V POLISH EYE TRACKING CONFERENCE

21st-23rd April 2017

The John Paul II Catholic University of Lublin

CONFERENCE'S GUIDEBOOK

"On behalf of the Lublin Organizing Committee, I would like to invite you to participate in inspiring lectures and discussions taking place in the one and only Lublin – the city of inspirations."

Prof. Piotr Francuz,

The John Paul II Catholic University of Lublin

"The Polish Conference on Eye Tracking each year provides us with a magnificent intellectual feast.

I am glad that we can again organise the conference together. This year, due to its international character, the event creates for us an opportunity to present our achievements to the international eye tracking community."

Prof. Sambor Grucza, University of Warsaw

"The Polish Eye Tracking Conference is a great opportunity to meet the best researchers and practitioners from various disciplines that utilize eye tracking technology. It is also a chance to network and to discuss potential common projects, often of interdisciplinary character. Additionally, the series of workshops and methodological sessions available during the Conference, allow participants to further develop their oculography research competencies. Without hesitation, the Polish Eye Tracking Conference is a mandatory event for all people who are already using the eye tracking technology and those who are pondering its use."

dr Krzysztof Krejtz, Eye Tracking Research Center, Warsaw Faculty of Psychology, University of Social Sciences and Humanities and Laboratory of Interactive Technologies, National Information Processing Institute

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Introduction to Fifth Polish Eye Tracking Conference

Dear Sir or Madame,

Five years have passed since the first Polish Eye Tracking Conference, which took place in 2012 at the John Paul II Catholic University of Lublin. This year we will have an opportunity to meet in Lublin again to celebrate the first jubilee of the Conference. Much has changed since then. We have noticed that the interest the Conference arouses among researchers has been constantly growing. More and more universities as well as commercial laboratories are equipped with eye trackers. The circle of people who have discerned the potential of eye tracking for solving problems concerning vision through eye-movement analysis has widened considerably. The National Science Centre and other institutions financing science each year spend more and more money for research grants using eye tracking as a method for gathering valuable and reliable data concerning a broadening spectrum of various aspects of human life. Today we know much more about the capabilities and limitations of the eye movement recording technology.

Since the first meeting eminent Polish eye-tracking researchers, with Professor Jan Ober (Institute of Biocybernetics and Biomedical Engineering at the Polish Academy of Sciences in Poznań) at the forefront, have participated in the Conference. During the next editions of the Conference we had the opportunity to attend their lectures and meet the doyens of world's eye tracking, such as Professor Andrew T. Duchowski from School of Computing (Clemson University, USA), or Halszka Jarodzka PhD from Teaching and Technology (Open University of the Netherlands). Among the participants were also numerous young science adepts, fascinated with the opportunity to see how people analyse visual scenes using their sight.

This year we decided to considerably broaden the format of the Conference and make it an international scientific event. The invitations for giving plenary lectures were accepted not only by Jan Ober, Andrew Duchowski and Halszka Jarodzka, but also by Kenneth Holmqvist, who is the co-author of the first and so far the most extensive eye-tracking handbook. The applications for talks and posters at the Conference were sent not only from Poland, but also from numerous European as well as non-European countries.

We hope that, as in the previous years, this year's edition of the Conference will provide us with numerous chances for interesting discussions, establishing personal relationships and acquiring new eye-tracking competences. We wish that sincerely for all the participants.

The Organisers

The keynote speakers of the 5th Polish Eye Tracking Conference

We have an honor to announce that the keynote speakers of the 5th Polish Eye Tracking Conference are ones of the world's famous researchers on eye tracking:

- **Andrew T. Duchowski** - a Professor of Computer Science at Clemson University, United States of America

- **Kenneth Holmqvist** - a Professor in Psychology, Sweden

- **Halszka Jarodzka** - an Assistant Professor at the Welten Institute-Research Centre of Learning, Teaching and Technology of the Open University of the Netherlands, Heerlen, Netherlands

- **Jan Ober** - a Professor at The Institute of Biocybernetics and Biomedical Engineering Polish Academy of Sciences, Poland

Organizers:

Neuro Device Group

Neuro Device Group was founded in 2008. We were the first company in Poland specializing in design, building and equipping laboratories and we keep growing in knowledge and experience ever since. We manufacture our own devices and custom-made solutions for our clients. We are also a licensed reseller of eye tracking and medical devices of the world's best manufacturers such as NordicNeuro Lab (NNL), SensoMotoric Instruments (SMI), BIOPAC and g.tec.

Merging business with science

Our team is our strength. Neuro Device Group is a group of scientists full of passion supported by experienced engineers. We are everyday users the devices and methods we offer, which guarantees high standards of service. We have the right attitude and easily find a common language with customers.

We can support you when:

- you are planning a purchase of such devices
- you want to equip a research laboratory
- you want to equip a usability or neuromarketing laboratory
- you are a professional, looking for devices for your medical facility
- you need consulting in aforelisted areas
- you need medical device, which has not been made yet – our engineers will design it for you

Exclusive distributor:

We are an exclusive distributor of NNL, BIOPAC, g.tec and SMI in Poland. Consequently, we can offer best prices, the widest range of products and the newest solutions. We also provide comprehensive device servicing, technical trainings and workshops for offered products.

We are keen to help with the projects utilizing functional magnetic resonance imaging - fMRI, eye tracking (oculography), cognitive psychology and neuropsychology research. Do not hesitate to contact us – we will do our best to help with finding a satisfying solution!

The John Paul II Catholic University of Lublin

A fundamental mission of the University, as it is stated in more detail in its Statute, involves "conducting research in the spirit of harmony between science and faith, along with teaching and educating Catholic intelligentsia as well as co-creating Christian culture." Reference to God encoded in the mission of a Catholic university makes it a special community of professors and students, universitas magistrorum et scholarium, united by the same love of wisdom. What they have in common is the joy of seeking the truth in all fields of knowledge, its discovery and its faithful propagation. The University embraces such features as: a certain legal system, an institutional connection with Church and Its teaching, scientific penetration of such areas as faith, religion, philosophy, Church, ethics, Catholic social science, the science of family, and the humanities in their deepest and broadest version.

We are an open university, because within its walls there is also a place for representatives of other religions and for those at the stage of searching for God. The existence of a Catholic university is indispensable for the development of Christian thought, which, as a matter of fact, helps a human being to fulfill his/her sense of life. A high educational level of the University, which is an achievement of many generations of professors and students, research done at the highest level, combined with the education of the young with regard to moral values, are the priorities of our University.

Relations between science and faith, Christian values and ethics as well as shaping young characters and attitudes are in the scope of the activities of KUL. The memory of our Patron requires from us a constant reflection upon John Paul II's legacy and teaching.

Department of Experimental Psychology and Cognition & Perception Lab

We represent the Department of Experimental Psychology and Cognition & Perception Lab (http://www.kul.pl/home,22777.html), where we conduct research on neural correlates of perception, imagery, memory and attention. We accomplished several research projects funded by, *inter alia*, National Science Center, National Centre for Research and Development, Ministry of Science and Higher Education, Ministry of Health. Their results have been published in JCR journals and presented on international conferences.

Our lab equipment includes the following devices: EEG (EGI and Brain Products), ET (SMI), physiology (BIOPAC), Vienna Test System. The eyetracking research in our lab focuses on mental rotations (Francuz, 2010; Bałaj & Francuz, 2012), perception of aesthetic stimuli (Francuz, 2013; Francuz & Augustynowicz, 2016; Szubielska at al., 2012), isolated dysorthography (Francuz & Borkowska, 2012, 2013; Francuz et al. 2013), change blindness (Fudali-Czyż et al., 2014) and spatial disorientation (Bałaj et al., 2016; Lewkowicz et al., 2015).

The head of our lab, prof. Piotr Francuz, is the author of, *inter alia*, a frequently awarded book: 'Imagia: towards neurocognitive theory of image' (2013). It was his initiative to conduct extensive research on art perception, including determinants of aesthetic judgments (NSC grant) and determinants of harmony in paintings (in cooperation with Museum of King Jan III Sobieski's Palace in Wilanow and PZL Agency in Warsaw).

