Program and abstracts
TU Eindhoven, Human Technology Interaction
Authors:

Raymond Cuijpers, Armin Kohlrausch
with support from Jeroen Smeets

Contact address

Human-Technology Interaction
School of Innovation Sciences
Eindhoven University of Technology
P.O. Box 513
5600 MB Eindhoven
+31-40-2472889
www.dagvandeperceptie.nl
dagvandeperceptie@gmail.com

Design Logo: Anja Ebbinghaus
Welcome

We would like to welcome you at the subdepartment Human-Technology Interaction of the Eindhoven University of Technology to the 4th edition of the Dag van de Perceptie (Perception Day). This workshop provides a forum for all colleagues interested in perception research, with a certain regional focus on the Netherlands and Belgium, independent of their favorite modality, to exchange research results and ideas and extend individual networks. The initiative for this meeting was taken in 2006 by colleagues from the then TNO Institute Human Factors in Soesterberg, who successfully organized the first three editions of this Perception Day. We want to thank them, in particular Jaap Beintema and Jan van Erp as the organizers of the previous event in 2009, for their continued effort, on which we could build in planning the present Day.

Most of the aspects of the previous workshops have been preserved: the focus is on keeping the workshop accessible to all interested colleagues. We have a small number of plenary talks, a series of sessions with two talks in parallel, and plenty of time in between to have coffee, visit posters and get into discussions. The most relevant change compared to previous years lies in the choice of the language for the oral presentations. All these will be held in English in order to make this meeting also accessible to non-Dutch speaking colleagues. In this booklet, you will find the program, the abstracts of all oral presentations, a list of poster titles and a list of participants as of April 2nd.

We are very grateful that our colleague Jeroen Smeets, professor of Psychology in relation to human movement at the department Human Movement Science of the VU University Amsterdam, accepted our invitation to be the chair of the day and to support us in shaping the program. We are also indebted to a number of persons from our university group who supported us in organizing this Day. Special thanks go to our sponsors for the financial support that we have received: Philips Research Europe and the subdepartment Human-Technology Interaction at the TU/e.

On behalf of the organizers

Raymond Cuijpers and Armin Kohlrausch
Table of Contents

Program........................................................................................................................................4

Talks ...............................................................................................................................................6
Plenary Session 1 ..........................................................................................................................6
  How do we know where our thumb and finger are? ............................................................... 6
  Illusory vision ..............................................................................................................................6
  Our senses deceive us: Two haptic illusions and the influence of visual cues ...................... 6
Parallel Session 1A ......................................................................................................................8
  Bottom-Up Is Going Down: Oculomotor Evidence For Top-Down Control ....................... 8
  Top-down and bottom-up saccadic selection in patients with parietal lesions .................. 8
  Haptic pop-out of movable stimuli ......................................................................................... 8
  Impact of visual attention on image quality assessment ....................................................... 9
Parallel Session 1B ......................................................................................................................10
  Multisensory Navigation in Virtual Mazes ..........................................................................10
  Priming and suppression by attending to one tone: measurements over a wide frequency range .................................................................................................................. 10
  Sound affects the speed of visual processing .....................................................................11
  Reweighting visual cues by touch .........................................................................................11
Parallel Session 2A ......................................................................................................................12
  Feed forward versus feedback competition in saccadic target selection .........................12
  Can we predict categorization from our gaze behaviour? .................................................. 12
  Judging an unfamiliar object’s distance from its retinal image size ...................................12
  Interpretation of the scene influences judgments of surface reflectance .........................13
Parallel Session 2B ......................................................................................................................14
  Mapping Tonotopy in Human Auditory Cortex using Minimally Salient Tone Stimuli .......14
  Grey matter differences associated with tinnitus ................................................................14
  The pupil response shows an effect of semantic context in background sound ................15
  Multisensory perception in schizophrenia .........................................................................15
Parallel Session 3A ......................................................................................................................16
  The neural correlates of viewing priority ............................................................................16
  Pointing from pictorial space into real space .....................................................................16
  Understanding packaging design from a holistic perspective ..........................................16
  Avoiding Obstacles: Strategy Changes as a Result of Visual Field Limitation .................17
Parallel Session 3B ......................................................................................................................18
  Number magnitude to finger mapping is disembodied .......................................................18
  “Nattigheid voelen”- haptic perception of wetness .............................................................18
  Higher and lower order somatosensory processing in Anorexia Nervosa .........................18
  Influence of Edges as Salient Features in Haptic Shape Perception of 3D Objects .............19
Plenary Session 2 ......................................................................................................................20
  Population receptive field mapping in visual cortex following retinal lesions .................20

