List of Oral Presentations

Monday, 18 January 2016	16:30-18:30	Chair: Tyler Thrash, ETH Zurich	Auditorium
1	**Olivia** **Gerber-Morón**	**Universidad Autónoma de Barcelona, Spain**	oliviagerb@hotmail.com
	Subtitle Segmentation on Smartphones		
2	**Annika** **Küster**	**Freie Universität Berlin, Germany**	annika.kuester@fu-berlin.de
	Attention Bias in a national sample of military personnel with posttraumatic stress disorder		
3	**Christina** **Pfeuffer**	**University of Freiburg, Germany**	christina.pfeuffer@psychologie.uni-freiburg.de
	A Look into the Future: Spontaneous anticipatory saccades reflect processes of anticipatory action control		
4	**Ioannis** **Giannopoulos**	**ETH Zurich, Switzerland**	igiannopoulos@ethz.ch
	Supporting Wayfinding Through Mobile Gaze-Based Interaction		
5	**Ismini-Eleni** **Lokka**	**University of Zurich, Switzerland**	ismini.lokka@uzh.ch
	Impact of level of detail in realistic 3D geographic visualizations on memory: An empirical study with a focus on aging population using eye tracking		
6	**Alexandra** **Zaharia**	**University of Geneva, Switzerland**	Alexandra.Zaharia@unige.ch
	Face processing in 22q11.2 deletion syndrome (22q11.2DS): developmental trajectories and scanpath specificities		
7	**Quentin** **Lohmeyer**	**ETH Zurich, Switzerland**	qlohmeyer@ethz.ch
	Skimming and Scrutinizing Sequences in Reading Engineering Drawings		

Tuesday, 19 January 2016	16:30-18:30	Chair: Martin Raubal, ETH Zurich	Auditorium
8	**Jakob** **Suchan**	**University of Bremen, Germany**	jsuchan@informatik.uni-bremen.de
	A Computational Framework for Semantically Analysing the Spatio-Temporal Dynamics of Visual-Attention		
9	**Keng-Teck** **Ma**	**Institute for Infocomm Research, A*STAR, Singapore**	makt@i2r.a-star.edu.sg
	Eye-2-I: Eye-tracking for just-in-time implicit user profiling		
10	**Sarah** **Lukas**	**University of Education Weingarten, Germany**	lukas@ph-weingarten.de
	Task-effect anticipation in eye movements		
11	**Steven** **Rick**	**University of California San Diego, USA**	srick@eng.ucsd.edu
	Making sense of in-situ eye tracking		
12	**Sascha** **Credé**	**University of Zurich, Switzerland**	sascha.crede@geo.uzh.ch
	The influence of visual realism on emotion and decision making with geovisual displays		

13	**Moniek**	**Kuijpers**	**Max Planck Institute for Empirical Aesthetics, Germany**	Moniek.kuijpers@aesthetics.mpg.de
	Using eye tracking to capture absorption during literary reading			

Wednesday, 20 January 2016 16:30-18:30			**Chair: Peter Kiefer, ETH Zurich**	**Auditorium**
14	**Christina**	**Leuker**	**Max Planck Institute for Human Development, Germany**	leuker@mpib-berlin.mpg.de
	Decision-Making in a Risk-Reward World			
15	**Richard**	**Wermes**	**Universität Hamburg, Germany**	richard.wermes@uni-hamburg.de
	Potentials and Limitations of Eye-Tracking Procedures in Clinical Research: Psychometric Properties of Measures of Attentional Biases			
16	**Robert**	**Moro**	**Slovak University of Technology in Bratislava, Slovakia**	robert.moro@stuba.sk
	Considering individual differences in quantitative eye-tracking studies			
17	**David**	**Rudi**	**ETH Zurich, Switzerland**	davidrudi@ethz.ch
	A Pilot's Spatial Awareness			
18	**Beatrix**	**Emo**	**ETH Zurich, Switzerland**	b.emo@gess.ethz.ch
	Choice zones: architecturally relevant areas of interest			
19	**Anne Kathrin**	**Schwenzfeier**	**Ruhr-University Bochum, Germany**	anne.schwenzfeier@rub.de
	“Listen! I am afraid of gaining weight!” A path from anxiety to anorexia nervosa through biased attention			