University of Warsaw (UW)

The University of Warsaw, the largest institution of higher education in Poland, is the country's leader in teaching and research.

In November 2016 the UW celebrated the 200th anniversary of the establishment of the University of Warsaw.

The University of Warsaw is among the top two percent of the world's best universities. According to international rankings, it also is the best university in Poland and one of the leading ones in this region of Europe.

Approximately 51,500 people study at the University of Warsaw every year. The candidates are offered a very broad range of courses in the fields of humanities, social sciences and natural sciences, as well as many interdisciplinary courses combining knowledge and skills of many disciplines. In addition to the 21 faculties, the University of Warsaw has 30 academic units. Their diversity reflects the University's multiple internal aspects and the many functions it performs, while also showing UW's wide range of research and study areas.

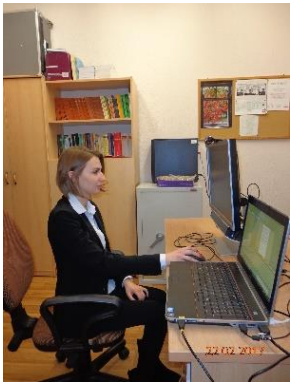
The University's historical Main Campus, located in the very heart of Warsaw, is renowned for its splendid architecture. Its imposing buildings, some going back to the 17th century, are one of the city's main tourist attractions. The opening of the nearby University Library building, which took place at the very end of the millennium, marked a new chapter in the history of the University's architecture. New buildings, completed in the following years, are modern, functional and moreover architecturally interesting.

Laboratory of Experimental Eye Tracking Linguistics (LELO)

The Laboratory of Experimental Eye Tracking Linguistics (LELO) is part of the Institute of Specialised and Intercultural Communication of the University of Warsaw. The Lab was founded in 2012. Prof. Sambor Grucza is its Research Supervisor and dr hab. Monika Płużyczka is Head of the Laboratory.

The primary task of LELO was to initiate in Poland and conduct research in the field of experimental eye tracking linguistics, especially translation studies-oriented experimental research, as well as experimental glottodidactic research, leading to broadening its exploratory boundaries. The team co-organised two International Conferences on Eye Tracking and Applied Linguistics (ICEAL – Warsaw 2014, 2015) and is a co-organiser of Polish Eye Tracking Conferences (PKE – Warsaw 2013, 2015, 2016, 2017).

The team is now conducting research projects concerning sight translation, written translation, reception of business e-mails, perception and comprehension of legal texts, eye tracking corpus and usability of websites from the linguistic perspective. The main focus of interest for eye tracking research are individual speakers-hearers, as well as their linguistic properties and mental processes that occur in their brains.



SWPS University of Social Sciences and Humanities (SWPS University)

SWPS University of Social Sciences and Humanities (SWPS University) is a private university in Poland affiliated with the Nencki Institute of Experimental Biology and the Institute of Psychology, Polish Academy of Sciences. SWPS University was founded in 1996 by Andrzej Eliasz, Zbigniew Pietrasiński and Janusz Reykowski. SWPS University is one of the largest private universities in Poland and offers several undergraduate and graduate programs
in English and over 30 undergraduate, graduate, and doctoral study programs, with over 70 specializations, in Polish. The University has been ranked by the Ministry of Science and Higher Education as the leading higher education institution offering Social Sciences programs, in Poland.

Seven faculties of SWPS University have the authority to grant doctoral degrees in the following disciplines: cultural studies, literature studies, law, and sociology (in Warsaw) as well as psychology (in Warsaw, Wrocław and Sopot). The university also has the authority to grant post-doctoral degrees (habilitacja) in cultural studies (Warsaw) and psychology (Warsaw and Wrocław).

Eyetracking Research Center

Eyetracking Research Center at the University of Social Sciences and Humanities was created in 2014. Since the beginning, OBO was created in close cooperation with Eye-Tracking Laboratory in Clemson University, USA, which is one of the worlds' leading eyetracking research centers.

The cooperation is based on exchange of research experiences, educational programs, and programming solutions for collecting and analyzing eyetracking data.

SWPS University Eyetracking Research Center is equipped with 12 high quality video eyetrackers and experimental mobile eyetracker.

It allows to perform research both in laboratory conditions, as well as field research.

The work of Research Center focuses on applying eyetracking research to various psychological studies and also actively develop the eyetracking method itself.

Eyetracking Research Center also cooperates with commercial companies, conducting among others usability research.

Equipment and methodology of eyetracking research experience allows us to conduct a series of classes for students of all levels of education available at SWPS University in conditions not found in any other university in Poland.

The University of Turku

Turun yliopisto
University of Turku

The University of Turku (in Finnish Turun Yliopisto) was founded in 1920 as the first Finnish-language university in the world. To commemorate the 22,040 donors whose funds first helped to establish the university, UTU produces its own alcoholic drink called '22040', which is made from cloudberry, rowan and sea buckthorn. The University has 20,000 students and generates approximately 3,500 graduates and 180 news doctors every year. The University is the third biggest employer of Turku and its researchers are involved in the writing of about 5000 scientific publications per year. The university includes 7 faculties : Humanities, Mathematics & Natural sciences, Medicine, Law, Social Sciences, Education and Economics.

The main campus at Turku is complete with a cathedral, railway station, restaurants, libraries, bars, cafés, shops and more. Due to existence of other higher education institutes in the city, the total student population in Turku is around 40,000. The University Hill is at the heart of the campus. The main building, central square and surrounding buildings were designed by architect Aarne Ervi who was an important Finnish designer in the post-World War II period.

In the 2017 QS World University Rankings by Subject, in which 4,438 universities were ranked in 46 different disciplines, the University of Turku was successful in 12 disciplines, among them Education (151–200) and Psychology (251–300). According to vice-rector Kalle-Antti Suominen this shows that the University's international visibility and reputation are on a good level.

Courtyard area between the Faculty of Education located in the Educarium building and the Faculty of Social Sciences located in the Publicum building.

Campus area on the university hill.

Turku Eye-tracking Laboratories

Turku Eye-tracking Laboratories (Turku EyeLabs) is a community of researchers applying eye-tracking in research on cognition and learning. The research covers various research topics from basic cognitive processes to higher-order cognition as well as research across domain boundaries. We also aim to support eye-tracking research by sharing know-how on designing experiments, use of equipment, and analytical tools.

Equipment in our lab includes SR Research eye-trackers (EyeLink 1000+, EyeLink 1000, EyeLink II, EyeLink Portable Duo) as well as Tobii eye-trackers (TX300, TobiiT60XL) as well as Mobile eye-trackers (Tobii Glasses, Dikablis Ergoneers Mobile Eye-Tracking System). Additional software being used includes Observer XT, E-Prime 2.0, Noldus FaceReader 6, AcqKnowledge, Matlab and BioPack.