Posters .........................................................................................................................................21

List of participants ....................................................................................................................23
# Program

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.00</td>
<td>Registration &amp; Reception with coffee and tea</td>
</tr>
<tr>
<td>9.30</td>
<td>Opening</td>
</tr>
<tr>
<td>9.40</td>
<td>How do we know where our thumb and finger are?</td>
</tr>
<tr>
<td></td>
<td>W. D. Schot, E. Brenner, J. B. J. Smeets</td>
</tr>
<tr>
<td>10.00</td>
<td>Illusory vision</td>
</tr>
<tr>
<td></td>
<td>Rob van Lier</td>
</tr>
<tr>
<td>10.20</td>
<td>Our senses deceive us: Two haptic illusions and the influence of visual cues.</td>
</tr>
<tr>
<td></td>
<td>Mirela Kahrimanovic, Wouter M. Bergmann Tiest and Astrid M.L. Kappers</td>
</tr>
<tr>
<td>10.40-</td>
<td>Poster session 1 &amp; Coffee break, IPO Hal</td>
</tr>
<tr>
<td>11.30</td>
<td>Parallel session 1A, IPO 0.98</td>
</tr>
<tr>
<td></td>
<td>Bottom-Up Is Going Down: Oculomotor Evidence For Top-Down Control</td>
</tr>
<tr>
<td></td>
<td>Following The Initial Saccade</td>
</tr>
<tr>
<td></td>
<td>Alisha Siebold, Wieske van Zoest, Mieke Donk</td>
</tr>
<tr>
<td>11.45</td>
<td>Top-down and bottom-up saccadic selection in patients with parietal lesions</td>
</tr>
<tr>
<td></td>
<td>Isabel Dombrowe, Mieke Donk, Hayley Wright, Chris Olivers, Gly Humphreys</td>
</tr>
<tr>
<td>12.00</td>
<td>Haptic pop-out of movable stimuli</td>
</tr>
<tr>
<td></td>
<td>Vonne van Polanen, Wouter Bergmann Tiest en Astrid Kappers</td>
</tr>
<tr>
<td>12.15</td>
<td>Impact of visual attention on image quality assessment</td>
</tr>
<tr>
<td></td>
<td>Hani Al-Ers, Judith Redi, Hantao Liu, Ingrid Heynderickx</td>
</tr>
<tr>
<td>12.30</td>
<td>Lunch break</td>
</tr>
<tr>
<td></td>
<td>Parallel session 1B, IPO 0.11</td>
</tr>
<tr>
<td></td>
<td>Multisensory Navigation in Virtual Mazes</td>
</tr>
<tr>
<td></td>
<td>Tom Philippi, Jan van Erp, Peter Werkhoven</td>
</tr>
<tr>
<td></td>
<td>Priming and suppression by attending to one tone: measurements over a wide frequency range</td>
</tr>
<tr>
<td></td>
<td>T. Borra, H. Versnel, R. van Ee</td>
</tr>
<tr>
<td></td>
<td>Sound affects the speed of visual processing</td>
</tr>
<tr>
<td></td>
<td>Jean Vroomen, Mirjam Keetels</td>
</tr>
<tr>
<td></td>
<td>Reweighting visual cues by touch</td>
</tr>
<tr>
<td></td>
<td>Robert J. van Beers, Christa M. van Mierlo, Jeroen B.J. Smeets, Eli Brenner</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>14.00</td>
<td>Parallel</td>
</tr>
<tr>
<td>14.15</td>
<td>Parallel</td>
</tr>
<tr>
<td>14.30</td>
<td>Parallel</td>
</tr>
<tr>
<td>14.45</td>
<td>Poster</td>
</tr>
<tr>
<td>15.00</td>
<td>Parallel</td>
</tr>
<tr>
<td>15.15</td>
<td>Parallel</td>
</tr>
<tr>
<td>15.30</td>
<td>Parallel</td>
</tr>
<tr>
<td>15.45</td>
<td>Poster</td>
</tr>
<tr>
<td>16.00</td>
<td>Plenary</td>
</tr>
<tr>
<td>16.15</td>
<td>Plenary</td>
</tr>
<tr>
<td>16.30</td>
<td>Plenary</td>
</tr>
<tr>
<td>16.45</td>
<td>Plenary</td>
</tr>
<tr>
<td>17.00</td>
<td>Plenary</td>
</tr>
<tr>
<td>17.15</td>
<td>Plenary</td>
</tr>
<tr>
<td>17.30</td>
<td>Plenary</td>
</tr>
<tr>
<td>17.45</td>
<td>Plenary</td>
</tr>
</tbody>
</table>

