Max Wertheimer MINERVA Center for Cognitive Processes and Human Performance
Evaluation committee meeting
Haifa, March 6 2013

As requested by the Minerva Stiftung an external review committee was asked to evaluate the Max Wertheimer MINERVA Center for Cognitive Processes and Human Performance. This meeting took place in Haifa on March 6 2013. The committee was asked to evaluate the Center on five different criteria. Dependent on the outcome of this evaluation the Minerva Center would receive funding for either three years (in the case of an unfavorable evaluation) or another six years (after a favorable evaluation).

The evaluation committee consisted of
Prof. Jörg Rieskamp (University of Basel)
Prof. Brigitte Röder (University of Hamburg)
Prof. Jan Theeuwes (VU University Amsterdam)

The following sources were used for the evaluation:

- Scientific Report Feb 2013
- Fiscal Report 1/10/2011 - 30/9/2012
- Report of the Scientific Review (Nov 2003)
- Report of the Ninth Advisory Council Meeting Oct 2012
- Full CV of all PIs
- Impressions from the talks at University of Haifa
- Interviews with current and former students
- Extensive discussions with the PI (Prof. Ido Erev, Prof. Ruth Kimchi, Dr. Morris Goldsmith, Prof. Daniel Gopher, Prof. Asher Koriat, Prof. Joel Norman, Prof. Eldad Yechiam, Dr. Yaffa Yeshurun)
- Additional information on recent publications and projects (not yet included in the Center's report).

Based on these sources, the committee made the following observations regarding the 5 criteria.

1. Scientific excellence

The Max-Wertheimer Center of Cognitive Processes and Human Performance is a scientific center investigating cognitive processes and human factors. It consists of members of two universities: the University of Haifa and the Technion. Research of the members of the Psychology Department of the University of Haifa mainly focuses on attention, perception, and meta-cognition, investigating the underlying basic processes. The researchers of the Technion are involved in basic research on human decision-making, as well as theory-guided human factors research.

During the meeting the PIs of the Minerva Center presented most recent developments of their research: In the morning there were talks by the researchers of the University of Haifa. Prof. Asher Koriat gave a talk about metacognition and Feeling-of-Knowing. Prof. Ruth Kimchi (the current co-director of the Center) gave a talk via Skype on perceptual organization and the role of attention. Prof. Morris Goldsmith talked about metacognition and its role in real-life memory tasks such as eye witness memory. Prof. Yaffa Yeshurun gave a talk about transient attention and the role of the parvo and magno cellular mechanism. In the afternoon there were talks from the researchers of the

Technion. Prof. Daniel Gopher talked about training cognitive skills and the concept of task shells; Prof. Ido Erev (the current co-director of the Center) gave a talk about decisions from experience. Finally, Prof. Eldad Yechiam talked about the effects of punishment and reward on decision making.

The research members of the center presented excellent and outstanding research. All researchers spoke with great enthusiasm and passion. They not only talked about the basic fundamental implications of their research but also indicated possible applications. The overarching impression was that each study was strongly rooted in a theoretical framework. From this framework several predictions were made. All researchers publish their findings in the major tier-one journals, which all have a strong theoretical footing in cognitive psychology such as *Psychological Review, Psychological Bulletin, Journal of Experimental Psychology: General; Journal of Experimental Psychology: Human Perception and Performance*. In addition, the publication in 2012 in *Science* of Prof. Koriat's study indicates the international interest and the broader scope of the research of the Minerva Center. The Minerva group as a whole represents the strongest group of researchers in Israel working on cognitive processes and human performance. It was clear that there was a lot of cross-fertilization between the researchers within the departments and between the Technion and the University of Haifa. The scientific excellence is also evident by the fact that the decision making group of the Technion (Prof. Erev) was recently chosen as one of Israeli's centers of excellence. Both the Technion and the University of Haifa have received prestigious grants including an ERC advanced grant, and grants from the GIF, Israel Science Foundation, Israel National Institute for Psychobiology, Israel Anti-Drug Authorities, and Foundation of Insurance Matters. The research of the Minerva Center is mainly behavioral, strongly rooted in classic psychological research and theories. The scientists have chosen to focus on behavioral experiments, though they currently employ human electrophysiology as well. However, the Minerva Center decided against a move towards brain-imaging research as currently seen in many other centers and universities. The evaluation group judges their decision against the mainstream and the concentration on strong cognitive psychological research as a wise decision to remain internationally competitive and leading in their field.

In sum, the Minerva Center in Haifa scores high in all scientific indices: Publications, both number and quality, third party funding and international standing. The institute belongs internationally to the forefront of cognitive psychology and human factors.

The funding provided by Minerva has been instrumental for the success of the Center. Often the Minerva funding has been used as seed money to start up pilot projects that ultimately resulted in a full-fledged project funded by other external bodies. Thus, the funding of the Minerva Center has a snowball effect for the group of obtaining additional third-party research grants. The flexibility that the Minerva funding allowed was crucial. Students were allowed to work out their ideas, often resulting in experiments and starting new lines of research. According to the PIs, the continuous and flexible allocation of Minerva funding to new and promising (student) projects has been a vital instrument in the success of the research endeavors. Some of the students supported in this way became successful scientists such as some of the recent PI.

