

**Behavioral and Social Research Program  
National Institute on Aging**

**NEUROECONOMICS AND AGING**

**August 26, 2005**

**Meeting Report**

(Rev. 9-20-2005)

**Invited Participants**

John Cacioppo, University of Chicago  
Colin Camerer, Cal Tech University  
Brian Knutson, Stanford University  
David Laibson, Harvard University  
George Loewenstein, Carnegie Mellon University

**National Institute on Aging (NIA) Participants**

Jeff Elias, Behavioral and Social Research (BSR), NIA  
Anneliese Hahn, BSR, NIA  
Jennifer Harris, BSR, NIA  
Lis Nielsen, BSR, NIA  
Richard Suzman, BSR, NIA  
Molly Wagster, Neuroscience and Neuropsychology of Aging Program, NIA  
Rose Maria Li (contractor)

**Invited Guests**

Kaye Husbands Fealing, Directorate of Social, Behavioral, and Economic Sciences, Division of  
Social and Economic Sciences (SBE/SES), National Science Foundation (NSF)  
Robert O'Connor, SBE/SES, NSF

**Introduction**

The August 26, 2005, teleconference was the last in a series of two teleconferences<sup>1</sup> on neuroeconomics and aging initiated by the National Institute on Aging (NIA) Behavioral and Social Research Program (BSR). The aim of the teleconference was to solicit perspectives from psychology and economics experts on promising avenues for aging research in neuroeconomics, particularly areas of research that address multilevel interactions among psychological, physiological, social, and economic factors that influence how older adults negotiate important life decisions related to retirement, Medicare, and healthcare management.

Lis Nielsen reviewed interim steps for advancing a research agenda on neuroeconomics and aging that arose from the last teleconference (see pp. 6-7 of August 12 teleconference summary). She noted that a key suggestion was to support an exploratory workshop that would encourage interdisciplinary interaction, and urged participants to suggest implementation strategies while

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<sup>1</sup> The first teleconference took place on August 12, 2005.

considering the broader BSR scope that encompasses social and behavioral neuroscience, sociogenomics (social life in molecular terms), and a lifespan perspective. Richard Suzman clarified that longitudinal studies do not preclude BSR interest in experiments and laboratory studies, and that NIA welcomes applications of almost any magnitude. He instructed potential applicants not to wait for a formal solicitation and encouraged participants to “think big.”

Participants decided to forego individual introductions and proceeded to a general discussion about obstacles in promoting neuroeconomics and aging research and topics deserving of research attention not already contained in the participant statements.

## **Obstacles in Promoting Neuroeconomics and Aging Research**

### **Need for Fast-Track Small Grants**

George Loewenstein was impressed by how far small amounts of money can go, and how incredibly efficient the application process can be if it is not onerous and decisions can be made quickly. He described his experience with Russell Sage Foundation grants at the \$5,000 level. Such small grants permit a professor working with a graduate student to submit via e-mail a one-page application coupled with a one-page advisor recommendation letter, and to receive within a few weeks an answer about whether a decent idea will be funded. There is virtually no cycle time and amazingly little time spent on the application itself. Loewenstein and Brian Knutson had a similar experience when their \$30,000 McArthur Foundation request was approved quickly via return e-mail, permitting them to immediately begin a research project involving brain scans.

The smallest NIA grant is \$25,000 in direct cost (which is probably about \$35,000 in total costs), generally with a minimum 6-month interval between application and award. Alternatives include: 1) NIA/BSR’s network of funded centers can award pilot grants with administrative approval by NIA. NIA prefers that these pilot projects not exceed \$25,000 but they can be larger; 2) Program Project (P01) Grants can issue a call to fund small projects; 3) the R21 planning grant can provide \$275,000 in direct costs spread over 2 years; or 4) network grants can be used as another potential mechanism but they are still in development. Among these alternatives, it seems that the best approach at this time would be to add pilot funds to be distributed through a program project or center grant.