Presentation 1: **Olivia Gerber-Morón (Universidad Autónoma de Barcelona, Spain)** **Monday, 18 January, 16:30-16:45**

Subtitle Segmentation on Smartphones

Second screen devices (tablets, smartphones and similar) are increasingly expanding and becoming an omnipresent key element in our lives which enable us to benefit from all the advantages of new technologies while providing mobility. We resort to subtitles and translation in order to access the audiovisual content displayed on these devices. Therefore, it is essential to carry out research in this field to understand how to adapt subtitles for second screens and make them accessible to as many different user profiles as possible. An important aspect to consider is the legibility of the subtitles, which depends on the way they are divided into sections on screens. A few studies have been carried out into subtitle segmentation, but no similar research has been conducted for second screens and platforms. This presentation aims at examining the impact of subtitle segmentation on comprehension, perception and legibility on second screen devices, more precisely on smartphones. Aspects such as the screen size, the user profile and the approach to segmenting subtitles will be studied to determine to what extend syntactic-semantic considerations are pertinent when creating subtitles.

Presentation 2: **Annika Küster (Freie Universität Berlin, Germany)** **Monday, 18 January, 16:45-17:00**

Attention Bias in a national sample of military personnel with posttraumatic stress disorder

Patients suffering under post-traumatic stress disorder (PTSD) tend to show an attentional bias towards trauma related stimuli. We provide a national sample of military personnel with PTSD with an internet based psychological intervention. Before the treatment begins, after its completion, and several months post intervention we apply our eye tracking experiment to test for attention bias to trauma related, general threatening, and socially relevant stimuli across the intervention and control groups and over time. To our knowledge, this study is the first study that examines intervention effects on attention bias in PTSD.

Presentation 3: **Christina Pfeuffer (University of Freiburg, Germany)** **Monday, 18 January, 17:00-17:15**

A Look into the Future: Spontaneous anticipatory saccades reflect processes of anticipatory action control

According to ideomotor theory, human action control employs anticipations of one´s own actions´ future consequences, i.e., action effect anticipations, as a means of triggering actions that will produce desired outcomes (e.g., Hommel et al., 2001). Using the response-effect compatibility paradigm (Kunde, 2001), we demonstrate that the anticipation of one´s own manual actions´ future consequences not only triggers appropriate actions, but simultaneously induces anticipatory saccades to the location of future action consequences. An analysis of the timeline of anticipation revealed that anticipatory saccades typically occur after the manual response. We hypothesize that these anticipatory saccades are functionally linked to the comparison of intended and observed action outcomes for the purpose of outcome evaluation. Further, we propose that the observation of anticipatory saccades constitutes a new powerful tool for determining the dynamics of action effect anticipation on a single-trial basis.

Presentation 4: **Ioannis Giannopoulos (ETH Zurich, Switzerland)** **Monday, 18 January, 17:15-17:30**

Supporting Wayfinding Through Mobile Gaze-Based Interaction

Wayfinding in unfamiliar environments often requires the use of assistance aids. Humans utilize navigation aids to make the correct spatial decisions in order to reach their destination. The main purpose of these aids is to minimize the complexity (e.g., cognitive load) of a decision, which varies according to the number of possible options to follow at a decision point, as well as based on the abilities of the wayfinder and the available environmental information that can be incorporated in a wayfinding instruction. Several wayfinding assistance aids require the user's visual attention in order for her to obtain the provided information. The interaction with such assistance aids might increase the complexity of decision making having an impact on wayfinding performance. Furthermore, wayfinding aids that require the user's visual attention distract her from the surrounding environment having an impact on safety as well as on spatial knowledge acquisition. The focus of this work lies in the investigation of self-localization and navigation in urban environments utilizing eye tracking technology as well as in the investigation, implementation, and evaluation of gaze-based wayfinding assistance systems. The main aim was to identify problems that occur during aided wayfinding, focusing on the visual interaction with mobile devices and the environment. Through novel gaze-based interaction approaches with mobile devices and the environment, it was possible to address problems concerning visual attention switches away from the surrounding environment and provide solutions and directions for novel assistance systems that minimize the interaction with the device to a minimum, redirecting the visual attention to the surrounding environment, increasing spatial knowledge acquisition, performance as well as usability aspects.