2. Cooperation with Germany

The Minerva Center has active ongoing research cooperation with several centers in Germany. For instance, the co-director Ido Erev has a major ongoing research project with the Center for Adaptive Rationality at the Max Planck Institute for Human Development in Berlin (Prof. Hertwig). Likewise, Eldad Yechiam has an ongoing research project on decision making under risk with researchers (e.g Prof. Glöckner) from the Max Planck Institute for Research on Collective Goods in Bonn. Prof. Gopher and Prof. Yechiam have been partners of the EU 6 Research Project Skills where Prof. Gopher served as the scientific chair. This research led to intensive collaboration with the two German partners of the consortium: Fraunhofer Institute (IGD) in Darmstadt led by Prof. Uli Bockholt, and the DLR

Institute for Robotik and Mechatronik in Wesseling, led by Prof. Carsten Freusche. Prof. Koriat, Dr. Ackerman, Prof. Dr. Wolfgang Schneider (University of Würzburg), and Dr. Kathrin Lockl (Otto-Friedrich-University of Bamberg) have an ongoing research project funded by the GIF on Metagognitive control. Prof. Goldsmith has ongoing collabortations with Prof. Dr. Wolfgang Schneider, Prof. Dr. Herbert Bless (University of Mannheim), Prof. Dr. Edgar Erdfelder (University of Mannheim), Prof. Dr. Klaus Fiedler (University of Heidelberg), and Prof. Dr. Fritz Strack (University of Würzburg). Dr. Yeshurun collaborates with Dr. Elisabeth Hein from the University of Tübingen, exploring attentional effects on motion perception. Dr. Yeshurun is also currently a fellow of the ZiF research group (Bielefeld). These examples, highlighting only a subset of collaborations to Germany, demonstrate the strong connection that the members of the Minerva Center have build up to serveral institutions and researchers in Germany. The success of these scientific projects is evidenced by the large number of common publications.

3. Support of young talented students

The committee had discussions with current and former Ph.D. and Master students associated with the Minerva Center. The committee was impressed by the open and cooperative spirit among the students, which provides a very motivating and stimulating atmosphere for research. It was also clear that the senior researchers of both the University of Haifa and the Technion invested a lot of effort in educating and promoting young scientists. The Minerva funding was used for additional support of Ph.D. scholarships, mainly at the University of Haifa as this university had a less generous structure in place for Ph.D. funding than the Technion. In addition, the funding of Minerva was used to enable students to visit conferences and universities in Germany, which often resulted in enduring collaborations (one of the former Ph.D. students who is now a assistant professor at a nearby college remarked “the Minerva funding made my career”). The funding through Minerva is often used to start up pilot projects typically based on ideas that were generated by the students. The opportunity to run their own experiments was seen as one of the biggest advantages of this funding. The flexibility with which this money could be applied and the lab space offered by the Minerva Center were crucial for the success of student research projects. First studies often resulted in larger projects, often leading to grant applications. In this sense the Minerva funding is truly seed money. As a byproduct and through the reputation of Minerva in Israel both the Technion and the University of Haifa have been able to attract the best students of the country.

4. Collaboration within Israel

The psychology department of the University of Haifa and the Technion have been successfully working together since the foundation of the Minerva Center. This cooperation has developed scientists educated in both basic cognitive psychology and translational aspects of this research, including applied research (see future aspects). The fact that the Minerva Center made possible the cooperation between these two science institutes in Haifa, is a success and now opens further options (see future).

The researchers of the Minerva Center have a long list of cooperation with other institutions within Israel. Among the several project the ICORE research grant that Prof. Erev and Prof. Yechiam got with 8 researchers in the Hebrew University (led by Prof. Ilana Ritov) should be mentioned. Prof. Gopher has an long and ongoing cooperation with Prof. Yoel Donchin, Hadassah Hospital and Hebrew University. Prof. Yechiam works with Dr. Itzhak Aharon - IDC, Prof. Hilik Levkovitch and Dr. Ziv Carmel - Tel Aviv University and Shalvata Hospital. Prof. Koriat is collaborating with Prof. Yadin Dudai and Micah Edelson in a project on the brain correlates of metacognitive judgments and their accuracy.

Prof. Kimchi collaborates with Dr. Galia Avidan, Ben Gurion University. Prof. Goldsmith collaborates with Prof. Reuven Dar, Tel-Aviv University, Dr. Ainat Pansky, and Prof. Danny Koren, University of Haifa. In sum, the members of the Minerva Center have several research project that stimulate cooperations within Israel. This list illustrate that the members of the Center are well-connected within Israel to several institutions and universities and shows the strong impact of the Minerva Center.

5. Future

The Minerva Center will follow a theory-driven approach for investigating basic human cognition and examine its consequences for applied human factor settings. The Center will focus on the following four research areas:

(1) Metacognition
(2) Visual perception, processing
(3) Judgment and decision making
(4) Skill acquisition

The mixed-age structure of the Center and initiated employment of two new researchers provides a solid foundation for continuing the research with the same success as in the past years. Moreover, the University of Haifa and the Technion have currently established a joint program for educating young scientists. This is a highly promising development because the students will acquire a unique combined education in cognitive psychology and human factors (that is, in basic and applied research) that will open up for them a future both in academia and in the private sector.

Final Recommendations

We highly recommend funding this excellent and unique Center for six years. We expect both the University of Haifa and the Technion to supplement the group with sufficient research space and basic equipment such as personal computers. Sufficient research space and equipment appears crucial to support the research of the young scientist and Ph.D. candidates. We recommend organizing collaborative meetings between Ph.D. students of the University of Haifa and the Technion to present and discuss their research. We very much hope that at the end of the next six-year funding period that a joint program between both science institutes will be established that would allow them to further develop research in cognitive psychology and human factors.