Proceedings of a Workshop

IN BRIEF

July 2018

Behavioral Economics and the Promotion of Health Among Aging Populations

Proceedings of a Workshop—in Brief

There has been a significant increase in research applying behavioral economics and related behavioral science to health. The Board on Behavioral, Cognitive, and Sensory Sciences convened a workshop for the National Institute on Aging (NIA) June 4–5, 2018, to discuss behavioral economics research with the goal of extending such research to be of benefit to older and middle-aged adults. The goals of the workshop were (1) to share knowledge about successful applications; (2) to encourage investigations that will deepen understanding of the specific conditions, people, and contexts for which such applications are more and less effective; and (3) to identify the mechanisms underlying the interventions. Specifically, there was a focus on considering interventions that could generate long-term benefits in areas of interest to NIA, such as decreasing sedentary behavior, promoting volunteering and social engagement, improving medical regimen adherence, and reducing inappropriate use of opioids and using opioids when medically necessary. This document summarizes the workshop presentations and discussions.[1]

WORKSHOP CONTEXT AND OBJECTIVES

Jonathan King, National Institute on Aging (NIA), Division on Behavioral and Social Research, set the stage by stating that NIA is focused on factors that affect the health and well-being of older adults as well as dimensions of midlife that could affect adults as they age. NIA recognizes the value of behavioral economics and would like to better integrate its principles and knowledge into intervention development, particularly to address the differential characteristics of aging and older adults.

Laura Carstensen, Stanford University, steering committee chair, noted that, although many people can and do age very well, others do not function well and may develop chronic conditions

[1]More information about the workshop is available at http://sites.nationalacademies.org/DBASSE/BBCSS/Behavioral_Economics_Among_Aging_Populations/index.htm.

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and comorbidities in midlife that accelerate over time. The task, she said, is to build institutional and cultural infrastructures that support people and naturally move them to lead healthy lives. The behavioral economics framework is ideally suited to system change, can provide direction in terms of scalability, and can aim at large parts of the population to improve the health of aging and older adults.

Eric Johnson, Columbia University, steering committee member, explained that the workshop was organized around potential new directions for applying behavioral economics research to increase understanding of inter-individual and contextual differences in intervention effectiveness, improve knowledge of mechanisms, and encourage innovation in intervention methods.

BEHAVIORAL ECONOMICS RESEARCH IN AREAS OF INTEREST TO NIA

Improving Medical Regimen Adherence

Andrea Troxel, New York University School of Medicine, provided an overview of behavioral economics approaches for the NIA interest area of improving medical regimen adherence in older adults. Many chronic diseases (e.g., diabetes, hypertension, and psychiatric conditions) require adherence to medical regimens, such as taking medications, daily monitoring, and/or behavioral lifestyle changes. These regimens carry varying degrees of burden and often confer future benefits such as heart attack prevention.

Troxel explained that standard economics theorizes that people are rational beings who make decisions by maximizing expected value. Behavioral economics, on the other hand, integrates theories of economics and psychology, and recognizes that decision errors are common and take predictable forms. In decision making, people tend to be swayed more by what confronts them in the present than by future considerations, to have a poor understanding of probabilities, to be differentially affected by the idea of losing a certain amount of value in comparison to gaining the same amount, and to be subject to social influences.

She offered examples of potential interventions for motivating people and providers to improve daily behaviors as part of a medical regimen. She mentioned "daily lotteries for daily behaviors," a financial incentive that rewards the desired behavior. With "deposit contracts," people commit money in advance and get it back (plus a matching amount) if they meet desired goals. Social incentives, such as a "medication buddy" or "support partner," call for people to be accountable to someone else in trying to achieve their desired goal. "Fixed payments" to providers are tied to particular outcomes of the target population, such as improvements in blood pressure.

Troxel then described two trials of interventions that applied behavioral economics theory. The Shared Incentives trial involved the use of financial rewards to reduce cardiovascular risk in patients with high LDL cholesterol.[2] Results showed that the intervention was effective only when both the patients and providers received incentives; the posited mechanism is that incentivized patients took their medications and incentivized providers prescribed or intensified statin medications. The results showed how study designs can increase understanding of what elements of an intervention, and in what combination, will lead to the desired outcome.