Regular EyeLabs members are Johanna Kaakinen (discourse processing, emotions, embodied cognition, working memory), Jukka Hyönä (reading, visual perception and attention, working memory), Raymond Bertram (bilingualism, reading, visual perception, expertise development), Natalia Chitalkina (music reading), Timo Heikkilä (reading), Suvi Holm (gaming), Tuomo Häikiö (reading development), Aki Kyröläinen (semantics, big data, natural lannguage processing) , Henri Olkoniemi (discourse processing), Seppo Vainio (reading, bilingualism) & Marjaana Puurtinen (music reading, history, expertise)


Johanna Kaakinen


Raymond Bertram


Jukka Hyönä


Henri Olkoniemi


Seppo Vainio


Tuomo Häikiö

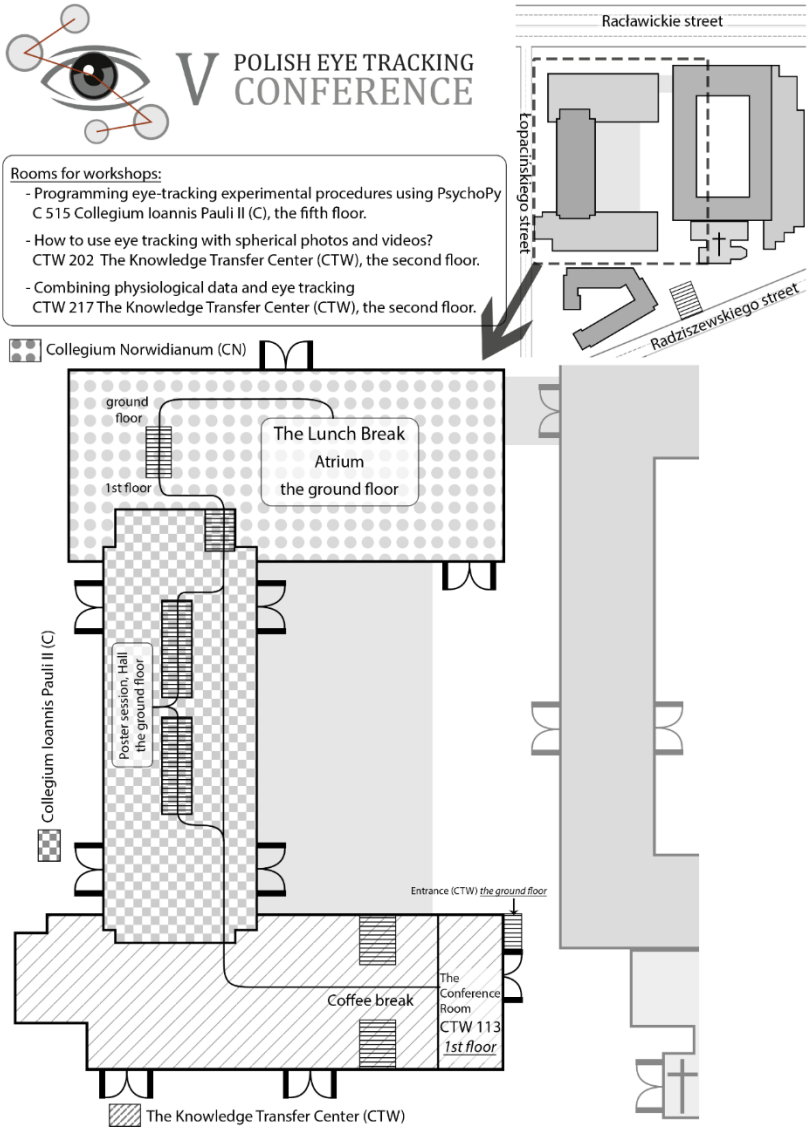

Aki Kyröläinen


Suvi Holm


Timo Heikkilä


Marjaana Puurtinen

Conference’s map:


V POLISH EYE TRACKING CONFERENCE
Rooms for workshops:
- Programming eye-tracking experimental procedures using PsychoPy C 515 Collegium Ioannis Pauli II (C), the fifth floor.
- How to use eye tracking with spherical photos and videos? CTW 202 The Knowledge Transfer Center (CTW), the second floor.
- Combining physiological data and eye tracking CTW 217 The Knowledge Transfer Center (CTW), the second floor.
Racławickie street
Kopernika street
Radziszewskiego street
Collegium Norwidianum (CN)
ground floor
1st floor
The Lunch Break
Atrium
the ground floor
Collegium Ioannis Pauli II (C)
Poster session, Hall the ground floor
Entrance (CTW) the ground floor
Coffee break
The Conference Room
CTW 113
1st floor
The Knowledge Transfer Center (CTW)

Program:

Friday, 21st April, 2017		
from 13:00	Registration	
16:00-16:10	Opening of the Conference	
16:10 -17:00	***Keynote speaker*** **prof. Kenneth Holmqvist:** **What eye-trackers are; types of instruments and their properties.**	
17:00 - 17:25	Agnieszka Nowik: The stages of planning functional grasps of tools in right- and left-handers – an eyetracking study.	COGNITION
17:25 – 17:50	Jukka Hyönä: Eye movements when tracking multiple moving objects.	
17:50 – 18:15	Piotr Dlugiewicz: Validity of the Index of Cognitive Activity, as a measure of cognitive effort – pilot study.	
18:15 – 18:40	Joe MacInnes: Comparison of temporal models for spatial cuing.	
18:40 – 19:05	**FORWARD SESSION**	
19:05 – 19.30	Welcome meeting „Eye on finger food” ATRIUM at The John Paul II Catholic University of Lublin	

Saturday, 22nd April, 2017		
From 8:00	Registration	
08:30 - 09:00	Welcome coffee	
09:00 - 09:10	Opening of the 2nd day of the Conference	
09:10 - 10:00	***Keynote speaker*** ***prof. Jan Ober:*** **Eye movements for problem solving.**	
10:00 - 10:25	Agnieszka Fudali-Czyż: Oculomotor parameters in analysis of eye-fixation related potentials (EFRP).	NEW TECHNOLOGIES
10:25 - 10:50	Michał Chwesiuk, Radosław Mantiuk: Do-It-Yourself High Frequency Eye Tracker.	
10:50 - 11:15	Jacek Matulewski: The developement of Gaze Interaction Markup Language (GIML).	
11:15 - 11:55	**FORWARD SESSION**	
11:55 - 13:10	Lunch break	
13:10 - 14:00	***Keynote speaker*** ***prof. Andrew Duchowski:*** **Eye Tracking Measurement of Cognitive Load.**	
14:00 - 14:25	Pawel Kasprowski: Gaze Self-Similarity Plots as a useful tool for eye movement analysis.	METHODOLOGY
14:25 - 14:50	Dominik Chząstowski-Wachtel, Marek Młodożeniec: Improving Gaze-Control in Games.	
14:50 – 15:15	Stanislav Popelka: ScanGraph - a tool for scanpath comparison using cliques of simple graphs.	
15:15 - 16:00	**FORWARD SESSION**	
16:00 - 16:35	**POSTER SESSION 1** / Coffee break	

Saturday, 22nd April, 2017		
16:35 - 17:00	Raymond Bertram: How expertise in radiology changes perceptual processes.	PERCEPTION / ATTENTION
17:00 - 17:25	Adrianna Liczbańska: Recognising faces in the crowd.	
17:25 - 17:50	Krzysztof Krejtz: Attention to human and animal faces – an eye tracking study among carnists, vegetarians and vegans.	
17:50 - 18:30	**FORWARD SESSION**	
20:30	Integration meeting at Mercure Lublin Centrum Hotel	

Sunday, 23rd April, 2017		
09:00 – 09:10	Opening of the 3rd day of the Conference	
09:10 - 10:00	**Keynote speaker :** **dr Halszka Jarodzka: Keeping an eye on the classroom:** **How eye tracking helps us to understand and to support teachers and pupil.**	
10:00 - 10:25	Katarzyna Harezlak: Chaotic behaviour of Eye Movement Signal.	GENERAL
10:25 - 10:50	Anastasiya Lopukhina: Eye movement control in the visual world paradigm.	
10:50 - 11:15	Marta Rusnak: Eye tracker as a research tool for studying architectural heritage.	
11:15 - 11:35	**POSTER SESSION 2** / Coffee break	
11:35 - 12:00	Anna Bonek: Perception of German administrative acts during translation proces.	LANGUAGE
12:00 - 12:25	Tuomo Häikiö: Syllables vs. morphemes in early reading of Finnish.	
12:25 - 12:50	Paweł Korpal, Katarzyna Stachowiak: On visual processing of numbers and its effect on the accuracy of simultaneous interpreting.	
12:50 - 13:15	Małgorzata Szupica-Pyrzanowska, Katarzyna Malesa: The influence of intense linguistic training in L2 and L3 on the sensitivity to errors in L1 – an eyetracking study.	
13:15 - 13.30	Closing the Conference	
	Lunch	

Abstracts:

Kenneth Holmqvist is a professor of psychology. Having a broad interest in eye-movement research and eye-trackers, he has worked with mental imagery, reading, distraction from ads, traffic research, air traffic control and many other applied areas. He is also the main author of the book 'Eye-tracking: a comprehensive guide to methods and measures' which will soon be out in its 2nd edition. In recent years, he has worked with methods, data quality and international teaching of eye-tracking methodology.