Another possibility would be for the NIA to work with a foundation that would administer small grants with faster turnarounds. One participant suggested that the NIA award \$200,000 per year to a foundation (e.g., Russell Sage Foundation). NIA is willing to entertain such a request from an interested foundation. Robert O’Connor stated that the National Science Foundation (NSF) would be pleased to accept interagency transfers for such a purpose.

In terms of a reasonable award level, participants believed that \$25,000 or \$30,000 per grant is needed for small projects involving imaging. The field of neuroeconomics applied to aging is still very small, even with BSR’s very broad interpretation of “aging” as encompassing anything dealing with adults. Participants doubted that more than five to ten applications would be received in the first several years of such an initiative. The Health and Retirement Study (HRS) offers an enticing vehicle for adding a module on the older population. There are plenty of neuroimaging centers willing to rent time.

### **Long Lag Time in Review**

The standard NIH grant application review procedure has lags and uncertainties. David Laibson said that people devote substantial time to writing an application and then get the bad news 6 months later. Suzman responded that the NIH as a whole is trying to address this through the interdisciplinary Roadmap activity.

### **Need for Truly Interdisciplinary Review Committees**

NIH recognizes that an interdisciplinary review group needs more than an expert representative from each field (e.g., neuroscience, economics). It needs people who can connect two or more fields and understand the interfaces. Suzman stated that a Program Project (P01) Grant application is likely to get a much better review because an ad hoc panel is constituted specifically for a P01 review. A P01 could include a core that provides pilot funding to associates. Awards need not be centered at one institution. One possibility is for NIA to issue a call for small program projects that would permit requests for small set-aside funds for supporting high-risk pilots. A network of such program projects could provide an initial infrastructure for the field, but there needs to be a leader and an agreed-upon set of procedures.

### **Need for a Network of Networks**

John Cacioppo observed that, other than getting small amounts of funding into investigators' hands, the field of neuroeconomics is still nascent and diffuse. He suggested the Alzheimers Disease (AD) Centers network as a possible model. If there were 6 or 12 P01s across the country, a network of the P01 directors would be valuable to help promote standardization and solve problems. AD Centers have developed interactive calls for archiving materials and adopting common measures. This method has proved very useful. BSR has tried to encourage but not mandated that Demography centers do the same. AD centers garner about \$60 million per year in NIA funds. In contrast, the Demography and Roybal centers together are funded at \$5 million to \$6 million per year. One consideration with a center competition is that awards can only be made as part of a request for application (RFA) and there must be set-aside funds. BSR is not scheduled to have another centers competition for 2 years. The Demography and Roybals, and perhaps the AD Centers if they were interested, could team up to produce a modest overlay network.

### **Additional Research Areas for Consideration**

Looking at neuroeconomics as part of a larger behavioral and social research agenda—i.e., topical problem areas that one might be interested in pursuing—Nielsen asked participants to consider the actual research questions and issues that are most important in neuroeconomics. Are there pressing issues or areas of research on aging that merit exploration, but that were not addressed in the submitted papers or following discussion?

Jeff Elias noted that one issue is how to develop good ideas into grant applications before interest dissipates. The idea-generation and grant-application processes have to develop together and work in tandem.

Participants added a number of topics to the areas already mentioned in the participants' statements:

- 1) How risk estimation is being communicated and perceived across ages, with particular attention to how risk is experimentally presented versus how risk is encountered in the real world was raised as an issue. Laibson contrasted abstract cut-and-dried exercises common in economics with the rich, ambiguous risk environment that does not necessarily come with specified possibilities (e.g., stock market) but that represents the context in which people must confront uncertainty in the real world.
- 2) From the experimentalist perspective, there is a desire for better behavioral assessments of decision making, for data on reliability and validity of both old and new assessments, and for the ability to generalize actual real-life decisions (e.g., portfolio decisions).
- 3) Social aspects, including the influence and/or absence of others, on decision making, and individual action in the collective interest versus self-interest. Other than Laura Carstensen's work, there has not been much work on this.
- 4) Dynamic aspects (e.g., interaction between the limbic and cortical systems), particularly as individuals mature, are of considerable interest.
- 5) Changes that are more psychological (cf Carstensen), and motivations and attitudes about aging that may influence behaviors, would benefit from further discussion. For example, Becca Levy has shown that older adults who hold negative stereotypes about aging are more likely than younger adults to oppose funding for programs to support the elderly.
- 6) The importance of context and the social component was noted. The application of better technologies to examine individual differences versus exogenous or situational variables will help in understanding what influences people, especially as they are aging.
- 7) Neuroimaging across time for the same person, and at the same point in time was raised as an issue. Technical issues need to be resolved with respect to the reliability of the images themselves. An unresolved issue in the HRS is getting magnetic resonance imaging (MRI) of subjects at multiple points in the survey. Results from a neuropsychological component of the HRS (Aging, Demographics and Memory Study [ADAMS]) are forthcoming. The cognitive component in the HRS is going to be significantly expanded because of an allied project getting underway. The National Health and Nutrition Examination Survey (NHANES) does some imaging but not MRI. The NIA Baltimore Longitudinal Study of Aging has a longitudinal MRI component.

### **Implementation Strategies for an Exploratory Workshop**

Nielsen reported that participants from the first teleconference were keen to develop a workshop and a common language for psychology, economics, and neuroscience. If this common language is developed, does this need to focus on operational aspects of high level concepts like emotion, risk, and reward; finding commonality in levels of analysis with computational models or neural systems; or different disciplinary criteria for what constitutes a well-executed decision process? Are there certain areas that need to be targeted, or should attention focus on all of the above?

Colin Camerer said he believes attention is needed on all of the above areas—from appreciation for difficulties in what is learned at the most basic design level all the way up to the meaning of “rational” or “emotional.” There can be some confusion when the same word is used in very different ways by different fields. In behavioral economics, the Russell Sage Foundation's 2-week summer camp has been a huge success. The recipe there seems to be having sufficient time and self-selection of students willing to take 2 weeks in the summer to gain exposure.

Participants believed that a minimum of 1 week is needed to do an adequate job; 2 to 3 days is too short a period, giving only enough time to get warmed up. Such a workshop could be designed for different levels of seniority. Most of these workshops were held on the West Coast (Berkeley, Stanford) and once in Trento, Italy. Organizers need to balance the need to make the meeting accessible with the desire for an intensive experience that encourages interdisciplinary work. Breaking down suspicion about research methodologies across fields is a first step, which will require addressing higher-level concerns about what makes a good study. What are the high-level concepts and nature of the modeling in other fields, and what does a policy prescription mean?

Participants agreed that the right person must be identified to plan an exploratory workshop. Someone needs to apply for a conference grant, or NIA could consider providing some of the funds through a purchase order. Camerer, Antonio Rangel, and Paul Glimcher are planning a summer school in neuroeconomics in 2006 and NIA could consider adding funds to cover a few days' focus on aging. Elias suggested riding the success of a 2006 workshop into a larger R13 conference grant.

NIA conference grant applications can get processed faster if they are under \$50,000. The RAND Summer Institute and MiniMed School is funded through an NIA conference grant and center grant funding, with some contributions from the NIH. NIA can find ways initially to fund an exploratory workshop at a modest level. Various centers might be willing to support travel costs for people attending from their own institutions. NIA welcomes inquiries and requests about this. (Requests involving Stanford University should be directed to Phillips, Elias, or Suzman as Nielsen is still affiliated with Stanford.)

Loewenstein expressed skepticism that a top-down process would lead to a common language in neuroeconomics. Rather, a natural evolutionary process must occur and has been occurring. Although supportive of NIA efforts to fund basic research in neuroeconomics, he observed that the conversation has been focused on how the interests of neuroeconomists can be applied to aging questions. There is an opportunity to think also about the big social science issues in aging and obvious ways that neuroeconomics can help shed light on those issues.