Presentation 5: **Ismini-Eleni Lokka, Arzu Coltekin (Department of Geography, University of Zurich, Switzerland)**

Monday, 18 January, 17:30-17:45

Impact of level of detail in realistic 3D geographic visualizations on memory: An empirical study with a focus on aging population using eye tracking

With the unprecedented developments in hardware & software technology, the accessibility of realistic three-dimensional (3D) visualizations has dramatically increased. While more and more people use realistic 3D visualizations, a debate on whether this is a good idea from a human factors perspective has also emerged (Shepherd, 2008). However, it appears that the usefulness of 3D depends on the task and the user (e.g., Huk, 2006). To identify who might benefit from using 3D geovisualizations for what and when; we propose a set of controlled lab experiments based on the three basic parameters of the experimental design process: i) the theme (stimuli), ii) the context (tasks) and iii) the audience (participants) of the visualization.

In particular, we are interested in using eye movements to identify the information processing strategies of the participants when they work with 3D visualizations in given scenarios. More specifically, we want to understand how various 3D geographic visualizations with differentiations in their design affect different user groups' memory retention. To operationalize our research, we vary the levels of detail in our visualizations, provide fundamental geographic tasks that require local and/or global visual information processing, and measure memory retention/recall success at different points in time. A specific focus will be on aging and whether different visualization designs might help with the memory retention/recall differently with healthy memory decline.

References

Huk, T. (2006). Who benefits from learning with 3D models? The case of spatial ability. Journal of Computer Assisted Learning, 22(6), 392–404. doi:10.1111/j.1365-2729.2006.00180.x

Shepherd, I. D. H. (2008). Travails in the third dimension: a critical evaluation of three-dimensional geographical visualization. In M. Dodge, M. McDerby, & M. Turner (Eds.), Geographic Visualization: Concepts, Tools and Applications (pp. 199–210). Wiley.

Presentation 6: Alexandra Zaharia (Office Médico-Pédagogique Research Unit, Department of Psychiatry, University of Geneva School of Medicine, Geneva, Switzerland)

Monday, 18 January, 17:45-18:00

Face processing in 22q11.2 deletion syndrome (22q11.2DS): developmental trajectories and scanpath specificities

Background

Previously, difficulties in social interactions and abnormal scanpaths in face exploration were reported in 22q11.2DS. Furthermore, configural face processing (analysis of spatial relationships between features) had been described as having a different and atypical development compared to featural processing (analysis of individual features) in clinical populations with social impairments. Configural processing is highly important in decoding social-related cues, emotional expressions, and in face recognition.

The aims of the present study were (1) to explore the development and the scanpaths of configural versus featural face processing in 22q11.2DS compared to typically developed (TD) participants and (2) to identify evidence sustaining the assumption of eye-contact avoidance.

Method

75 22q11.2DS and 84 TD individuals (aged 6-21 years old), of whom 66 completed the second visit, participated in our study. A face discrimination task ("Jane Task") in which participants had to identify Configural and Featural differences between faces was administered on a Tobii 1750 eye tracker. Eye-tracking measures were assessed using Clearview 2.7.1 software. The variables of interest were: accuracy data, first and second fixations and percentage of time spent on features (e.g.: eyes, mouth).

Results

A mixed model regression analysis revealed a significantly different developmental trajectory of the Configural face processing in TD (accuracy improves with age) compared to 22q11.2DS (p=.003). The gap between Configural and Featural processing performances was significantly larger in patients than controls. Patients also spent more time on Mouth, and showed a reduced number of fixations and transitions between images than Controls. Only controls presented distinct scanpaths in Featural versus Configural trials and an increase in percentage between 1st and 2nd fixations on the Eyes.

Conclusion

To our knowledge, this is the first study investigating the developmental trajectory of Configural face processing in 22q11.2DS. In line with previous findings on individuals with social impairments, we found evidence confirming that configural processing in 22q11.2DS remains constant over time and shows an atypical

development. Additionally, patients' visual scanpaths suggested no differentiation between featural and configural processing strategies. Our study also highlighted impairments in visual exploration of faces and lack of engagement in eye-contact in the 22q11.2 sample.