The HeartStrong trial was designed to improve medication adherence for patients with coronary heart disease after their discharge from hospitalization for a myocardial infarction.[3] An intervention group received both financial and social incentives through a support partner and an engagement advisor. Troxel reported that she and her colleagues did not find effects of this intervention on the primary outcome of repeat cardiac events. They attributed the results in part to

[2]Asch, D.A. et al. (2015). Effect of financial incentives to physicians, patients, or both on lipid levels: A randomized clinical trial. *Journal of the American Medical Association 314*(18), 1926–1935.

[3]Troxel, A.B. et al. (2016). Rationale and design of a randomized trial of automated hovering for post-myocardial infarction patients: The HeartStrong program. *American Heart Journal, 179*, 166–174.

some degree of self-selection; participants may have had relatively high adherence, motivation, and engagement at baseline.

It is important, Troxel concluded, to systematically study levels of motivation, the characteristics of study participants, and outcomes in response to interventions. She suggested that effects of an intervention might be different if rolled out in a health system where the intervention is available for everyone, in comparison to a trial population that may have more motivated, self-selected individuals.

Incentivizing Walking: Using Lifespan Developmental Theory to Inform Incentive Effectiveness

In describing her research, which stems from developmental theory and examines motivation, Laura Carstensen, Stanford University, explained that socioemotional selectivity theory assumes that humans are uniquely able to monitor time and set goals in temporal contexts, and that they associate age with time left in life. Whereas younger people make choices to expand their horizons and gather experiences and resources for the future, older people become more conscious of time's passage and focus more on the present. Older people tend to see more clearly what is important, value their relationships more, grow more selective in everyday choices, and pursue goals that prioritize emotional meaning.

Carstensen pointed to evidence showing a shift in motivation across adulthood toward a preference for positive information. She illustrated this "positivity effect"[4] in a study on walking that compared the effects of a message phrased as a gain ("Walking helps you to preserve the flexibility of the joints and slows the process of osteoporosis.") with those of a message phrased as a loss ("Not walking can make you lose the flexibility of your joints and speed up the process of osteoporosis."). Message direction did not matter to younger people, but in older adults walking increased over time with the positive message.

Carstensen and colleagues have also tested the effectiveness of different incentives to increase walking. She presented findings that personal incentives were comparably effective regardless of age, whereas incentives to earn money for charities were more effective in older adults. Importantly, older participants were more likely to maintain increased step counts even after incentives were discontinued.[5]

Volunteering and Social Engagement in Later Life: Applications from Behavioral Economics

Nancy Morrow-Howell, Washington University in St. Louis, considered social engagement in later life, providing a perspective based on gerontological social work research, which she sees as very relevant to behavioral economics concepts and methodologies. Volunteering has been used as an intervention to address the decline in social engagement among older adults due to the thinning of social networks, onset of functional limitations, and loss of social roles in age-segregated institutions.

Reviewing research on volunteering, Morrow-Howell reported that, compared to younger adults, those aged 65 and older have lower rates of volunteering but a higher average time commitment. Older volunteers in formal programs have higher levels of human, social, and cultural capital and are less likely to have a lower socioeconomic status (SES) or an ethnic background. They are motivated by opportunities for giving back, meaningful engagement, and social interaction. Especially for older people, volunteering is positively associated with physical, mental, and cogni-

[4]Notthoff, N., and Carstensen, L.L. (2014). Positive messaging promotes walking in older adults. *Psychology and Aging, 29*(2), 329–341.

[5]Raposo, Hogan, Barnes, Chemudupati, and Carstensen under review.

tive health. Psychological, social, and physical pathways between volunteering and health have been theorized.[6]

Volunteering depends on organizational arrangements such as training, ongoing support, and flexibility. There is evidence that stipends increase participation (especially for lower-SES older adults), enable fulfillment of a time commitment, and increase satisfaction with the volunteer experience.