**Additional Notes:**
- Grey matter differences associated with tinnitus.
- Tactile perception in schizophrenia.
Talks

Plenary Session 1

How do we know where our thumb and finger are?
*W. D. Schot, E. Brenner, J. B. J. Smeets*
Research Institute MOVE, Faculty of Human Movement Sciences, VU University Amsterdam.
w.d.schot@vu.nl

When we want to touch an object, we have to know where our fingers are and where the object is. It is well known that when the visual information of where the object is is perturbed (for example through prism displacement) people adapt to this perturbation rather easily. However, what the underlying mechanism for this adaptation is has been under debate for many years. We show here that when people have to make pointing movements with the thumb and the index finger while the two digits are associated with opposite prismatic displacements, each digit adapts to its own prismatic displacement as shown by aftereffects in opposite directions. From this we can conclude that the adaptation cannot have taken place in terms of perception of joint angles of the arm, since the same arm was used for both pointing movements. Also, it cannot have taken place in the eyes because subjects used the same unperturbed vision when we measured the aftereffects. This has large implications for the way we view visuomotor adaptation.

Illusory vision
*Rob van Lier*
Donders Institute for Brain, Cognition and Behaviour Radboud University Nijmegen
r.vanlier@donders.ru.nl

Whatever we see, its appearance belongs to the output of the perceptual system. To create the visual world, the perceptual system seems to use a “basket full of tricks”. One way to unravel these tricks is to develop and study visual illusions. Time and again it appears that relatively simple stimulus manipulations reveal new extraordinary perceptual output -- with varying degrees of phenomenological “presence”. I will review a few recent studies on illusory appearances with a focus on filling-in phenomena and show how they help to understand the underlying mechanisms of perception.

Our senses deceive us: Two haptic illusions and the influence of visual cues
*Mirela Kahrimanovic, Wouter M. Bergmann Tiest and Astrid M.L. Kappers*
Helmholtz Institute, Physics of Man, Universiteit Utrecht
m.kahrimanovic@uu.nl

During exploration of objects, a specific object property may influence the perception of another one, resulting in perceptual illusions. Our psychophysical studies focused on two illusions: the shape-size and the shape-weight illusions. The first one investigates the influence of the shape of 3-dimensional objects on the perception of their size. The results revealed large perceptual biases: During haptic, visual and bimodal perception, a tetrahedron was perceived as larger than a cube and a sphere of the same physical volume, and a cube was perceived as larger than a sphere. These biases could be explained by the subjects’ tendency to base the judgment on specific geometric properties. The second illusion investigates the influence of the shape of 3-D objects on the perception of their weight. Again, large perceptual biases occurred: Perceptually smaller objects were perceived as heavier than perceptually larger objects. Availability of visual information had
no effect on the direction or on the strength of this illusion. From these studies we can conclude that perception of size and weight is not veridical and that our senses deceive us.
Parallel Session 1A

