to change by observation of change among others in their reference group. For instance, in a study by Renjilan (2001), 75 obese adults were first asked whether they preferred group or individual settings, and then were randomized either to their preferred option or not. Surprisingly, people randomized to the "group" intervention lost significantly more weight regardless of their initial preference for group or individual.

Past research has also found that it is potentially important to consider cultural differences between various racial/ethnic groups that may predispose certain individuals to performing better in a group or individual setting. For example, Cousins (1992) randomized 168 Mexican-American obese women to receive bilingual printed materials and (1) a low-fat Mexican cookbook, (2) classes with bilingual dieticians or (3) family-oriented classes which the entire family could attend. Although the results did not reach statistical significance, all groups reduced BMI and weight, with greatest reductions in the family group, followed by the individual group, and last the comparison group. As evidenced by Humphreys (1999) and Stead and Lancaster (2003), a relatively effective type of addiction intervention provides social reinforcement for abstinence in the form of group therapy (most notably Alcoholics Anonymous).

4. Emotional Responses

Emotional responses to interventions, and materials designed to manipulate such responses, constitute another important category of psychological tools that can potentially be used to influence behavioral change or increase the effectiveness of existing interventions.

4.1 Language

For instance, past studies show that the tone of promotional materials can influence their impact on behavior. Two interventions included in the database incorporate "tone of message" to effect behavior or attitude change. Richard *et al.* (1999) used three types of leaflets explaining melanoma: 1) humoristic 2) alarmist 3) neutral and had a no-leaflet control group. Fifteen days after mailing, subjects were interviewed by phone about awareness of melanoma. The authors conclude that fewer people read the alarmist leaflet. Meanwhile, the impact of the message in the humorist leaflet was decreased, but differences among groups were not significant. Another study investigated the effects of different language intensities on the persuasiveness of a

campaign to increase family sun protection behavior, and found that messages with intense language were more persuasive when the arguments were formatted in a deductive style, while low language intensity was more persuasive in inductively styled messages.

4.2 "Fear Tactics"

Disseminating new information about the dangers of certain behaviors by spreading fear may have counter-productive results on behavioral change. For example, one important lesson from past research on cancer prevention is that old-fashioned "fear tactics" designed to influence people away from risky or damaging behaviors can actually inhibit information-seeking and preventive health measures. In a study by Schwartz *et al.* (1999), individualized risk factor counseling of 508 women led to decreased mammography among less educated women. While much work remains to be done in helping people overcome the unique psychological barriers that may exist to obtaining screening examinations, overcoming the fear of discovering a problem during a screening test is one barrier that may be important and relatively simple to remove.

4.3 Competition

Another intervention type that has not been extensively investigated is competition. As opposed to fear, interventions that incorporate elements of competition – even without monetary reward - appear to stimulate change. An innovative study by Blake et al. (1996) used a worksite competition to motivate employees to spend more time in daily aerobic activity. Non-monetary awards (plaques) were given to companies with the highest rates of employee participation. Smaller companies had the highest participation rates, and women were more likely to participate. Similar in logic to contingency management, but with much less structure, are quitting competitions, generally used only for smokers. These competitions are only moderately effective in demonstration projects, though they are notably inexpensive and potentially reach a broad pool of smokers (for an example, see Altman et al 1987; for a discussion of a review-in-progress see Hey and Perera, 2003). Currently these programs are vulnerable to deception – both

in participation, when non-smokers sign up, and in outcome, when non-quitters lie about quitting status – however the latter can in theory be remedied with biological verification such as cotinine or CO levels.

The motivation effect of competition-based interventions may also be achieved through more broadly defined efforts to boost participation morale. In one study of forty adolescents with poor oral hygiene, Feil et al. (2002) examined the influence of the "Hawthorne effect" in improving an at-home dental care campaign. Intervention group subjects were led to believe that they were participating in a study, were given toothpaste labeled "experimental," and were told to brush their teeth twice a day for two minutes using a timer, and to return unused toothpaste. Compared to controls who were given unlabeled materials and the same instructions, tooth surface with plaque at baseline was equal (71%, 74%), but at three months intervention group subjects had significantly decreased tooth surface covered with plaque (54% intervention, 78%control) and the effect persisted at 6 months (52% and 79%). Hence, it seems that participants' desire to produce positive results was alone responsible for increasing the effectiveness of a simple intervention.

4.4 Positive Reinforcement

Existing studies of competition-based interventions leave open the age-old question of whether positive or negative incentives are more effective for stimulating change. Kidorf and Stitzer (1999) report one study that randomizes patients to positive or negative methadone dosing reinforcement. One group had their methadone doses reduced for every consecutive positive drug test, while another group had their methadone doses increased for every consecutive positive drug test. While patients in both conditions showed similar improvement (measured by drug tests), patients in the negative incentive group had a lower retention rate. Another study randomized clients between a take-home privileges reinforcer only and a take-home privileges plus negative dosing reinforcer. Again, both groups had similar improvements on drug use but there was less retention in the group that faced the possibility of having its dose lowered.

5. Pro-active recruitment

The first step for any treatment program is recruitment. One of the most powerful small interventions, which parallels 401(k) interventions, applies to program recruitment. Deciding to use a treatment resource bears considerable resemblance to the decision to use a 401(k) program: The actor might know that she or he is engaged in suboptimal behavioral (not saving for retirement, abusing a dangerous substance), but may be ambivalent about taking action, or may simply be procrastinating. Alternatively, the actor might not be attending to the negative consequences of her or his actions. Either way, the small change from "reactive" to "proactive" recruitment methods has the potential to dramatically increase the salience of initiating action, even if maintaining that action proves considerably more difficult than remaining enrolled in a 401(k) plan.