Morrow-Howell and her colleague Cal Halvorsen (Boston College) considered 14 concepts from behavioral economics and gave several examples (e.g., choice architecture and social norms) that could be applied to research on volunteering for older adults.

Reducing Unnecessary Opioid Prescribing

Jason Doctor, University of Southern California, described a randomized trial conducted by his team to reduce opioid prescribing by physicians and others, such as nurse practitioners, physician assistants, and dentists. Their research question was: Does a personal letter from the medical examiner notifying clinicians of a scheduled-drug death in their practice have an effect on subsequent opioid prescribing? This approach was selected because prescribers often do not know the outcomes of their patients, and an individual's behavior tends to improve when a second party attends to it, particularly a person in authority.

Medical examiner case reports identified the prescribers of the decedents. Data on opioids dispensed were evaluated for each prescriber before and after the letters were sent from the medical examiner. The letter to physicians was in a nonblaming, informative tone, and phrased as a courtesy notification to let them know their patient died, with relevant points from CDC guidelines.

Doctor described the findings, which are still under review. However, with regard to their methods, he commented that the letters were fairly low cost, and the intervention has potential for scalability because every county has a medical examiner, and 49 states have a prescription drug monitoring program.

INTER-INDIVIDUAL AND CONTEXTUAL DIFFERENCES IN INTERVENTION EFFECTIVENESS

Individual Differences and Context: Two Perspectives from Health Behavior Research

Angela Bryan, University of Colorado Boulder, described two health behavior studies in her lab with older adults. She explained that the hippocampus (responsible for memory function) and the prefrontal cortex (responsible for executive function, decision making) of the brain decrease in volume with age on average, but with substantial variability. Some people in their 70s have more volume in these regions of the brain than some 20-year-olds. The same type of variability is seen in the functional connectivity of parts of the brain. This implies that there is much plasticity and potential for interventions to exert positive effects.

Bryan also described the psychological, physiological, and neurocognitive benefits of physical activity in older adults, and said that emerging data show that more benefits accrue from physical fitness over and above physical activity. Among older adults who have completed a supervised exercise intervention, results showed that those in the higher-intensity exercise condition demonstrated greater gains in cardiorespiratory fitness than those in the lower-intensity condition. They also found that exercise leads to improvements in executive functions. Participants in general had a high SES, which suggested some selection effects. An analysis was also performed to consider the context of cannabis in Colorado, where medical and recreational use is legal. Analyses con-

[6]Fried, L.P. et al. (2004). A social model for health promotion for an aging population: Initial evidence on the Experience Corps model. J*ournal of Urban Health, 81*(1), 64–84.

trolling for baseline physical activity and the intervention condition showed that cannabis users were engaging in marginally more total physical activity than nonusers.[7]

Individual and Contextual Differences in Multi-Attribute Choice

Joel Myerson, Washington University in St. Louis, focused his presentation on discounting, which is a way to approach multi-attribute choice. Everyday choices involve outcomes that are delayed and/or probabilistic, and in making these choices individuals discount the value of the delayed and the probabilistic outcomes. Discounting has important implications for understanding health-related decisions, substance use and addiction, economic decision making, and consumer purchases.

Decision making is more difficult when it involves multiple attributes. To study how people make choices, researchers try to estimate the present, subjective value of delayed outcomes and the certain equivalents of probabilistic outcomes, and the degree to which they differ from actual values. Myerson described a study that illustrated discounting in people who use drugs, including the overlap between users and nonusers.[8] He noted that people's everyday decisions are usually more complicated than those studied in research labs. They often involve gains and losses and/or outcomes that may be both delayed and probabilistic. They may also involve choices between qualitatively different outcomes. Individual and contextual differences add another level of complexity and may have important implications for mechanisms as well as interventions. For this reason, Myerson emphasized that, when designing interventions, a "one size fits all" approach usually will not work.

