

OPINION

by Prof. Encho Nedyalkov Gerganov, New Bulgarian University, retired
Field of Higher Education 3. Social, Economic and Legal Sciences,
Professional field 3.2. Psychology

about the scientific works for participation in a competition for the academic position of
professor in the field of higher education 3. Social, economic and legal sciences,
Professional field 3.2. Psychology,
announced in State journal No. 51/18.06.2021
with the candidate Assoc. prof. Maurice Avram Grinberg, PhD

I. Assessment of compliance with the minimal national requirements and the requirements of New Bulgarian University

The information provided shows that the candidate meets the minimal national requirements and the requirements of the New Bulgarian University. It should be noted that the candidate has a lot more number of points in some groups of indicators.

II. Research (creative) activities and results

For his participation in the competition assoc. prof. Maurice Grinberg has submitted 70 publications. Among them is the monograph "Social Dilemmas. Cognitive perspective", defined as habilitation work; a PhD thesis; 28 papers and publications in scientific publications, referenced and indexed in renowned international databases for scientific information; 32 papers and publications in unreferenced journals with scientific reviews or published in edited collective volumes; 4 longer papers published in scientific publications, referenced and indexed in international databases of scientific information; 4 published chapters in a collective monograph. 60 of the publications are in English and 10 are in Bulgarian.

1. Assessment of the monograph, creative performances or other publications corresponding in volume and integrity to a monographic work, including an assessment of the author's scientific and applied scientific contributions.

In the monograph "Social Dilemmas: Cognitive Perspective" the main decision-making models for social dilemmas in several scientific fields, such as economics, experimental economics, social psychology, cognitive psychology, and cognitive science have been reviewed. The focus is on models based on reinforcement learning including cognitive aspects such as access to information, the process of judgement and comparison of alternatives, etc. In the context of cognitive science, the critically validated approaches over the past 50 years have been analyzed, attempting to explain such phenomena as cooperation based on the basic constructs and assumptions of Game Theory – preferences, payoffs and utility.

The book focuses on mixed-motives games – the Prisoner's Dilemma, Stag Hunt, Chicken, Leader etc; Dictator game; Ultimatum game; the Public Goods game, etc. It is in these games that the greatest difference was found between the prescriptions of game theory and the results of behavioral experiments. The prescriptions of normative Game Theory are in the direction of more individualistic and selfish choices, while participants in experiments often choose cooperation. Although cooperation is not recommended by Game Theory, empirical research has found that it can lead to a greater benefit than selfishness, but at the cost of risk of great loss.

The monograph is structured in four parts, afterword and two appendices.

The basics of Game Theory (von Neumann & Morgenstern, 1947) were introduced in Part I. This is the first attempt to formalize social interactions. The examination of mixed-motive games raises the question of the problems of Game Theory to prescribe unambiguous actions in them or, as in the case of the Prisoner Dilemma, these prescriptions do not lead to the best possible outcome for the participants in the interaction.

Part II introduces the models of social preferences and taking into account the interests of the other player. These models explain the cooperation in the games mentioned above, using concepts such as altruism, reputation building and reciprocity. Another feature of them is that they work with complex social psychological constructs that are formalized by expressing utility through the player's and other players' payoffs.

In Part III and Part IV, cognitive models for decision making in the Prisoner's Dilemma are considered such as the well-known models of Macy and Flache, Roth and Erev, and the model EWAM of Camerer et al. These models show that people's behavior in mixed-motive games can be explained on the basis of reinforcement learning, cooperation level and other mechanisms. In Part III, the author presents three models he had developed to take into account various cognitive aspects, such as reinforcement and dependence of the choice on the presented game. These are the CSRL and SARL models. They allow to describe without a special mechanism the dependence of cooperation on the so-called "cooperation index" which has been supported by many experiments. The SARL model is an innovative decision-making model that includes a simplified mechanism for simulating eye fixations and sequential game perception. The model, called Model-A, is based on a recurrent neural network that includes a combination of Elman's Simple Recurrent Network and an autoassociator. The model uses reinforcement learning and simulates future games for determining the best strategy. This model is innovative in the field of experimental economics and has been successfully used in other games by other authors (Fernandez Domingos, Burguillo, & Lenaerts, 2017). The models proposed by assoc. prof. Grinberg show good agreement with the experimental results and show that the inclusion of specific cognitive mechanisms such as selective attention and learning are important in the decision-making process.

