

The 1st International Seminar on Experiments and Surveys
in Economics and Related Social Sciences

-Economic incentives and their impacts on human brain and behaviors-

第一回国際経済理工学セミナー「経済理工学における実験調査の現状と課題」

23rd July 13:10 - 15:00 at Seminar room of Department of Social Engineering, West 9
building 2nd Floor 西9号館2階社会工学セミナー室 204

13:10--30 Network Science and Graph Clustering to Simulate Human Behaviors

--How the Hub Person Plays a Role for Attracting the Interest of a Group

by Jaeyoung Jung & Hiroyuki Akama

The Karate Club which has become famous with the name of Zachary (1977) allows us to make use of graph clustering methods for simulating human behaviors in a network of community. Taking example from this small episode and using the renovated version of MCL (Markov Cluster Algorithm), we will treat the possibility of applying the leading network science to the analysis of decision making and economic phenomena.

13:30-45 Discussion

13:45-14:05 Voluntary Participation in Public Good Provision Experiments: Are Japanese spiteful? by Takehiko Yamato.

We study voluntary public good provision in the laboratory, in a cross-cultural experiment conducted in the United States and Japan. Our environment differs from the standard voluntary contribution mechanism because subjects first decide whether or not to participate in providing this non-excludable public good. This participation decision is conveyed to the other subject prior to the subjects' contribution decisions. We find that only the American data are consistent with the evolutionary-stable-strategy Nash equilibrium predictions, and that behavior is significantly different across countries. Japanese subjects are more likely to act spitefully in the early periods of the experiment, even though our design changes subject pairings each period so that no two subjects ever interact twice. Surprisingly, this spiteful behavior eventually leads to more efficient public good contributions for Japanese subjects than for American subjects.

14:05-14:20 Discussion

14:20-14:40 Psychophysiological studies: mechanisms of anticipatory functions using EEG and
fMRI

by Yoshimi Ohgami

Anticipation is the most influential cognitive factor that animals and humans use to optimize behaviors. Anticipation of future events makes us quick and accurate in our actions. For instance, anticipation must be involved if safe driving is to occur. There are two main methods to monitor the brain's anticipatory actions. Electroencephalogram (EEG), and functional Magnetic Resonance Imaging (fMRI) can be used to measure the brain activities during anticipation. The stimulus-preceding negativity (SPN) is the EEG that is related to anticipatory functions. Concerning the functional significance of the SPN, the existence of two types of anticipatory brain activities have been hypothesized that (1) perceptual anticipation is anticipation of perceptual inputs such as visual stimulus and auditory stimulus and (2) emotional anticipation is anticipation of emotive stimuli. Aim of the study was to experimentally confirm the existence of perceptual anticipation and the relationship between emotional and perceptual anticipation. Moreover, it is well known that emotions can be classified as "positive" and "negative." Another aim of the study was to determine whether any difference exists between positive emotional anticipation and negative emotional anticipation. The EEG study revealed that anticipation of different stimulus modality (visual vs. auditory) caused distinct brain activity. The validity of perceptual anticipation was empirically confirmed by our research. Anticipation of a positive emotional valence induced

brain activity in both the left and right hemispheres, but only the right hemisphere was activated by negative emotional anticipation. The fMRI studies revealed that the insula, striatum, anterior cingulate cortex, and the frontal gyrus of the brain are related to anticipation. Some applications of economics from psychophysiology and neuroscience using EEG and fMRI will be discussed.

タイトル: 予期機能の解明 - EEG と fMRI を用いて - 特別研究員 大上淑美:

行動を最適化するために影響力を持った認知因子として、予期・予測がある。未来の出来事に対する予期・予測により、行動を迅速にさせ、また正確に実行させることも可能になる。例えば、車を安全に運転するためには予測が不可欠である。予期・予測行動と関連する脳活動をモニターする主な方法として、脳波 (EEG) や機能的磁気共鳴画像法 (fMRI) がある。

予期や期待と関連していると考えられている脳波に SPN (Stimulus-preceding negativity: 刺激先行陰性電位) と呼ばれる脳波がある。この SPN が何を反映しているかについて、(1) 知覚の予期 (刺激の入力の予測) を反映するという仮説と、(2) 課題に対する情動・動機づけの程度を反映するというふたつの仮説がある。本研究では、ふたつの予期仮説の存在と関係を明らかにすることを目的とし、実験を行った。また、情動が“ポジティブ”と“ネガティブ”に分類できることはよく知られているが、ポジティブとネガティブな情動予期の違いが存在するかどうかを確認するための実験も合わせて行った。

結果として、異なる知覚刺激モダリティ (視覚対聴覚) は、脳の異なる部位の活動が明らかにされ、情動・動機づけが高い場合には、活動が増加することが確認された。また、ポジティブな情動価に対する予期・予測は両側の脳活動を誘発し、ネガティブな情動予期によって右半球だけ活動した。左半球はポジティブな情動価に対する予期・予測に対して反応する。別途に行った fMRI 研究により、insula、striatum、anterior cingulate cortex と frontal gyrus が予期・予測に関与した脳の部位であることが明らかにされた。

最後に EEG や fMRI を用いて、精神生理学や脳神経科学から経済活動への応用を紹介する。

14:40-55 Discussion

14:55-15:00 General Discussion

The 2nd International Seminar on Experiments and Surveys
in Economics and Related Social Sciences

-Economic incentives and their impacts on human brain and behaviors-

第二回国際経済理工学セミナー「経済理工学における実験調査の現状と課題」

24th July, 14:00 - 15:30 at Seminar room of Department of Social Engineering, West 9
building 2nd Floor 西9号館2階社会工学セミナー室 204

14:00-14:20 Individual rationality and social rationality: Logical thinking and the ultimatum game
by Kuninori Nakamura

Previous studies reveal that people weigh fairness principle even when it prevents them from the subjective expected utility maximization. Then, one question arises: How does rational person who can solve logical tasks behave when his/her maximization of the expected utility is not compatible

with social rationality? We examined this question by using ultimatum game (Guth et al, 1982) and Wason's selection task (Wason, 1966). In this study, participants answered various kinds of the selection tasks and then performed the ultimatum game. The results indicated that, regardless of the performance of the selection task, participants opted for fair allocation.

邦題：個人の合理性と社会的合理性：論理的思考と最後通告ゲーム

14:20-35 Discussion

14:35-55 Does a task to think about the monetary ranges reduce anchoring effects in contingent valuation for anti-global warming policy evaluation?

by Noboru Hidano

Kahneman et al (1999) claimed that elicited WTPs in contingent valuation are skeptical for decisions on public policies due to anchoring effects on the values. We examined the effects of asking the respondents of their ranges that they may pay for the public goods before selecting their dichotomous choice in referendum format and eliciting their WTPs on the anchoring effects. The task is effective to reduce anchoring effects and to increase the subjective belief not to change the values. The times required to think about the WTP values are also reduced by this task.

14:55-15:10 Discussion

15:10-30 General Discussion

Organizers: Professors Takehiko Yamato, Hiroyuki Akama and Noboru Hidano