What eye-trackers are; types of instruments and their properties.

I will talk about the different methods that have been used to track human eye-movements. I will focus of the features of the eye(s) that they track, and their properties in terms of precision, accuracy, sampling frequency, latencies, temporal precision, and coordinate systems. I will also peek forward into the future and guess what eye-trackers we might see in 10 years time.

The stages of planning functional grasps of tools in right- and left-handers – an eye tracking study

Speaker: Agnieszka Nowik, specialist

Authors: Agnieszka Nowik*, Magdalena Reuter*, Grzegorz Króliczak*

Affiliations:

*** Institute of Psychology, Action & Cognition Laboratory, Adam Mickiewicz University in Poznan, Poland**

The perceived functional characteristics of tools, the so-called affordances, automatically "potentiate" relevant actions. Whether or not this is also the case for eye movements in the absence of overt tasks is debated. To test this idea directly, participants were asked to freely view tools or to watch these tools with a view to planning functional grasps enabling immediate use. We used SMI RED eye-tracker to study the temporal and spatial patterns of eye movements. The stimuli consisted of high-resolution pictures of workshop, kitchen, or garden tools presented at three viewing angles (0, 135, and 225 degrees) in foreshortened perspectives that emulate 3D viewing. Eye movements were analyzed within three time intervals 0-500ms, 500 -1000ms and 1000-1500ms. When tools were viewed freely, the fixations and gaze durations were distributed equally across different parts of these objects. On the other hand, when object functions were taken into account, the graspable parts were more extensively viewed. In other words, participants did not pay much attention to the execution-related parts when affordance discrimination was critical for task performance. These results support a tenet that even the visual exploration of tools is responsive to specific tasks (cf. Belardinelli et al. 2016), and therefore automatic action potentiation in the presence of tools is driven by factors that contribute to action guidance (Przybylski & Króliczak, 2017).

Eye movements when tracking multiple moving objects

Speaker: Jukka Hyönä, professor
Authors: Jukka Hyönä*, Jie Li, China Lauri Oksama*****

Affiliations:
*** University of Turku, Finland**
**** Beijing Sports University, China**
***** National Defense College, Finland**

The ability to track the whereabouts of moving objects is relevant in many real-life environments. For example, in football players need to dynamically update the locations of his/her teammates in relation to the players of the opponent team. In a recent study (Oksama & Hyönä, 2016), we simulated a dynamic tracking task on a computer monitor and tracked the observers' eye movements when they carried out the task. The results showed that in multiple identity tracking with distinct target identities, the observers refreshed the identity-location bindings by serially looking at the moving targets. Thus, the study suggests that foveal inspection of target identities is necessary for successful task performance. In a follow-up study, we tested whether this is indeed the case.
For that purpose, we used the gaze-contingent display change paradigm with four display change conditions: (a) normal viewing, (b) only the fixated target is present and the peripheral targets are masked, (c) only the non-fixated targets are present and the fixated target is masked, (d) all target identities are masked during movement. A total of 6 experiments was conducted with three different kinds of stimuli (faces, line drawings, and color patches) and two target set-sizes (3 and 4). The data on performance accuracy demonstrated that in tracking color patches foveally fixating the targets is not necessary. However, the availability of foveal inspection facilitated tracking moving faces. These results suggest that the ease with which target identities can be identified peripherally affect the degree of seriality in multiple identity tracking.

Validity of the Index of Cognitive Activity, as a measure of cognitive effort – pilot study

Speaker: Piotr Długiewicz, Chief Pilot/Human Factor Researcher
Author: Piotr Długiewicz*

Affiliation:
***Aero Poznan Human Lab, Poznan, Poland**

The Index of Cognitive Activity was proposed by Sandra Marshall, as an analytical development of pupillometric measures of cognitive effort. The purpose of this study was to initially verify its validity, based on selected cognitive tasks of known characteristics. Subjects were divided into two samples (N = 30) and (N = 29). Each of them performed three cognitive tasks, DAKT, VIGIL, easy version of DIVA and DAKT, VIGIL, difficult version of DIVA, respectively. While performing these tasks, the diameter of the pupil was measured, as a basis for the ICA value calculation. Using an ICA to assess the level of difficulty of tasks, it was determined that: difficult DIVA > (VIGIL = easy DIVA) > DAKT, which is broadly in line with the theoretical assumptions. Also there was no statistically significant correlation between ICA levels and task performance. The results suggest that the ICA can be a valid tool for cognitive effort measurement, however it has no direct relationship with performance in cognitive tasks, as several factors, such as individual differences influence outcome.

Comparison of temporal models for spatial cuing

Speaker: Joseph MacInnes, Assistant Professor
Author: Joseph MacInnes*

Affiliation:
***National Research University Higher School of Economics (HSE), Moscow, Russia**

Cuing a location in space produces a short lived advantage in reaction time to targets at that location and this is typically followed by a longer lasting disadvantage
in processing. Multiple models are presented for saccadic and manual reaction time for spatial cuing experiments with random CTOA and probe locations. First, diffusion models can generate accurate distributions of reaction time data by modelling a response as a build-up of evidence towards a response threshold (Ratcliffe, 2008).
An adapted diffusion model is presented which allows for spatiotemporal events to trigger changes in signal strength over time. Diffusion Models which allow temporal onsets have added potential to implement theories of attention which rely on sequential events and internal feedback mechanisms. Additionally, salience models of attention (Itti etal, 1998) demonstrate how low level features combine to produce shifts of attention in a scene and this model has also been adapted to work with traditional cuing tasks. Data from recent experiments are presented on the transition timing of facilitation and Inhibition of Return to test the advantages of both models.

Saturday, 22nd April, 2017

10:00

Prof. Extraord. Jan Ober, B.Eng. PhD, DSc – Oculomotor Activity Research Laboratory, Maciej Nałęcz Institute of Biocybernetics and Biomedical Engineering at the Polish Academy of Sciences.
Professor is one of the pioneers of eye tracking in Poland.

He received an MSc diploma in mechanical engineering in 1969 at the Leningrad Institute of Fine Mechanics and Optics (LITMO). Between 1980 and 2007 he organised and headed the Independent Rehabilitation Engineering and Biomechanics Laboratory, and since 2008 he has headed the Oculomotor Activity Research Laboratory at the Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, in Poznań.

Current research interests: visual functions, oculomotor activity, aviation safety, human factor research methods and apparatus, reading acquisition and dyslexia.

Eye movements for problem solving

I will talk about Poznan Laboratory over three decades adventure in developing eye movement measurement method in particular direct Infra Red oculography. We were motivated by the idea of utilising existing knowledge about eye movement control through exploring new applications areas for eye movement signal. We considered it as the most informative signal about CNS workings, which is objective and relatively easy to measure and process. Two approaches will be discussed the Cognitometrics, where the eye movements are used for monitoring attention processes and second the Saccadometry, giving the insight into the decision processes. Part of the talk will be about using eye movements for helping children with reading difficulties.