The monograph is based on 18 publications with the main participation of the author in the creation of the models in them. Many of these publications are conference papers, which are published in the book in an extended form. The generalized formalism associated with the effects of Simpson's paradox is published for the first time. All these publications are united by the idea of a cognitive approach when examining decision-making in experimental economics. The cognitive approach is based on the idea of using complex cognitive models in agent-based simulations modeling social interactions. In general, the monograph contains original scientific contributions to the theories examined and can be given the highest rating.

2. Evaluation of contributions in the other included publications (creative performances) made after the appointment on the academic position "Associate Professor". It shall also include an assessment of the requirement of the publications to be reviewed.

In the contribution report given by assoc. prof. Maurice Grinberg, the main contributions of the publications are divided into three main areas.

I. Cognitive architectures have been developed to describe higher cognitive processes (analogy) and their application for artificial cognitive agents in Internet.

1. A new cognitive architecture called TRIPLE has been proposed, which combines symbolic and connectionist modules as well as a module taking into account the modulating role of emotions. The architecture is inspired by the AMBR/DUAL cognitive architecture but includes a different, more flexible mechanism for establishing correspondences between a target situation (perceived by the model) and the content of long-term memory and a module taking into account the role of emotions. The new mechanism replaces the mechanisms of "marker passing" and for structural correspondence used in the AMBR/DUAL cognitive architecture (Kokinov & Petrov), which are not cognitively realistic, with a single mechanism based on activation and similarity.

2. New mechanisms for describing reasoning by analogy in the cognitive architecture AMBR/DUAL (Kokinov & Petrov) have been developed. One of the contributions is the creation of an AMBR/DUAL model that allows a description of the so-called "blending" of episodes retrieved from memory when making an analogy. The effects of blending have been confirmed experimentally. A memory extraction mechanism (additional transfer) based on mechanisms like those associated with making an analogy has been proposed, which expand the capabilities of the AMBR/DUAL cognitive architecture to describe different cognitive processes. This mechanism allows the architecture to describe the process of response generation to a question, enriching the initial question with types of information that are derived based on elements similar to those in the question. Question enrichment and additional memory transfer are a new mechanism that greatly enhances AMBR/DUAL's capabilities for more realistic behavior and the ability to integrate into multi-agent applied systems.

3. Anticipatory mechanisms based on analogy in AMBR/DUAL cognitive architecture and their application in cognitive robotics have been developed and implemented. Mechanisms have been developed that allow decisions to be taken for actions based on expectations derived from only one situation in long-term memory. The developed model was used with an AIBO robot (Sony).

II. Models of decision-making with reinforcement learning in experimental economics

The main part of the contributions of the publications in this section are in the field of experimental economics. They include the development of models and conducting behavioral experiments. Several models of players in mixed-motive (2x2) games are created, aimed at various cognitive aspects, such as access to available information and its use, learning and predicting the opponent's strategy, decision-making process, etc. The models are applied to the game "Prisoner's Dilemma" and are in good agreement with the results of the conducted experiments.

The same applies to the model which for the first time explores the emergence of sustainable cooperation based on Simpson's paradox effects. Based on the positive results of the model, a common formalism is developed, describing a combination of two situations – cooperative and non-cooperative. The formalism makes it possible to estimate the existence of zones of sustainable cooperation based on the effects of Simpson's paradox. The results of the simulations are presented in the monograph "Social Dilemmas: Cognitive Perspective." under the assumption of equilibrium, in which all agents have the same strategy expressed by the probabilities of cooperation in both types of situations.