Presentation 7: **Quentin Lohmeyer (ETH Zurich, Switzerland)** **Monday, 18 January, 18:00-18:15**

Skimming and Scrutinizing Sequences in Reading Engineering Drawings

Engineering drawings representing machine systems are usually sectional drawings showing the inner mechanical mechanisms. A precondition for understanding such a drawing is to be familiar with the notation of its basic elements. However, in order to really understand how a represented machine system works, additional cognitive processes have to be initiated. This presentation/poster presents an eye tracking study investigating how engineers behave while trying to understand such a sectional engineering drawing. The eye tracking data collected during the experiment was analyzed by an approach that for the first time combines the evaluation methods of skimming and scrutinizing sequencing and transition matrix analysis. Based on this procedure, three behavioral patterns have been identified that, if found in a person's eye tracking data, allow drawing substantial conclusions about the cognitive processes run through.

Presentation 8: **Jakob Suchan (University of Bremen, Germany)** **Tuesday, 19 January, 16:30-16:45**

A Computational Framework for Semantically Analysing the Spatio-Temporal Dynamics of Visual-Attention

I will present a general constraint logic programming framework for semantic analysis of visual attention based on a general theory for declarative reasoning about visuo-spatial dynamics with regions in space-time. Within this framework perceptual and analytical entities like areas of attention & interest, visuo-perceptual saliency, heatmaps are available as primitive and truly first-class (dynamic) spatio-temporal objects and can be used for analising eye movements with respect to the perceptual input.

I show the application of the framework for cognitive film studies in the context of a large scale eye-tracking experiment with a total of 31 subjects, and involving 16 scenes (per subject) from 12 films, where we combine perceptual primitives obtained from eye tracking data with visual analysis of the scene using state-of-the-art computer vision algorithms for detecting scene elements, such as shot types, camera movement, people and object movement. Within this, the framework is used for analysing the effects of these cinematographic aids on the perceptual experience of the spectators.

Presentation 9: **Keng-Teck Ma (Institute for Infocomm Research, A*STAR, Singapore)** **Tuesday, 19 January, 16:45-17:00**

Eye-2-I: Eye-tracking for just-in-time implicit user profiling

For many applications, such as targeted advertising and content recommendation, knowing users' traits and interests is a prerequisite. User profiling is a helpful approach for this purpose. However, current methods, i.e. self reporting, web-activity monitoring and social media mining are either intrusive or require data over long periods of time. Recently, there is growing evidence in cognitive science that a variety of users' profile is significantly correlated with eye-tracking data. We propose a novel just-in-time implicit profiling method, Eye-2-I, which learns the user's interests, demographic and personality traits from the eye-tracking data while the user is watching videos. Although seemingly conspicuous by closely monitoring the user's eye behaviors, our method

is unobtrusive and privacy-preserving owing to its unique combination of speed and implicitness. As a proof-of-concept, our method is evaluated in a user study with 51 subjects. It achieved a mean accuracy of 0.89 on 37 attributes of user profile with 9 minutes of eye-tracking data.

Presentation 10: **Sarah Lukas (University of Education Weingarten, Germany)** **Tuesday, 19 January, 17:00-17:15**

Task-effect anticipation in eye movements

When performing two or more tasks in a frequent transition, the agent experiences the conflict of selecting the appropriate reaction in the current situation and suppressing other, competing reactions. To resolve this conflict, it is suggested, that a so called task set is implemented. A task-set contains all relevant information to execute appropriate actions in terms of a correct response according to a specific S-R rule. In previous work, it has been found evidence for the assumption that task-specific action effects (task-effects, or: T-Es) might help to reduce the conflict of ambiguous task sets (Lukas, Philipp, & Koch, 2013) by anticipating and implementing them in the task-set. T-Es are to be perceived consequences of a task performance. The role of T-Es as task-set components has not yet been thoroughly studied. In the presented research work, it is aimed to show that the anticipation of T-Es is an important factor in the correct task performance. In a visual-spatial task design it is investigated whether eye movements reflect the anticipation of T-Es. It is assumed that participants direct their look already shortly before or during response execution to the location where they expect the T-E to happen. In addition, if unexpected T-Es occur, this might be reflected in the pupillary response of the participants.