Oculomotor parameters in analysis of eye-fixation related potentials (EFRP)

Speaker: Agnieszka Fudali-Czyż, research and teaching assistant

Authors: Agnieszka Fudali-Czyż*, Piotr Francuz*, Paweł Augustynowicz*, Natalia Kopiś *

Affiliation:

*** Perception & Cognitionl Laboratory, Department of Experimental Psychology, The John Paul II Catholic University of Lublin, Lublin, Poland**

Eye Fixation-Related Potentials (EFRP) involves co-registration of EEG and eye movement data. Previous EFRP studies have shown that the saccades amplitude significantly affect the amplitude of EFRPs (averaged EEG epochs relative to fixation onset). Therefore, it is recommended to control the eye movements characteristics in simultaneous EEG-eye movement analysis. Furthermore, in several eyetracking studies parameters of linked saccades and fixations were considered as predictors of different modes of processing in free exploration of visual images: pairs of long saccades and short fixations (LS-SF) were related to the ambient processing with overall spatial orientation in a scene, whereas long fixations preciding by short saccades (SS-LF) were connected to focal processing with an object identification. Thus, it seems important to compare EFRPs between different experimental conditions, separately in different oculomotor contexts. We conducted EFRP study which involved 62 people, including 32 laypersons and 30 experts in paintings. The task was to evaluate 150 paintings as beautiful or not-beautiful after 15 seconds expositions. There were four oculomotor contexts: LS-SF („ambient"), SS-LF („focal") and long saccades and fixations (LS-LF), short saccades and fixations (SS-SF). We expected the biggest between- and within-subjects differences in the „focal" context (SS-LF). It occured that there were greater differences in EFRPs amplitude in the 160-230 ms time window between beautiful and not-beautiful judgements in a group of experts in comparison to layperson, but only in the LS-LF context. This study was supported by a grant from the Polish National Science Centre grant No. 2013/11/8/HS6/01816.

Do-It-Yourself High Frequency Eye Tracker

Speakers: Michał Chwesiuk, master student, Radosław Mantiuk, associate professor

Authors: Michał Chwesiuk*, Radosław Mantiuk*

Affiliations:
*** West Pomeranian University of Technology, Szczecin, Poland**

We present a tutorial how to build a high frequency do-it-yourself (HFDIY) eye tracker. Construction of our eye tracker is based on the typical infrared camera equipped with a custom reflector and a specialized tripod. The HFDIY eye tracker operates with the frequency close to 300 Hz and the system latency below 4 milliseconds. Such performance is achieved by using high framerate camera but also a software based on our custom pupil center detection algorithm. In this algorithm, called Cross Spread, the center of the pupil is searched by tracing horizontal and vertical rays in the recursive procedure. The technique is suitable for parallelization and locates the pupil center in less than 2 milliseconds using a typical GPU. We evaluate the accuracy of the HFDIY eye tracker by performing aperceptual experiment, in which people are asked to follow the reference marker. Comparing the known locations of the marker with the locations captured by the eye tracker, the accuracy of the eye tracker for average observer is estimated. In contrast to typical evaluation procedure, we also consider the moving markers making the experiment better reflecting the typical working conditions of the eye tracking.

The developement of Gaze Interaction Markup Language (GIML)

Speaker: Jacek Matulewski

Authors: Jacek Matulewski*/*, Iga Mościchowska****, Bibianna Bałaj**/***, Rafał Linowiecki*, Włodzisław Duch*/*****

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The GIML is a declarative language for writing gaze controlled application. It is simmilar to HTML, but our main inspiration was XAML. However GIML is not only designed for describing the GUI, but also the application dynamics. The essential elements of GIML will be discussed, as well as designing choices we've made and plans for its developing.

Dr. Andrew Duchowski is a professor of Computer Science at Clemson University. He received his baccalaureate (1990) from Simon Fraser University, Burnaby, Canada, and doctorate (1997) from Texas A&M University, College Station, TX, both in Computer Science. His research and teaching interests include visual attention and perception, eye tracking, computer vision, and computer graphics. He joined the School of Computing faculty at Clemson in January, 1998. He has produced a corpus of papers and a textbook related to eye tracking research, and has delivered courses and seminars on the subject at international conferences. He maintains Clemson's eye tracking laboratory, and teaches a regular course on eye tracking methodology attracting students from a variety of disciplines across campus.

Eye Tracking Measurement of Cognitive Load

In this talk I will compare and contrast a number of approaches to the measurement of cognitive load with an eye tracker. The first three are based on the manipulation of recorded pupil diameter. The fourth is based on the measurement of microsaccades. I will highlight two rather important pitfalls regarding pupil diameter measurement: sensitivity to luminance and off-axis distortion, and I will argue that microsaccadic measures are for the most part free from these limitations, however, their recording requires fast (> 300 Hz) sampling rates. Results from a high speed eye tracking study of task difficulty will be given to support the argument.

Gaze Self-Similarity Plots as a useful tool for eye movement analysis

Speaker: Pawel Kasprowski, Assistant Professor
Authors: Pawel Kasprowski *, Katarzyna Harezlak *

Affiliations:
*** Silesian University of Technology, Poland**

Eye tracking becomes more and more important way to analyze human behavior. However,
a proper analysis of data obtained from an eye tracker occurs to be a challenging task. Traditional visualization techniques like scan-paths or heat maps may reveal interesting information, however much of useful information is still not visible, especially when the temporal characteristics of eye movement is taken into account. This presentation introduces a technique called gaze self-similarity plot (GSSP) that may be applied to visualize both spatial and temporal eye movement features on one two dimensional plot. The technique is an extension of the idea of recurrence plots, commonly used in time series analysis. The presentation introduces the basic concepts of the proposed approach complemented with some examples explaining what kind of information may be revealed and areas of the GSSP applications.

Improving Gaze-Control in Games

Speakers: Dominik Chrząstowski-Wachtel, Junior Analyst and Marek Młodożeniec, Chief Research Specialist

Authors: Cezary Biele*, Dominik Chrząstowski-Wachtel*, Marek Młodożeniec*, Anna Niedzielska*, Jarosław Kowalski*, Paweł Kobyliński*, Krzysztof Krejtz*, Andrew T. Duchowski**

Affiliations:
***National Information Processing Institute (Ośrodek Przetwarzania Informacji - Państwowy Instytut Badawczy), Warsaw, Poland**
****** School of Computing, Clemson University, Clemson, South Carolina, USA**

There were numerous attempts to improve the precision and accuracy in gaze-controlled gaming, but most of them had unsatisfactory results. In the presented study we tested a novel approach to improving gaze control in gaming using Gaussian-based speed attenuation meant to control the speed of movement of the game character in relation to the user's gaze location. We hypothesized that such attenuation would lead to better gameplay both subjectively and objectively and that it would facilitate visual scanning. During conducted experiments we tested: performance (number of game goals reached), visual attention distribution (focusing on the game character vs visual scanning of the peripheries) and subjective ratings (i.e. enjoyment, difficulty, immersion) for the three different types of gaze control and traditional game controls (mouse, keyboard) during the simple arcade gameplay. Obtained results indicate that proposed novel method is effective for the control of the game. The game using Gaussian-based velocity attenuation function was easier to control (indicated by higher performance) than other tested gaze-controlled methods, and equally easy to control as standard versions with mouse and keyboard. Gauss-based velocity of the game promoted visual scanning (indicated as a ratio of fixations landing on the peripheral area of the screen) and was rated as equally immersive and engaging as other eye-tracking methods. Concluding, subjective evaluation, objective behavioral data, and analysis of visual attention distribution affirm that the design of the implemented attenuation function is effective.

ScanGraph - A tool for scanpath comparison using cliques of simple graphs

Speaker: Stanislav Popelka, head of eye-tracking laboratory
Authors: Stanislav Popelka*, Jitka Dolezalova *

Affiliations:
*** Palacký University Olomouc, Department of Geoinformatics, Czech Republic**

The contribution will introduce a new tool ScanGraph for scanpath comparison using visualisation of graph cliques. This tool will allow finding similarities between participants' process of presented stimuli observation. With information about their personal characteristics (age, sex, knowledge, etc.) it is possible to reveal if these groups are using a similar strategy. The application works with the output of open-source software OGAMA, where the user can create Areas of Interest. Fixations in these Areas of Interest are converted into character sequences, and these sequences are then compared to find participants with a similar strategy of stimuli inspection based on String Edit Distance method. The similarity between sequences is calculated using Levenshtein distance, Needleman-Wunsch algorithm or Damerau - Levenshtein distance. The output of the ScanGraph is a simple graph where participants are represented as vertices of this graph. Sequences/participants similar at the given level of similarity are connected by edges and form cliques of this graph. Cliques of the graph are sought using Bron - Kerbosch algorithm. The paper should aid researchers who would like to analyze the differences between groups of participants, and who would like to use our tool ScanGraph which is freely available at www.eyetracking.upol.cz/scangraph.