MECHANISMS OF BEHAVIORAL ECONOMICS STRATEGIES

Understanding Dynamic Inconsistency and Commitment: Evidence from Food Choice

Sally Sadoff, University of California, San Diego, explained that models of temptation and self-control are among the most prominent in behavioral economics. "Dynamic inconsistency" (i.e., making different decisions in advance versus immediately) in consumption has been proposed as a mechanism for poor health outcomes. On the other hand, "commitment devices" (e.g., going to restaurants that serve only salads, not hamburgers) have the potential to help people change health behaviors by restricting future choices so that short-term behaviors align better with long-term wishes.

Sadoff presented research by her team addressing these two mechanisms in the context of a grocery store delivery program of healthy and unhealthy food choices. Results showed that dynamic inconsistencies, driven by temptation, significantly reduced choices to purchase fruits and vegetables, and increased choices to purchase sweet/salty snacks and food with higher calories/fat.

Further, they found that commitment demand was highly negatively correlated with prior inconsistency, suggesting that those with self-control problems may be less likely to be aware of them. Charlie Sprenger, Sadoff's colleague at UCSD, commented that the study provided a real-world example of how lack of such awareness erodes the value of commitment devices, and raises the question of what is the best policy choice to promote health while honoring individual preferences.

Designing Decisions: Becoming Better Choice Architects

Eric Johnson, Columbia University, stated that choice architects have many tools and that more choice is available now through "active choice architecture," which uses choice engines to devel-

[7]Gillman, A.S., Hutchison, K.E., and Bryan, A.D. (2015). Cannabis and exercise science: A commentary on existing studies and suggestions for future directions. *Sports Medicine, 45*(10), 1357–1363.

[8]Mejía-Cruz, D.,Green, L., Myerson, J., Morales-Chaine, S., and Nieto, J. (2016). Delay and probability discounting by drug-dependent cocaine and marijuana users. *Psychopharmacology, 233*(14), 2705–2714.

op options and structure. Greater understanding of mechanisms and choice architecture could provide guidance on what tools are effective (and ineffective) for public policy, create new interventions, help researchers work better with ensembles of tools instead of single tools, and inform discussions of ethics.

Johnson presented a meta-analysis of studies showing that defaults have a robust effect, but with large variation.[9] Opt-out defaults lead to larger uptake of the desired decision than opt-in defaults. He suggested that defaults influence decision making through three channels: ease (how easy/hard it is to switch or opt-out), endorsement (extent to which the default conveys what the choice architect thinks the decision maker should do), and endowment (how much the decision maker believes the defaulted option reflects the status quo).[10] Johnson concluded that choice architecture is powerful and cost effective and that it is unethical to ignore it.

In discussion, Andrea Troxel suggested a way of incorporating more choice elements through a "ladder of interventions," which starts with the simplest and easiest option, such as a reminder for medical adherence. Those who do not succeed at that level get moved to another path with reminders plus an incentive such as a lottery, for example. Other higher levels could include a peer counselor and other more intensive interventions. Thinking in terms of a hierarchy is a useful way to frame the issue and make progress in understanding which components work for whom.

INNOVATIONS IN INTERVENTION METHODOLOGY

Vaccination Studies

Gretchen Chapman, Carnegie Mellon University, spoke about an innovative field study methodology she used in a clinic environment to increase flu vaccinations. In her opinion, ideal field studies test theoretically based interventions, use random assignment and have enough arms and power to capture the mechanism of interest, are conducted in real-life field settings with partnerships, and have concealment designs where people do not know they are being studied. Concealment designs obviate problems with demand, responsivity, or selection effects, and remove recruitment or response rate issues because everyone is a participant and people act like they do in their real lives.

Chapman described her study with a concealment design in which patients were sent a letter from their clinic saying they were scheduled for a vaccination (opt-out default condition) or a letter encouraging them to schedule a vaccination on their own (opt-in condition). To protect participants, Chapman and her colleagues worked with a HIPAA[11]-qualified medical records specialist and never saw patient records or names. A separate debriefing letter was later sent to patients informing them that their data were being used in a study to encourage vaccinations. Results showed that the default approach influenced vaccination behavior better than people making their own appointments or no intervention.[12] Chapman suggested that the success of the default option had less to do with the endorsement of the doctor via the letter and more to do with the ease of the appointment being set up already and getting a reminder.