All of these models are examined in the monograph as part of a new approach that emphasizes the cognitive level of description using complex cognitive models validated by comparison with experimental results and used in agent-based modeling of social interactions.

III. Empirical research in the field of experimental economics

1. In a series of studies, experiments have been conducted examining decision-making in the Prisoner's Dilemma. For the first time, some of them used eye-tracking equipment in the Prisoner's Dilemma game to analyze players' attention and access to game-related information. The so-called "disjunction effect" has also been investigated (Shafir & Tversky).

2. The theory of relational models of Alan Fiske is implemented via Game Theory. For the first time, the theory of relational models is related to different games, which are constructed based on the Prisoner's Dilemma with different ways of distributing payoffs (which transforms them into other games) and explicitly assigning roles to players. The results show that setting a relational model changes the way of playing and the level of cooperation.

In Section 1 Evaluation of the monograph, I have examined in detail the scientific contributions in the field of empirical research in the experimental economics.

3. Citation by other authors

According to Scopus, 61 publications are cited in papers in English. This is a reliable indicator of the high scientific level of research described in these publications.

4. Evaluation of the results of participation in research and creative projects and application of the results in practice

Assoc. prof. Maurice Grinberg has participated in 10 international scientific or educational projects. He was a principal investigator in the projects EUROCOG, Mind RACES, WELKOM and RASCALLI. The results of these projects have received high ratings and have been applied in practice.

III. Teaching and teaching activities

Assoc. prof. Grinberg has always fulfilled the requirement for number of lectures taught. He has taught courses in English: lecture courses PSYE502, PSYE503, COGM004, COGM013, COGM015, COGM331, COGM207, PSYE211 and training courses COGM013, COGM022. What is more, most of his courses have been delivered through the Moodle-NBU e-learning system. In Moodle-NBU original materials are uploaded for the following courses: COGM004, COGM013, PSYB522, PSYB523. PSYB522, PSYE502 and PSYE503.

He has provided opportunities for student practices and internships as director of the usability of products and services lab „HiLab“. for the bachelor program in Psychology in Bulgarian and English and the master program in Cognitive Science. Practice 1: Participation in experiments – Part I – PSYB626 and Part II - PSYB636; Practice 2: Empirical Research Part II; Internship-related courses. In the internships provided in the usability lab „HiLab" several theses have been completed: PhD theses – 1, Master theses – 1, BS theses – 5, empirical research works – 10, internships – 10.

Assoc. prof. Grinberg constantly works with students outside of the lecture courses. He was the supervisor of 3 PhD students who had successfully defended their doctoral theses. He was

also a supervisor of 9 graduates who successfully defended their theses. He participated in more than 30 committees for state exams.

IV. Administrative and public activity

1. Participation in collective management bodies of NBU

Assoc. prof. Maurice Grinberg has an active administrative and public activity involvement. He was:

- 1) Director of MS Cognitive Science Program (2000-2001);
- 2) Director of the Bachelor Program for outstanding students (2007-2010);
- 3) Vice rector for Quality, Evaluation and Attestation (2006 –2010);
- 4) Director of the NBU Assessment Centre (2006–2010).

He also participated in the Accreditation Committee of the MS Faculty of NBU.

2. Public activity

Assoc. prof. Grinberg has regularly participated in the meetings of the Master faculty council since 2006 – until now and of the Academic council – 2006-2010.

V. Personal impressions of the applicant (if any)

We have known each other with assoc. prof. Maurice Grinberg for more than 15 years. He is a very cooperative colleague. He is always ready to help. He and I have discussed productively various experimental studies.

Conclusion

In conclusion, I can give the highest positive assessment of both the academic activities and the research work of assoc. prof. Maurice Grinberg. Based on the above-mentioned contributions and evaluations, I propose to the Academic Council of NBU assoc. prof. Maurice Avram Grinberg as eligible for the academic position of professor.

Date 17.09.2021

Signature:

/Prof. Dr. Encho Gerganov/