How expertise in radiology changes perceptual processes

Speaker: Raymond Bertram
Author: Raymond Bertram*

Affiliations:
***Department of Psychology University of Turku, Finland**

In medical fields like pathology and radiology, residents train to develop visual pattern recognition skills towards an expert level. Several studies have shown that this development is reflected in changes in eye movement behavior. An increasing level of expertise is associated with faster times to first fixation on abnormalities, less coverage of images, longer saccades, and shorter overall viewing times. These findings are accommodated by the global-focal model, according to which experts are involved in detailed inspection of the foveal area in parallel with global processing of the extrafoveal area. In the current experiment we aimed to establish potential markers of visual expertise in eye movement patterns of early (n=15) and advanced residents (n=14) and specialists (n=12) in interpreting computed tomography (CT) studies. To that end the residents and specialists viewed 26 abdominal CT studies as a sequence of images at either 3 or 5 frames per second, while eye movements were recorded. This study showed both similarities and differences in detection performance and eye movement behavior between expertise groups. For instance, all expertise groups frequently visited or came in the vicinity of the more obscure lesions; the more salient lesions were less fixated, yet they were detected more often. Interestingly, when fixating lesions, specialists did so more quickly than residents. The result pattern evidences that the development of larger knowledge structures and development of perceptual processes is gradual and that it requires a substantial amount of practice to reach the highest expertise level.

Recognising faces in the crowd

Speaker: Adriana Liczbańska, Milena Kucio
Authors: Adrianna Liczbańska*, Milena Kucio*

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*** Institute of Psychology, Adam Mickiewicz University in Poznan, Poland**

The aim of this paper was to establish whether there is a difference in speed of recognising different emotions. The survey was conducted in December 2016, the subjects were 4th year students of Cognitive Science at The University of Adam Mickiewicz in Poznan. There were 12 participants, 8 female and 4 male. Experiment was a part of students course Eye – tracking laboratory, supervised by dr Agnieszka Nowik. All data was collected in Action and Cognition Laboratory, the Department of Social Sciences, Institute of Psychology UAM. The experimenters used eye tracker and questionnaire, subject were supposed to answer the question "Which emotion is different from others?". As stimulus they used matrix that consisted of nine areas, each containing face, that expressed certain emotion. Faces used to design matrixes were acquired from: Cohn-Kanade Database FACS, which is an online accessible database. Main purpose was to answer the question: does the speed of recognising different emotions differ. Five emotions were tested: anger, sadness, surprise, happiness and neutral. The results show that there is a pattern in the way emotions are recognised. It turns out that both the position of emotion and the main emotion itself are significant in the process. Key words: eyetracking, emotion, recognising emotions.

Attention to human and animal faces – an eye tracking study among carnists, vegetarians and vegans

Speaker: Krzysztof Krejtz

Authors: Daria Michalska*, Daria Gorotiza*, Krzysztof Krejtz*, Izabela Krejtz*

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*** SWPS University of Social Sciences and Humanities, Warsaw, Poland**

Diet and attitudes toward meat eating may be important factors determining whether we look someone, human or animal, in the eye or the kisser to memorize the face. The present study investigated how carnists (49), vegetarians (37) and vegans (43) perceived human and animal faces. Participants performed IAT test, verifying their implicit attitudes towards animals, followed by a memory test of human and animal faces. While memorizing the pictures, participants' eye movements were recorded with a Gaze Point 3 eye tracker (60 Hz). We controlled also for empathy and carnistic attitudes. We analyzed dwell time on key features of face: eyes vs. mouth. In general, all participants fixated longer on eyes than on mouth, both for human and animal faces. However, this difference was significantly smaller when carnists examined animal faces. Similar attentional pattern was observed for participants with high IAT score. The results may suggest dehumanization of animals among carnists.

Halszka Jarodzka is an assistant professor at the Welten Institute—Research Centre of Learning, Teaching and Technology of the Open University of the Netherlands. There she is chair of the research group 'Processes of learning and expertise development in information-rich environments'. Furthermore, she is a visiting scholar at an eye tracking lab in Lund University, Sweden. Halszka holds a Masters degree in Psychology and a PhD from the Knowledge Media Research Center, both at the Eberhard Karls University of Tübingen, Germany. Her research focuses on the use of eye tracking in educational psychology. In particular, she is interested in characteristics and development of visual expertise in diverse professions, in processes underlying the instructional design of computer-based learning and testing environments, as well as the training of perceptual processes with eye movement modelling examples. Moreover, Halszka is coordinator and founder of the SIG 27 "Online measures of learning processes" of the European Association for Research on Learning and Instruction (EARLI).

Keeping an eye on the classroom: How eye tracking helps us to understand and to support teachers and pupils.

Eye tracking research in educational science has provided interesting insights into how learning works and how its instruction should be designed. Most of this research – just as most eye tracking research in general – had taken place in the laboratory. Educational practice, however, is very different from any laboratory setting. For instance, a classroom is composed of many students in contrast to lab studies with one participant only. Hence, the question is to which extent can we generalize findings from lab studies to the educational practice and where do we need to move on towards more field studies to capture its complexity? In my keynote, I would like to address this

Chaotic behavior of Eye Movement Signal

Speaker: Katarzyna Harezlak
Authors: Katarzyna Harezlak*, Pawel Kasprowski*

Affiliations:
*** Silesian University of Technology, Gliwice, Poland**

The majority of physical phenomena occurring in nature as the result of biological systems functioning are examples of nonlinear dynamic systems. The oculomotor system is one of their representatives and is responsible for controlling eyes' positions so that the gaze-image falls on the center of the fovea. As a result, in eye movement two main events may be selected – fixations and saccades. Additionally, within a fixation, other types of movement such as: tremors, microsaccades and drifts may be identified. The aim of the presented research was to reveal in these movements the existence of chaotic behaviour observable in many biological systems. The studies were conducted with the usage of a 'jumping point' experiment. For each of its participants the set of fixations related to different stimulus positions was defined based on the registered signal. These fixations were explored independently by means of methods for time series analysis. Time series were formed on horizontal and vertical eye movement velocity. Additionally, for the research purpose, fixation duration was divided into several segments within which chaotic behaviour was studied. The analysis of the obtained results revealed chaos existence in the first 200 ms of eye movement after a stimulus position change.
In the remaining of the analysed segments, dependent on the analysed participant and stimulus position, eye movement signal behaviour was changing from convergent to chaotic and conversely.

Eye movement control in the visual world paradigm

Speaker: Anastasiya Lopukhina

Authors: Anna Laurinavichyute*, Anastasiya Lopukhina**

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**** University of Potsdam Anastasiya Lopukhina Neurolinguistics Laboratory, National Research University Higher School of Economics (HSE); Russian Language Institute RAS**

Visual world studies demonstrated that linguistic cues influence saccadic movements: at hearing a word, listeners rapidly look at its referent (Tanenhaus et al., 1995; Huettig et al., 2011; Knoeferle, Guerra, 2016). At the same time, people are generally unaware of their eye movements and exhibit poor cognitive control in visual tasks (Foulsham, Kingstone, 2013; Clarke et al., 2016). To investigate to what extent linguistic input determines eye movements, we conducted a visual world experiment in two groups of participants: in the first, participants were instructed to listen to the story and were implicitly allowed free inspection of the visual scene, while in the second, they were asked not to look at "the picture that the narrator is speaking about". 40 Russian speakers took part in each experiment that consisted of the same 32 stories and corresponding visual displays. The probability of looking at the referent picture was greater in the free inspection group than in the eye movement control group (Est.=-2.55, SE=0.17, p=0.001). Additionally, we found that in the eye movement control group the probability of fixating an object referred to with a pronoun did not decrease as much as the probability of fixating an object referred to with a noun (Est.=-0.89, SE=0.28, p=0.01): participants were less able to control their eye movements when hearing a pronoun. We suggest that they are less aware of the indirect nomination processing, and therefore are less successful in suppressing it.