Digital Health: Applying Novel Technologies and Methodologies to Understand and Impact Health Behavior

Lisa Marsch, Dartmouth College, stated that advances in digital technologies and data analytics have created unprecedented opportunities to assess and modify health behavior and have accel-

[9]Jachimowicz, Duncan, Weber, and Johnson, in revision.

[10]Dinner, I., Johnson, E.J., Goldstein, D.J., and Liu, K. (2011). Partitioning default effects: Why people choose not to choose. *Journal of Applied Experimental Psychology, 17*(4), 332–341.

[11]HIPAA refers to provisions of the Health Insurance Portability and Accountability Act related to safeguarding medical information.

[12]Chapman, G.B., Li, M., Leventhal, H., and Leventhal, E.A. (2017). Default clinic appointments promote influenza vaccination uptake without a displacement effect. *Behavioral Science & Policy, 2,* 3–12.

erated the ability of science to understand and contribute to improved health. They afford new opportunities to examine within-person differences in health behavior through intensive collection of individual-level data using mobile devices, wearable sensors, continuous monitoring, or digital mapping of online social media activity.

For example, noting that a large literature has identified self-regulation as a potential causal mechanism in health behavior (and deficient regulation as a potential mechanism in health risk behavior), Marsch reported that interventions designed to promote self-regulation have shown tremendous promise across diverse populations. Self-regulation tools offered on mobile platforms enable widespread reach and scalability of effective interventions. This line of research may contribute to crafting "precision medicine" approaches for diverse populations.

Marsch also described the Center for Technology and Behavioral Health at Dartmouth. This national research center is designed to use science to inform the development, evaluation, and sustainable implementation of a wide array of digital technology–based tools for substance use disorders and related issues (e.g., mental health, HIV, chronic pain) as well as for health behavior in general (e.g., obesity, diabetes).

New Methods in Using Behavioral Science to Improve Patient Health

Kevin Volpp, University of Pennsylvania, proposed ideas to counter challenges that keep the field from advancing. To accelerate the pace of innovation, he called for rethinking randomized controlled trials that force commitment to a new intervention model with few opportunities for improvement while experiments are unfolding. One alternative is to create ways of informing intervention development at multiple points in the design without compromising the ability to replicate results. He presented evidence-based evolutionary testing, a framework for continuously improving and building evidence. It involves randomization and a control group, but also modifying and testing different versions of an intervention in development based on side studies at planned points.

Volpp reported on a study to increase generalizability of interventions in which everyone in a workplace setting who had been a smoker in the prior year was enrolled in one of five groups of a smoking cessation intervention.[13] Results showed that quit rates were lower across the conditions than typically reported in the literature. The program's success was limited though because relatively few people actually quit. However, quit rates tripled in some conditions with incentives and the program was cost effective overall.

Finally, to address barriers to conducting research with diverse populations, Volpp described the "Way to Health" at the University of Pennsylvania. It is a platform for supporting patients outside of clinics using different wireless devices to send data on their behavior to a server; to receive feedback from providers; and to receive incentives through electronic funds transfer. Roughly 90 studies have been undertaken by Penn investigators across 45 states, and they are now interested in making the platform widely accessible in order to accelerate innovation and let the academic community focus efforts on ideas and not platform development.

BREAKOUT GROUP DISCUSSIONS

Three breakout groups were organized to provide the workshop participants with an opportunity to discuss how the research presented at the workshop and the ideas it generated can be applied to the areas of particular interest to NIA.

[13]Halpern, S.D., et al. (2018). A pragmatic trial of e-cigarettes, incentives, and drugs for smoking cessation. *New England Journal of Medicine, 378,* 2302–2310.