In their study of recruitment to a smoking cessation intervention, Prochaska et al (2001) discuss the difference between "reactive" and "proactive" methods. In a "reactive" recruitment, potential clients receive information about smoking cessation programs and must initiate contact to enroll. In a "proactive" recruitment, the smoking cessation program actively calls potential clients, asks them to participate in a brief (20 minute) phone survey on smoking habits, and after the survey asks smokers if they would like to enroll in a low-commitment smoking cessation program. The parallel to "active decision" programs is obvious.

In their study, Prochaska et al (2001) call 32,456 households, identifying 14,266 eligible subjects for their study, with 4,296 smokers. Of these, 4,144 agree to participate in the program, a yield of 80%, compared with the 1% typical of a community-based quit smoking program (Hey and Perera, 2003). Velicher and Prochaska (1999) note that free cessation clinics offered by HMOs typically yield 1% participation rates, and that pro-active methods are used by only 1-3%. Reactively recruited samples generally reach 5% of the available population, who are more likely to be female, highly educated, and readier to quit than the general smoking population.

Similarly, pro-active follow-up is utilized to change the default behavior of recent quitters in danger of falling off the wagon. Among smokers with a desire to quit, researchers have found that proactive telephone calls can serve an important role in follow-up care following smoking cessation interventions. Stead et al (2003) review studies of proactive and reactive telephone follow-up. Proactive calls involve counselors calling clients to provide support. Reactive calls involve telephone quit-lines that clients can choose to call. Stead et al. find clear evidence from randomized studies that adding proactive calling to a minimal intervention can substantially increase quit rates by two to four percentage points, that reactive counseling has not been thoroughly investigated but seems to increase quit rates, and that telephone counseling as a follow-up to face-to-face interventions has only weak evidence for effectiveness. Zhu et al (2002) directly compare proactive calling following the provision of requested self-help materials to a reactive-calling control group. Telephone counseling was provided to 72.1% of the treatment group and 31.6% of the control group. Abstinence rates at 1, 3, 6, and 12 months were 23.7% versus 16.5%, 17.9% versus 12.1%, 12.8% versus 8.6%, and 9.1% versus 6.9% ($p<.001$) respectively. For treatment group subjects who made at least one quit attempt, 12-month abstinence rates were 23.3% versus 18.4% for the control group ($p<.001$). The proactive/reactive distinction is less effective among smokers who have already initiated contact, but remains a useful intervention.

Conclusion

The studies described in this report suggest many areas in which interventions can be better designed to incorporate psychological lessons related to behavior modification. Examples from this meta-analysis of psychological tools that are likely to be low-cost and relatively effective in increasing the impact of existing policies include: identifying "teachable moments," tailoring interventions to stage of readiness for change, incorporating well-positioned reminders, designing interventions around predicted emotional responses, and incorporating social reinforcement into interventions.

The existing literature also provides evidence that in many settings information and monetary incentives are substantially less effective than overcoming or mitigating psychological influences. For instance, Jeffrey *et al*. (1993) compared the effects of food provision to monetary incentives on weight loss and found that food provision enhanced weight loss, while monetary incentives did not. Similarly, in addiction programs, money has frequently been utilized as a flexible and broadly applicable reinforcer for behavioral change (Higgins et al 1994). However, while very expensive monetary intervention can achieve minimal results in terms of motivating behavioral change (Silverman, 1999), there are generally only weak results of vouchers on addictive behaviors when payouts are low (Iguchi et al, 1997). As a result, to increase the cost-effectiveness of existing behavioral modification programs, more attention should be placed on tailoring interventions to incorporate psychological features of decision-making.

Suggested Directions for Future Research

While the existing literature suggests many broad psychological tools that could benefit the design of behavioral interventions, more research is needed to identify the precise instruments that are likely to be most effective. For instance, what are the most important teachable moments and what is the window of opportunity in these instances? What are the social factors that contribute to the added value of group interventions, and could these mechanisms be transposed into individually-styled interventions? With respect to incorporating emotion into program design, future work could help identify which populations are most easily influenced by emotional manipulation. For instance, among which populations does fear inhibit rather than incentivize behavioral change? Similarly, are there populations for whom competition actually de-motivates as opposed to facilitates change? While lessons from psychology suggest that emotional responses vary widely across the population, and provide some information as to how they vary systematically across types of individuals, more research is needed to most effectively sort individuals across intervention types. Similarly, to most effectively tailor interventions such as stage-matched programs, it would be useful to develop

standardized methods of identifying or predicting type differences among individuals who are observably equivalent. Since many of the theoretical foundations for the observed psychological patterns are still undeveloped, it is possible that future advances in behavioral theory will shed light on such predictions. Finally, more research is needed to learn which of these psychological tools are best at achieving long-term and sustainable behavioral changes.

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Category 5: Physical Activity

NOTE: THREE ENTIRE SUPPLEMENTS FROM AM J PREV MED ARE DEVOTED TO PHYSICAL ACTIVITY:

●Volume 25, Issue 3, Supplement 2, Pages 107-217 (October 2003)
Physical Activity: Preventing Physical Disablement in Older Adults

●Volume 25, Issue 3, Supplement 1, Pages 1-105 (October 2003)
Physical Activity in Women from Diverse Racial/Ethnic Groups: Environmental, Policy, and Cultural Factors

●Volume 23, Issue 2, Supplement 1, Pages 1-108 (August 2002)

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