Presentation 11: **Steven Rick (University of California San Diego, USA)** **Tuesday, 19 January, 17:15-17:30**

Making sense of in-situ eye tracking

Eye tracking provides insight into the attention and behavior of humans as they perform various activities. In order to be able to treat these attentional and behavioral observations as ecologically valid it is key to collect that data in-situ, out in the real world environments where those same activities happen naturally. To complicate this, in-situ activity rarely follows a predictable series of events and the data generated spans usage across a wide range of dynamic interfaces, disparate applications, and changing context. This presents a key challenge for eye tracking research and its subsequent data analysis as it must be able to take into consideration the dynamics of real-world activity.

As a part of a larger study looking at how physicians use their electronic medical record systems and simultaneously communicate with and care for their patients, we deployed a multimodal data collection system in a number of outpatient clinics in San Diego, CA, USA. We sampled from Veterans Administration (VA) clinics as well as those that are a part of the University of California, San Diego (UCSD). Within the VA and UCSD outpatient clinics we sampled from Primary Care and Specialty physicians in order to capture a mix of different clinical workflows. The exam rooms of participating physicians were equipped with depth cameras, directional microphones, and a remote eye tracker (SMI RED-m) mounted to their computer monitor.

Other than a brief calibration task run by a study RA prior to data collection, the physician and patient were left to work as they normally would and research staff were not present within the room during the visit. While clinical work is consistent thanks to quality of care standards, the exact details of how each physician performed their work varied greatly. Some moved around the exam room as they worked with their patient, other's remained seated at their computer. Some physicians used their computer extensively while others used it very little. All of this produced data that was both insightful and noisy. Gaps in data occurred for a range of reasons, from shift of attention away from computer to moving about in their seat as they worked, and methods had to be developed to adapt as needed.

Previous research has explored the contextual ties between eye tracking and the task a user was working on. A mix of methods were used that included both older proven approaches and newly created ones in order to enable analysis of naturally collected sparse data sets and generate preliminary behavior classifiers. Ongoing work now looks to further explore analysis with dynamic stimulus data. It aims to provide more useful quantitative and qualitative insights to real world eye tracking data as well as validate the quality of tracking through analysis alongside other redundantly available data streams. This presentation, while focused around data captured in the health setting, will share methods and early results that anyone working with eye tracking 'in the wild' should be able to leverage.

Presentation 12: **Sascha Credé (University of Zurich, Switzerland)** **Tuesday, 19 January, 17:30-17:45**

The influence of visual realism on emotion and decision making with geovisual displays

One of the powers of maps and other geovisual displays is their abstraction from real-world complexity: well-designed geovisual displays make task-relevant information perceptually salient and reduce irrelevant, extraneous detail (Bertin 1983; Kosslyn 1989; Tufte 1983). While abstraction might facilitate the study and understanding of complex spatio-temporal phenomena and processes, it is still an open research question how the reduction of visual detail might interact with a viewer's affect or emotional engagement with the presented information. This might be particularly relevant for emotionally laden or controversial display content. Furthermore, it is not clear how potential emotional engagement influences decision behaviour with geovisual displays.

In my PhD project I aim to empirically investigate how different levels of visual realism might carry emotionally charged content, and in doing so, might influence visuo-spatial decision making with graphic displays.

In order to empirically investigate these questions from a cognitive psychology perspective, I propose a series of controlled experiments, where participants are asked to make choices based on geovisual displays with varying degrees of visual realism. To get insight into the different processes of decision making, emotion, and attention, I will triangulate various measures. First of all, I will observe the influence of realistic displays on peoples' decisions in emotionally laden situations. Second, the level of emotional engagement will be captured with physiological measurements (EDA, EMG) and self reports, both indicating the psychological arousal during critical phases in the process of decision making. Lastly, eye tracking will be used to compare attentional patterns of viewers being confronted with displays of different levels of realism: how far extraneous detail is involved?

Presentation 13: **Moniek Kuijpers (Max Planck Institute for Empirical Aesthetics, Germany)** **Tuesday, 19 January, 17:45-18:00**

Using eye tracking to capture absorption during literary reading

States of absorption have been shown to be an important factor of reading and enjoying literary narratives. Relatively little is known, however, about the physiological markers that distinguish an absorbing reading experience. Absorption is a form of focused, sustained attention on the stimulus, which results in a lower bodily awareness, a lower awareness of surroundings and an altered sense of time (Carleton et al., 2010; Kuijpers et al., 2014; Kuiken & Douglas, in prep). Since one of the characteristics of absorbed reading is that a reader loses self-awareness, it is important that we not only rely on subjective measures, but also find objective measures to capture absorption during reading. Because of the emphasis on attention in describing absorption's experiential qualities, I assume that eye tracking measures are well suited to capture this integral physiological marker of absorbing reading experiences.