Nielsen added that one of the motivations for these teleconferences is thinking about how neuroeconomics can inform research concerning decisions in the areas of retirement, savings, investment portfolios, consumption, healthcare management, and interpersonal relationships, all of which tend to be very important for health. Aside from substantive issues, there is interest in more methodological questions such as understanding survey behavior (cf a workshop planned by Dan McFadden and Carstensen).

Loewenstein remarked that some of the most productive neuroeconomics work has started with some kind of observation – like rejections in the ultimatum game or hyperbolic time discounting – that stimulated questions about the underlying mechanisms. He described a three-step thought process:

Step 1: What are some of the major issues in aging?

Step 2: How can behavioral economics shed light on these issues?

Step 3: How can neuroeconomics help to explain the behavioral economics?

Participants said it would be helpful for BSR to assemble some of these observations (e.g., from the work of Carstensen, Denise Park, or Paul Slovic), i.e. documented anomalies in choice behavior. For example, Denise Park's finding that the more one repeats a negative finding to an elderly person the greater likelihood it would be remembered as something positive, contradicts what we believe about how people remember negative versus positive things. Changing the context could change the outcome. Nevertheless, Park's finding is interesting and has generated a great deal of attention.

Suzman mentioned that the single biggest change in welfare programs since Medicare is the new drug benefit that is expected to cost a third of a trillion dollars over 10 years. The question of uptake and decision making there is central. How people understand the choices and how they balance risk enters into a very complicated set of decisions. Lowenstein added that if this line of research were to reveal that older people are able to make certain types of decisions but get hung up on others, it would be interesting to follow up with brain scanning to try to understand the reasons.

Nielsen encouraged participants to consider, in conclusion, the most profitable directions for next steps.

## **Concluding Thoughts**

Suzman was confident that if one could assemble four to six expert psychologists to talk about aging from multiple perspectives, a dozen or so research ideas would materialize. Finding ways to entice people to meetings and getting them to talk about topics might spin hypotheses that would be unlikely to arise without such an event.

Camerer observed that one thing interesting about aging and retirement is adaptation to change—people are going through dramatic changes in income and time use. This topic is not studied much in economics, except that economists assume that utility functions are smooth and differentiable. In truth, there actually might be sharp changes. Suzman commented that this area is under-researched and perhaps has been avoided for the last 15 years, certainly by everyone on the HRS. This has been frustrating and maddening given the topic's importance in economics and in epidemiology. It seems like a very good idea to look at adaptation to computers and medical apparatus.

Suzman mentioned that Carstensen is studying how people represent time. Other studies on circadian rhythm and sleep, and lapsed time, represent a different but also important issue in terms of time left and time spent. This concept is open for more research. Knutson noted that it is worth taking a broad view of time, not just the life span but also the micro structure of temporal sequencing. Data from Germany show older individuals are less adept at reversal learning.<sup>2</sup>

Over 20 years ago, Powell Lawton modeled the cycle of competence, environmental press, and the adaptation of older people in certain domains (e.g. perceptual aspects like reading traffic

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<sup>2</sup> In reversal learning, the individual first is taught to make a discrimination (i.e., choosing a black object instead of white object), then is supposed to reverse his choice (i.e., choosing the white object).

signs, speed of processing). Elias said he sees parallels to “technological press” where everybody, not just the elderly, must deal with advances in technology. The applied issue of technology adoption is very interesting because older people can benefit in some ways much more from new technologies but they can take a long time to adopt technologies. However, when those new technologies are adopted, they end up revolutionizing their lives. Why technology uptake is so slow among older people could be attributed in part to emotional resistance. One participant suggested that a perfect project would be to try to understand the difference in adaptation of new technology by age, and the neural underpinnings of this difference. Use of instrumentation to monitor daily activities, including cheek swabs and heart rate monitoring, is one approach to begin looking at decisions that occur several times a day rather than focusing on once-in-a-lifetime decisions (e.g., marriage, retirement).

Nielsen welcomed further input from participants on these issues.