Eye tracker as a research tool for studying architectural heritage

Speaker: Marta Rusnak

Author: Marta Rusnak *

Affiliation:

*** Wroclaw University of Technology, Faculty of Architecture, Department of History of Architecture, Arts and Techniques, Poland**

In a posthumously published book Siatka Prostych professor Juliusz Żórawski suggests that when entering a gothic cathedral, every visitor applies an identical cognitive schema – first analyzes the rhythm of columns, then the regularity in distance between supporting ribs and the ribs opposite to them, and only after that looks up to comprehend the general layout of the cathedral. Nowadays, when it is commonly advocated to apply a strictly individual approach to both people and studied issues, such oversimplification appears not only false but perhaps also harmful. One may doubt whether the mechanism depicted by professor Żórawski applies equally to French, English, and Italian cathedrals, to the stone and the brick ones, to the high ones and the relatively low ones, the ones that are empty and the ones that are crammed with people, visited during a sunny morning or already after dusk. It seems possible that the opinion of professor Żórawski may be slightly too influenced by the perspective of a person fully aware of the logic that stands behind architectural design. But such subjective views can be expressed not only by architects and scholars of aesthetics, but also by conservation officers, whose decisions often prove crucial in cases of adaptation or extension of historic buildings for contemporary functions. Moreover, many other people may be involved in such a dialogue: urban development specialists, museologists, archeologists, politicians and experts in cultural sciences. The communication between all those different groups is often impaired exactly due to this subjective perspective, as it is extremely difficult to objectively assess how a given building is perceived by an average visitor. In my speech I would like to present a study that I undertook earlier this year and that makes use of an eye tracker. This device makes it possible to monitor and analyze what visitors pay attention to in a given space – what catches their eye, and for how long, and what remains neglected or overlooked. I would like to present the results of mu study, the conclusions, observed difficulties and various ideas for the continuation of applying eye trackers in architectural research. I intend to show that eye trackers may constitute a very useful and valuable conservation tool, especially helpful in historic research of urban arrangements, while revitalizing facades of historic buildings, adapting historic interiors, or designing museum layouts; I also believe that the obtained results may become an impulse leading to another look at some of the ideas held by conservation officers.

Perception of German administrative acts during translation process

Speaker: Anna Bonek
Author: Anna Bonek*

Affiliation:
*** University of Warsaw, Poland**

Objective: To investigate eye movements during the perception of parts of speech in the German administrative acts (source text) during the translation process. Materials and methods 15 students were asked to translate 3 German administrative acts into Polish. During translation, eye movements were analyzed using SMI RED 500 (60 Hz). Fixation duration, and fixation count in parts of speech were estimated. Parts of speech were established as variables: formatted nouns-terms, unformatted noun-terms, nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions and articles. In post-hoc questionnaire most of the students pointed formatted und unformatted nouns-terms as the most problematic in translation.
Results: Most of the students reported problems with translation of nouns/terms, both formated and unformatted. Fixation duration on nonformated nouns and nouns/terms was significantly higher than on formatted nouns/terms ($p<0,05$). Fixation count was found to be significantly higher on formatted nouns/terms than other parts of the speech ($p<0,05$). Noun-terms fixation counts were significantly higher in comparison to other parts of speech ($p<0,05$), except for nouns and adjectives ($p>0,05$).
Conclusion: Fixation count was useful in identifying translation problems while the fixation duration did not prove useful.

Syllables vs. morphemes in early reading of Finnish

Speaker: Tuomo Häikiö
Authors: Tuomo Häikiö*, Seppo Vainio*

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*** University of Turku, Finland**

Syllables are active processing units in reading for both children and adults (e.g., Ashby, 2010; Chetail, 2014; Hautala et al., 2012). To facilitate the use of syllables, syllable boundaries are signaled by hyphens (e.g., ta-lo, house) in early Finnish reading instruction. However, it has been shown that hyphenation is detrimental to reading speed (Häikiö et al., 2015, 2016). This is due to hyphenation dividing words into smaller units than preferred by the young readers. As readers become more skilled, they start utilizing larger units such as morphemes (e.g., Grainger & Ziegler, 2011). Since Finnish is an agglutinative language with rich morphology, it may be the case that morphemic structure is more important than syllable structure even for early readers. To assess this, 7-9-year-old Finnish children read sentences with embedded inflected target words while their eye movements were registered. The target words were presented either in essive or inessive/adessive (i.e., locative) case. Furthermore, the target words were either non-hyphenated, or had legal or illegal syllabic hyphenation. In Finnish, the syllable and morpheme boundaries overlap in the essive case but not in the locative case. This was utilized to disentangle syllables from morphemes; for locatives, illegal hyphenation was congruent with the morpheme boundary whereas for essives it was incongruent. In gaze duration, there was an interaction between hyphenation and case. Illegal hyphenation did not affect the locative case even though it slowed down reading the essives. We interpret this finding as early Finnish readers processing words via morphemes rather than syllables.

On visual processing of numbers and its effect on the accuracy of simultaneous interpreting

Speakers: Katarzyna Stachowiak, Paweł Korpal
Authors: Katarzyna Stachowiak*, Paweł Korpal**

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*** University of Warsaw, Poland**
**** Adam Mickiewicz University in Poznan, Poland**

Simultaneous interpreting is a challenging task, based on performing several activities concurrently (Seeber 2011). While multitasking itself is demanding, there are numerous tasks which make interpreting even more difficult, such as fast rendering of numbers and proper names, or dealing with a speaker's foreign accent (Gile 2009). Among these, number processing is particularly complex as it involves several cognitive mechanisms (Mazza 2001). What is more, a person rendering the number into another language needs to understand its magnitude, unit (e.g. centimetres, pounds, volts), as well as its context (Jones 2002). Our aim was to verify whether simultaneous interpreters, while listening to the source speech and speaking themselves, look at numbers displayed on slides. We also wanted to determine whether visual input in the form of numbers increased interpreting accuracy. We used an EyeLink 1000+ eye-tracker to examine 20 participants, including 10 interpreters and 10 interpreting trainees. The participants' task was to interpret two short speeches filled with numbers. Our results show that while all interpreters look at numbers on slides, novices are characterised by longer fixation time and higher fixation count. In addition, access to both visual and auditory input facilitates interpreting: we observed greater interpreting accuracy of numbers when the slides were present. We believe that the results might be a valuable contribution to studies on number processing, multimodal processing, eye tracking and interpreting.

The influence of intense linguistic training in L2 and L3 on the sensitivity to errors in L1 – an eyetracking study

Speakers: Małgorzata Szupica-Pyrzanowska, Katarzyna Malesa
Authors: Małgorzata Szupica-Pyrzanowska*, Katarzyna Malesa *

Affiliations:
*** Institute of Applied Linguistics, University of Warsaw, Poland**

The influence of one's mother tongue on non-native languages (NL -> NNL) has been thoroughly investigated in both online and off-line studies (Dussias, 2011; Kroll et al., 2011, Liszka, 2004, Roberts et al., 2008, Roberts & Liszka, 2008). However, the literature on the reverse pattern (NNL -> NL) is scarce. In our study we take the notion of language influence a step further and examine the relationship between an intense linguistic training in second and third languages (L2 and L3 respectively) and the sensitivity to errors in the native language (L1). The sentence stimuli included three error categories: lexical, phonetic, and inflectional. The experimental group (EG) consisted of senior B.A. students of applied linguistics while the two control groups included students of Polish philology (CG1) and students of Warsaw Institute of Technology (CG2). The comparison between the EG and CG1 was necessary to assure that the patterns observed in the experimental group were triggered by the linguistic training since unlike linguistics students, the students of Polish philology do not have an intense exposure to two non-native languages. In contrast, the comparison of the EG and the CG2 was needed to determine the extent to which students' sensitivity to the L1 errors derives from general language trends characteristic of young speakers of Polish. In order to assure group homogeneity, the participants were given a grammaticality judgment test in Polish. In the experiment, the participants were asked to silently read the sentences for comprehension at their natural pace. We used the SMI RED eye tracker with a good temporal resolution and a sampling rate of 250 Hz. Sums of fixation durations were averaged across participants. The results are discussed in the context of language acquisition theories.