Improving Medication Adherence and Decreasing Sedentary Behavior

The first breakout group was composed of Angela Bryan, Gretchen Chapman, Andrea Troxel, and Kevin Volpp. Bryan reported for the group that they first considered the challenges to improving medication adherence in older adults, including cognitive decline, multiple medications and prescribers, and the difficulty in sustaining impacts of an intervention once the supports are discontinued. In light of research showing that older adults are somewhat less motivated by monetary incentives, and considering the importance of individual preferences, more investigation on what is rewarding to older adults could inform intervention design. The question is how to leverage individual and contextual differences, decision errors, biases, and positivity effects to change behavior in older adults.

To build knowledge of mechanisms, group members discussed ideas for a specific theory of how the expected changes in individuals, systems, or contexts could lead to the desired change in behavior; for methods to measure mechanisms of change; and for routine, postintervention qualitative research to learn why interventions worked or did not work.

To foster methodological innovations, a targeted program announcement might focus on adaptive designs for behavioral economics interventions and tools for systematically examining how decisions are made and how to adapt interventions.

The group also discussed distinctions between pragmatic and explanatory trials. Whereas the goal of the latter is to understand mechanisms, moderators, effects, and impacts, pragmatic trials are conducted to enable better decision making for patients by clinicians, systems, or programs—a purpose that is ideally suited to test different behavioral economic incentives or nudges.

On the subject of technology, engagement was noted to be more of a challenge than usability for older adults; apps and tools can be adapted to make them more usable. While discussing the Way to Health platform as technology infrastructure for connecting health and health behavior, a question was raised about whether the platform offers a direct user interface. Volpp explained that although there is a direct user interface with the platform, the more common interface is for the platform to push out feedback, via the patient's device, to the patient, which would be familiar to older adults. Research to determine which devices older people prefer to use would be helpful in building a menu of devices for older adults.

Reducing Inappropriate Use of Opioids

In the breakout group on opioid use, Jason Doctor, Eric Johnson, and Sally Sadoff focused mainly on adaptive designs. Reporting for the group, Johnson remarked that because opioid use occurs over time, consideration might be given to a set or string of decision nodes, which can each be modeled on its own. The group members suggested that an adaptive design could be applied in this type of scenario with a "cascade of interventions" to assist with decision making. For example, in advance of a planned surgery a prescriber could start with preventive messages discouraging opioids after surgery and deciding on an alternative pain medication approach, possibly using a precommitment. At the next level, a 3-day opioid prescription might be provided. More intensive efforts could be made to prevent the "90-day cliff" (after 90 days, one-half of patients may become addicted). For patients who are addicted, a long-term taper over 12 months could be prescribed with other clinical care. At a more serious level of addiction, medication-assisted therapy and counseling could be prescribed. Some group members had other ideas about complementing the cascade with a predictive risk assessment that could aid in decision making. In addition, a patient questionnaire could be used periodically along the treatment pathway to assess time preferences, self-awareness, cognitive function, degree of dependence, and treatment needs.

Johnson clarified that the breakout group was discussing the "cascade of interventions" as a staged research design. In discussion, Carstensen suggested that Markov state models might be used for analysis, but this would depend on the power of the design. Sadoff added that sample

size may be addressed by doing this type of cascade of interventions/staged design approach in a health system with a larger, diverse population. A few group members noted, though, that health systems may present barriers to using alternatives to opioids and thus contribute to patients being on opioids when not necessary. Nonopioid analgesics can cost more, may not be on the formulary, and may require special approvals. Coordination with insurers would be advantageous to address these types of system issues, and there may be interest in testing alternative coverage designs.

Discussion also brought up that only a couple of meta-analyses have been found on the effects of opioid use on cognitive function, and with very select older adult samples. One perspective on how opioids affect social functioning is that they target not only pain reception but also social perceptions. Socialization has less value to people using opioids. Research in social neuroscience has similarly shown the dulling of social pain by analgesics. More research on the relationship between opioid use and cognitive/social functioning in older adults would be helpful.