The study I am planning to conduct will examine eye-tracking correlates of absorbing reading experiences. The participants (N=30) are asked to read 8 different stimuli of each four pages long. Every text has one of two different errors on each page (distributed in a randomized order): a low level error in the lexical domain (e.g., replacing a word by a morphologically and phonologically legal pseudo word), and a high level error in the discourse domain (e.g., making neighboring sentences inconsistent with each other) of the text. The errors in the text are used to detect mindless reading (Schad, Nuthmann & Engbert, 2012); readers are instructed that there are two different types of errors that can occur in the text and that when they notice one, they have to press button A. When a reader does not respond to an error in the text it is assumed that they are reading mindlessly.

I propose that a distinction needs to be made between mindless reading and absorption, since absorption will be measured online by responding (i.e., pressing button B) to distracting stimuli (i.e., either a red dot in the corner of the screen or a sound). When a reader does not notice the distracting stimuli or responds very late, we need to know whether that is because of the fact that they were absorbed or because of the fact that they were not paying any attention. I propose that the longer readers' response time to distracting stimuli is, the more they are absorbed.

I will then correlate the response times of the readers to subjective self-report measures of absorption to investigate whether the subjective and objective measures actually capture the same thing. For those readers who are not reading mindlessly and who have the longest response times, I will explore a number of standard eye tracking measures (i.e., eye blink rate, pupil dilation, average gaze durations, average gaze regressions, average gaze fixations, overall reading time). For some of those I have specific hypotheses: 1) I expect eye blink rate to decrease, indicating focused attention (cf. Nakano et al., 2009) I expect that absorbed readers show greater pupil dilation (cf. Rayner, 1998; Hoeks & Levelt, 1993).

Presentation 14: **Christina Leuker, Timothy J. Pleskac, Thorsten Pachur (Max Planck Institute for Human Development, Berlin, Germany)**

Wednesday, 20 January, 16:30-16:45

Decision-Making in a Risk-Reward World

An adaptive view of cognition implies that decision processes reflect and exploit statistical regularities in the world. We examined how decision-making is affected by a prominent statistical regularity of real-world risky decisions: the size of rewards is often negatively related to their probability. We invited 60 participants to the lab and asked them to choose between two gambles of the form "p chance of receiving x, otherwise nothing." In the risk-reward condition, risks and rewards were negatively correlated. In the control condition, they were factorially combined. In three posttasks, we show that participants' choices are consistent with them inferring probabilities from payoff magnitudes, via a previously learned risk-reward relationship.

Presentation 15: **Richard Wermes (Universität Hamburg, Germany)** **Wednesday, 20 January, 16:45-17:00**

Potentials and Limitations of Eye-Tracking Procedures in Clinical Research: Psychometric Properties of Measures of Attentional Biases

An unusual way of attending to threat is according to cognitive-behavioral models related to the development and maintenance of anxiety disorders. To better understand such so called attentional biases and likewise to clarify the mechanisms of specific illnesses, research is beginning to use eye-tracking procedures. However, while this is still a rather novel and only partly established approach, the potentials and limitations of eye-tracking procedures as measures of attentional biases are not yet understood. It needs to be further explored to what extend eye-tracking procedures can be reliable and valid measures for these applications. Such research may be useful, not only for the specific topic of attentional biases in anxiety disorders, but as a methodological attempt, it may help to estimate the capabilities of eye-tracking procedures in general terms.

In a DFG-funded research project (HE 5292/4-1) at the Department of Clinical Psychology and Psychotherapy at the University of Hamburg, we investigate the relation between social anxiety and visual attention to social stimuli using eye-tracking measures and manual reaction times. As a first and fundamental approach to analyze the data of the first 94 participants of our experimental study, reliability and validity of first fixation latencies and manual reaction times were estimated. We would like to present our research project in terms of its design, the processing of eye-tracking data and first results.