Posters and FORWARD session

Title	Authors	POSTER's number	FORWARD SESSION TIME
Development of a Combined TMS/Eye-Tracking Study for Executive Process	Liubov Ardasheva, W. Joseph MacInnes, Matteo Feurra	1	1 Friday
Cognitive load caused by time pressure task	Joanna Kamińska, Roman-Liu D.	2	2 Friday
Combining EEG and eye tracking: a joint experiment with the exogenous orienting task	Tatiana Malevich, Vadim Nikulin, Zafer Iscan, W. Joseph MacInnes	3	3 Friday
Do Subliminal Primes Influence Voluntary Choice in Oculomotor Action?	Sake Kaushik, Seema Prasad, Ramesh Kumar Mishra	4	1 Saturday morning
Effect of aging on the early saccadic responses	Dagmara Witkowska, Jan Ober	5	
Examination and numerical analysis of personal directionality of eye movements while fixation on stationary and moving point	Marta A. Szmigiel, Urszula Getek, Henryk Kasprzak	6	
Eye Movements As Reflections Of Language Proficiency In The Process Of L2 Reading	Valeriia Demareva, Anna Polevaia, Sophia Polevaia	7	2 Saturday morning

Fixational eye movements and their stochastic modeling	Aleksandra Grzesiek, Marta Szmigiel, Agnieszka Wyłomańska, Henryk Kasprzak	8	
Impact of stimuli incongruence on tool recognition	Dawid Ratajczyk, Wojciech Błądek	9	
Influence of colour on percpeption of food attractiveness	Michałowska Agnieszka, Malwina Miś	10	
In-store customer behaviour - eye-tracking research	Bartłomiej Pierański, Sergiusz Strykowski	11	
Investigating cognitive load in simultaneous interpreting with the support of terminology management tools	Bianca Prandi	12	
Modeling of eye movements during induction of spatial disorientation in pilots and amateurs	Bibianna Bałaj, Piotr Francuz, Agnieszka Fudali-Czyż, Paweł Augustynowicz, Rafał Lewkowicz, Paweł Stróżak, Olaf Truszczyński	13	3 Saturday morning
Nasal-temporal saccade performance in amblyopia	Perdziak Maciej	14	
Perception of logo in video advertising. Eye-tracking study	Barbara Kilijańska, Julia Falkowska	15	

Perception of Provocative and Non-provocative Advertisements	Prof. dr hab. Bożydar Kaczmarek, dr Marcin Stencel, mgr Wioletta Ozga, Aleksandra Kilijanek	16	
Roadside advertisements as driver distractor	Adam Tarnowski, Michal Niezgoda, Tomasz Kaminski	17	4 Saturday morning
Ronaldo Effect. The role of visual attention in young football players' short-distance passing performance.	Weronika Węgier, Monika Kowalska	18	5 Saturday morning
Spatial attention, alertness and anti-saccades: a diffusion model analysis	Alena Kulikova, W. Joseph MacInnes	19	1 Saturday afteroon
Testing multiple metrics for saccadic facilitation in a cueing task.	Roopali Bhatnagar, W. Joseph MacInnes	20	2 Saturday afteroon
The effect of the left-right direction of saccadic eye movements and peripheral optokinetic stimulation on saccades latencies in change detection task	Agnieszka Fudali-Czyż	NIE	3 Saturday afteroon
The impact of biometeorological conditions on landscape perception - the concept of experiment with eyetracking glasses	Potocka Ilona, Mateusz Rogowski, Zygmunt Młynarczyk, Szymon Kupiński	21	
The Impact of the Direction of Visual Attention on the Eye Movement Trajectory During Aesthetic Evaluation	Anna Szymańska, Piotr Francuz, Tomasz Jankowski, Paweł Augustynowicz, Natalia Kopiś, Agnieszka Fudali-Czyż, Piotr Oleś,	22	

	Elżbieta Chmielnicka-Kuter		
The Impact of the Type of Sound in Viewing a Visual Scene	Marzena Wójtowicz	23	
The role of attention in sentence production: Beyond the visual modality.	Mikhail Pokhoday, Andriy Myachykov	24	4 Saturday afteroon
The use of eye-tracking to evaluate the labeling of dietary supplements packages	Bartłomiej Kabaja, Małgorzata Lisińska-Kuśnierz	25	
The visualization type and the poster persuasiveness in the eye tracker research	Alicja Waszkiewicz-Aviv	26	
Visual attention while solving a multiple choice task by students and academics	Roman Rosiek, Miroslawa Sajka	27	5 Saturday afteroon
Visual structures in developing student's mathematical mental activities – an eye-tracking approach	Bożena Rożek	28	
Word segmentation cues in reading unspaced text	Raymond Bertram	29	6 Saturday afteroon

Workshops

Programming eye-tracking experimental procedures using PsychoPy.

Cezary Biele

The workshop is planned for researchers who want to learn to conduct eye-tracking experiments using PsychoPy and have little or no experience with PsychoPy and Python programming language. On the workshop we will focus on generating experiments (presenting stimuli, collecting responses), controlling experiment flow (randomization) and collecting eye-tracking data.

Combining physiological data and eye tracking

Aleksandar Dimov and Krzysztof Malej:

During the workshop attendees will learn how to use eye tracking data together with physiological data, such as EDA, heart rate or EMG. Attendees will have opportunity to perform an experiment with either mobile and stationary systems. It will be also demonstrated how to perform data analysis.

How to use eye tracking with spherical photos and videos?

Ewa Ramus and Ashley Keeler

Main goal of the workshop is to see and test the newest possibilites of presenting the visual stimulus - spherical photos and videos. Second part of workshop will focus on building basic virtual environement and gaze-based interaction.

SensoMotoric Instruments

SensoMotoric Instruments (SMI) is a world leader in computer vision technology and pioneer of eye tracking systems for research and industry.

Today it serves sectors as diverse as virtual and augmented reality, human factors and usability, neurosciences, psychology, sports and education, medical research and diagnostics, and consumer and market research.

SMI has forged long and valued relationships with academics from leading universities and research institutions around the world. The more than 6,000 SMI systems that have been installed globally are testimony to SMI's continuing success in providing innovative products and commitment to improvement.

The company serves its customers from its offices in Teltow, near Berlin, Germany and in Boston, USA. SMI's global reach is made possible by a network of trusted local distributors and international partners.

SMI sees computer vision becoming an integral part of day-to-day applications. To that end, our work adds critical value for doctors, patients, researchers, trainees, marketing and usability professionals and ultimately, for users of everyday appliances.

In our future vision of eye tracking, visual attention will be guided intuitively to allow for easier and faster learning, better comprehension of documents and websites, optimal interpretation of graphical data, and other applications where human visual perception plays a central role.

www.smivision.com

Tobii Pro

Tobii Pro provides world leading eye tracking solutions to academic institutions and to commercial companies that want to better understand human behavior. Our solutions consist of hardware, software, training and support.

Ever since the start of the company in 2001, our mission has been to make eye tracking as accessible as possible and to make eye tracking easy to use for everyone.

Our eye trackers combine excellent accuracy and precision with an extremely high tolerance for large head movements and a variety of environments. They work for basically any user without requiring any manual adjustments.

Our aim and promise is to develop eye trackers that are:

Accurate and precise to ensure you get the most reliable research results

Unrestrained and unobtrusive so you can capture natural human behavior

Capable of robust tracking so you can work efficiently with a wide cross section of the population.

New!
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