Promoting Volunteering and Social Engagement

Nancy Morrow-Howell reported for this group, which included Laura Carstensen and Joel Myerson. They discussed social isolation as a compelling health issue and put forth research questions to advance knowledge and move in a more applied direction to study whether a formal volunteer role may confer more health benefits than other social or caregiving roles. The questions focused on the best ways to attract and keep older adults in volunteer roles—by incentivizing, making volunteering a default option or habit, targeting those who might benefit the most, and addressing motivation changes over the course of volunteering. Other questions concerned the health benefits of volunteering, mechanisms that make volunteering a health-producing activity, scaling up volunteering to make it a social norm, and incentives for organizations.

Discussion then moved to ideas for a small study that would start in midlife and take advantage of behavioral economics approaches. Morrow-Howell described a design for a multisite intervention, working with a large employer that would allow employees aged 55 and older to volunteer during their usual work hours. To deal with selection bias, they could consider some type of choice architecture. The outcome of interest would be continuity of engagement through retirement.

Myerson pointed out that financial incentives demonstrate others' value of the volunteer contribution. Carstensen added that Experience Corps thought it was important to pay people in their volunteer roles. The point was also made that paying volunteers requires thoughtful consideration because for some it may detract from their altruistic giving of time, they might not need the financial incentive, or paying volunteers could become some other category of employment that might have negative effects. Other options, such as gifts, were also discussed. A volunteer opportunity could be offered to everyone in an organization at various ages and at differing levels of engagement. It could be a bonus for employees to transfer to nonprofits as fellows or part of a phased retirement plan. An adaptive design would be advantageous to test the choice architecture for this type of intervention.

The possible benefits to employers were also discussed. Offering volunteering options might help employers who are encouraging senior staff toward retirement. This type of program would be useful in promoting good public relations for employers.

PERSPECTIVES ON KEY THEMES AND RESEARCH CONSIDERATIONS

During the final session, all the speakers were asked to identify high-priority areas that emerged from the discussions for NIA to consider. Their perspectives were grouped in the following themes.

Mechanisms and Individual Differences

Chapman emphasized that intervention development should be driven by research testing of specific theories related to underlying mechanisms of interventions versus just testing particular interventions. Bryan underscored the need for research to enhance understanding of the mechanisms through which behavioral economics interventions act on individuals or systems. To better and more deeply understand mechanisms, Carstensen asked several questions: How do commitments and dynamic inconsistencies differ for older people? Does predictive scoring work better in older populations because they know themselves more and are more predictable? Does the sense of time passing faster as we get older have something to do with discounting rates? She suggested that more basic research is required to deepen understanding of age differences. Johnson pointed out that heterogeneity of effects matters in relation to targeting and customizing interventions. Differential sensitivity provides insight about active mechanisms.

On the subject of volunteering, Myerson noted that if it is to be promoted, more information is needed about what kinds of volunteering affect health, how much difference it makes, who benefits the most, and underlying mechanisms. He also commented that individual differences in decision-making strategies could present methodological and analytical problems. Considering how to group people, not just along simple dimensions but along multiple dimensions, he suggested that a behavioral taxonomy might help make this information translatable. An important cross-cutting theme for Volpp was to systematically encourage qualitative follow-up research to learn from successful and nonsuccessful efforts.

Choice Architecture and Incentives

Morrow-Howell pointed out that behavioral economics has not been applied much in later-life volunteering and that choice architecture, defaults, and commitment devices have great promise for both innovating and studying volunteerism in organizations. Along the same lines, Volpp argued for more systematic testing of nonmonetary incentives in healthcare delivery settings, chronic disease management, and volunteering.

Discussions led Carstensen to think differently about incentive targeting: Rather than targeting individuals primarily, the most responsive targets may be physicians for opioids, employers for volunteering, and community leaders for system change. She noted that more basic research could enhance understanding of age differences in the effectiveness of rewards (social versus financial) and other incentives. Older people are generally more stable, patient, and grateful, which in some cases can make behavior change easier, but in other ways makes it more difficult. Chapman agreed that different kinds of monetary and nonmonetary incentives, as they relate to age differences, should be prioritized for future research.