Presentation 16: **Robert Moro (supervised by Maria Bielikova, Slovak University of Technology in Bratislava, Slovakia)**

Wednesday, 20 January, 17:00-17:15

Considering individual differences in quantitative eye-tracking studies

The goal of a quantitative study is usually to compare two designs or in general treatments by measuring certain (eye-tracking) metrics. However, the measured differences do not have to necessarily be the result of a different treatment, but can be influenced by the individual differences of the participants, such as their computer (or HCI) literacy, or a wide range of their cognitive characteristics, e.g., the perceptual speed, the size of the working memory, etc. An example, where these individual differences can manifest themselves and influence the outcome of a study is the task of locating a certain link on a webpage, which is typical in many usability studies.

For this reason we focus on the design of a set of tests that would allow the researchers to automatically “calibrate” the study to each participant, i.e., to take into account the differences in participants’ abilities when evaluating the results of the study. In addition, we are interested in reducing the time necessary for conducting and evaluating a quantitative eye-tracking study (semi)automatically – for this purpose, we have established an eye-tracking laboratory capable of recording multiple (up to 20) participants at once (20 workstations each equipped with the Tobii X2-60 eye tracker and a 3D camera) and develop our own software infrastructure that aggregates the data and attempts to automate some of the tasks usually done by the researchers manually. We will present this infrastructure together with the preliminary results of the first experiments.

Presentation 17: **David Rudi (ETH Zurich, Switzerland)** **Wednesday, 20 January, 17:15-17:30**

A Pilot's Spatial Awareness

The presentation will give an introduction to spatial awareness as a subset of situation awareness. I will describe how it by itself is composed of different subcomponents and give an overview of the research taking place and the involvement of eye tracking.

Presentation 18: **Beatrix Emo (ETH Zurich, Switzerland)** **Wednesday, 20 January, 17:30-17:45**

Choice zones: architecturally relevant areas of interest

The paper proposes a new type of area of interest (AOI), termed "choice zones" that is relevant for eye tracking research in the built environment. Choice zones are an ex ante measure; this is in contrast to many existing definitions of AOIs, such as the mean shift clustering algorithm (santella2004), which are data-driven. Choice zones, based on space-geometric parameters, are defined algorithmically. The validity of the concept is tested against eye tracking data taken from an an urban navigation experiment. Findings show that choice zones account for close to 90% of the fixations clusters defined using the mean shift clustering algorithm. The merit of the measure for applied studies in the field of architectural design and built environment studies is discussed.

Presentation 19: **Anne Kathrin Schwenzfeier (Ruhr-University Bochum, Germany)** **Wednesday, 20 January, 17:45-18:00**

"Listen! I am afraid of gaining weight!" A path from anxiety to anorexia nervosa through biased attention

Although Anorexia Nervosa (AN) and anxiety disorders (AD) share great comorbidity, little interest has been raised for the predictive power of anxiety. To advance and improve present treatment, we need to understand how anxiety influences the course of AN. Based on an evolutionary perspective; anxiety serves a threat detecting function. Whereas anxiety is functional up to a certain point, strong levels of anxiety bias the processing of information through a disproportionate likelihood of detecting threat. This has been defined as attentional bias (AB). Processing information in a biased negative way has a great impact on the subsequent manifestation and strengthening of psychopathological symptoms.

Hence, this project will test whether anxiety leads to biased attention in anorexia nervosa (AN) and whether biased attentional processes represent a mediating factor between trait anxiety and AN symptomatology. Thereby, it will contribute to the development of new etiological models that build on a causal relationship between anxiety and biased attention.

The experiment will be run in a female, adolescent population aged 14-18 years. At first, all participants will complete self-report questionnaires to assess their present eating disorder symptoms and trait anxiety. In the following, anorectic patients, depressed patients and a healthy control group will be confronted with an anxiety inducing and no-anxiety inducing math test in a counterbalanced order (mixed design). Following each test, participants` mood state will be assessed. The AB will be measured with three different tasks, i.e., a stroop task, a dot probe task and a free viewing task. Besides reaction times (RT), participants' eye gaze will be recorded.

It is assumed that ABs arise through an interaction between fast, automatic and more controlled cognitive processes. Eye tracking devices enable us to unravel the time course of ABs in terms of early hypervigilance and later difficulty to disengage attention from threat due to its high temporal precision. Hence, measuring eye movements' represents a highly relevant complement to the assessment of RTs.