Adaptive Designs

Volpp asserted that moving into evolutionary testing, rapid cycle innovation, and adaptive designs will provide an opportunity to apply a more nimble approach to learn who is not responding to interventions, why, and what alternative courses to take. For Doctor, ideas that came out of the workshop were orchestrated "nudges" and resetting expectations through systemwide design; the latter were illustrated in the breakout group discussion on adaptive design for studying decision nodes that reset objectives along a pathway for opioid reduction, from prescribing to deprescribing. Troxel echoed that there are multiple ways to be adaptive. The sequential, decision-nodes approach is fruitful because it mimics practice. In addition, novel methodologies can be employed to analyze a sequence of decision nodes. She also mentioned another type of adaptive design that adjusts the randomization probability as a function of response.

Carstensen and Bryan noted that adaptive designs can support more customized intervention and testing. Troxel emphasized that complex systems and processes require sustained engagement and repeated doses of attention to make them work and be sustainable, and that this needs to be integrated into designs. Carstensen agreed and remarked that thought should be given

to which intervention models in complex systems would fit these adaptive designs. Chapman added that support for underused methods such as pragmatic trials might be undervalued by review committees unless specifically called for in proposal announcements. Carstensen agreed that new funding approaches of innovative designs and methods would be beneficial.

Selection Issues and Generalizability

Troxel encouraged pragmatic trials and innovation in methods for conducting such trials, with a particular focus on addressing selection issues. Noting that research populations are narrowed by consent processes in tertiary academic medical centers where much research is done, she called for broadening the perspective to real-world settings and populations where most Americans access health care. Morrow-Howell commented that research on volunteering tends to focus on "boutique" interventions in small settings. Although Experience Corps is a much larger program, it is also not very generalizable because of its high intensity; the lack of generalizability affects the potential scalability of interventions, which also demands attention. Chapman and Volpp agreed that selection effects and implications for generalizability are a major concern. Volpp added that the issue applies from small select populations to broader populations, and urged more recognition of that while considering different approaches. He cautioned though not to rush headlong into pragmatic trials.

Technology

Morrow-Howell suggested that more thought should be directed to how technology can complement social engagement. Myerson pointed out that, while the possibility of volunteering online was not brought up in the workshop, it deserved more attention, particularly to enable participation of people with limitations in mobility. Several participants expressed interest in learning more about the Way to Health platform and suggested that a call for researchers to devise ways to apply the platform in behavioral health for older adults would be of value.

Measurement

Morrow-Howell made the case for viewing social engagement and volunteering as health behaviors and integrating them into screening and monitoring indicators. Sadoff encouraged the use of data and assessment methods (e.g., cognitive, preferences, decision making) to predict people's responsiveness to interventions so that interventions can be better targeted. Johnson suggested that using common measures across studies to examine the pathways of various incentives would facilitate understanding of mechanisms.

WORKSHOP PLANNING COMMITTEE: Laura Carstensen (*Chair*), Department of Psychology, Stanford University; **Eric J. Johnson**, Center for Decision Sciences, Columbia University; **Kevin Volpp**, Center for Health Incentives and Behavioral Economics at the Leonard David Institute, University of Pennsylvania.

DISCLAIMER: This Proceedings of a Workshop—in Brief was prepared by Jeanne Rivard, rapporteur, as a factual summary of what occurred at the meeting. The statements made are those of the rapporteur or individual meeting participants and do not necessarily represent the views of all meeting participants; the planning committee; the Board on Behavioral, Cognitive, and Sensory Sciences; or the National Academies of Sciences, Engineering, and Medicine. The planning committee was responsible only for organizing the workshop, identifying the topics, and choosing speakers.

REVIEWERS: To ensure that it meets institutional standards for quality and objectivity, this Proceedings of a Workshop—in Brief was reviewed by Angela Bryan, Institute of Cognitive Science, University of Colorado Boulder; Joel Myerson, The McDonnell Center for Neuroscience, Washington University St. Louis; Mitesh S. Patel, Nudge Unit, University of Pennsylvania Medical Center; and Andrea Troxel, Division of Biostatistics, New York University School of Medicine. Kirsten Sampson Snyder, National Academies of Sciences, Engineering, and Medicine, served as review coordinator.

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