Bottom-Up Is Going Down: Oculomotor Evidence For Top-Down Control

*Following The Initial Saccade*

Alisha Siebold, Wieske van Zoest, Mieke Donk

Vrije Universiteit, Amsterdam

*a.siebold@psy.vu.nl*

There exists an ongoing debate regarding the extent to which vision is guided by automatic stimulus-driven or volitional goal-driven processes. The present study attempts to resolve this issue by investigating the time-course of both processes over multiple eye movements. Observers were presented with a display containing three orientation singletons (one salient, one moderately salient, and one non-salient) embedded in a homogeneous background of line segments. Eye movements were recorded while observers searched for a probe dot superimposed upon one of the three singletons (Experiment 1) or for the only right-tilted singleton among two left-tilted singletons (Experiment 2). To explore the time-course of salience-driven and goal-driven processes, eye movements were analyzed as a function of saccadic latency, separately for initial and second eye movements. The results showed that initial saccades elicited shortly after the onset of the search display were primarily salience-driven whereas initial saccades elicited after approximately 250 ms as well as second saccades were completely unaffected by salience. In contrast, initial saccades were increasingly guided in line with task-requirements with increasing latencies, and were consistently goal-driven during second saccades, irrespective of latency. These results suggest that the extent to which vision is guided by stimulus-driven or goal-driven processes is dependent on the absolute amount of time passed between stimulus onset and the initiation of a saccade; salience seems to be represented in the visual system only briefly after a visual image enters the brain and has no effect thereafter.

Top-down and bottom-up saccadic selection in patients with parietal lesions

*Isabel Dombrowe, Mieke Donk, Hayley Wright, Chris Olivers & Gly Humphreys*

Cognitive Psychology, VU Amsterdam

*i.dombrowe@psy.vu.nl*

When people search complex displays, fast saccades tend to be predominantly stimulus-driven, whereas slower saccades become increasingly goal-driven. Here we use this pattern to assess whether patients with parietal damage have deficits in stimulus-driven processing, goal-driven processing, or both, when selecting feature-defined targets. A group of patients and a group of healthy controls were asked to make a saccade to one of two differently oriented lines presented amongst homogeneous background lines. Using a multinomial model, we decomposed the individual speed-accuracy functions into the underlying stimulus-driven and goal-driven components that bias visual selection at each point in time. We found that stimulus-driven processing of stimuli in the more affected hemi-field of the patients was reduced relative to the less affected hemi-field and in comparison to controls. Furthermore, goal-driven processing tended set in later and increased more slowly. This pattern of results did not depend on an overall spatial bias towards the less affected hemi-field. Our results show that both stimulus-driven and goal-driven processing over time are affected by parietal damage.

Haptic pop-out of movable stimuli

*Vonne van Polanen, Wouter Bergmann Tiest en Astrid Kappers*

Helmholtz Instituut, Universiteit Utrecht
V.vanPolanen@uu.nl

When in visual and haptic search a target is easily found among distractors, this is called a pop-out effect. The target feature is then believed to be salient and searched in a parallel way. We investigated this effect with movable stimuli in a haptic search task. The task was to find a movable ball among anchored distractors or the other way round. Results show that reaction times were independent of the number of distractors if the movable ball was the target, but increased if the anchored ball was the target. Analysis of hand movements revealed a parallel search strategy, shorter movement paths, a higher average movement speed and a narrower direction distribution with the movable target, compared to a more detailed search for an anchored target. Taken together, these results show that a movable object pops out between anchored objects and this indicates that mobility is a salient object feature.

Impact of visual attention on image quality assessment
Hani Al-Ers Judith Redi Hantao Liu Ingrid Heynderickx
Philips Research Laboratories, Eindhoven, The Netherlands Delft University of Technology, Delft, The Netherlands
h.e.b.al-ers@tudelft.nl

In this talk we will discuss the work we performed in trying to understand how we observe images in different levels of quality under different tasks or settings. We will address both bottom-up and top-down aspects of the interactions between image quality perception and visual attention, discussing the results of three eye-tracking experiments. We will first look at how saliency maps of still images change depending on the time viewers are allowed to look at an image. Then we will discuss the differences in the saliency when observers are freely viewing images or assessing their quality. The results of this experiment suggest that with a decrease in image quality, saliency moves away from the natural saliency towards those regions in an image where the artifacts are most noticeable. In a third experiment we determined the importance of image quality in the region of interest compared to image quality in the background for different levels of artifacts in the images.
Parallel Session 1B

Multisensory Navigation in Virtual Mazes
Tom Philippi1,2, Jan van Erp2, Peter Werkhoven1
1 Department of Computing and Information Sciences, Utrecht University
2 Department Perceptual and Cognitive Systems, TNO
tomp@cs.uu.nl

We integrate information from multiple sensory modalities to form a single unambiguous impression of the world around us. The process of sensory integration affects behaviour: for example, in comparison to unisensory presentation, multisensory presentation often improves perception, attention, and memory. We investigated whether multisensory presentation improves spatial navigation. Because navigation largely relies on spatial memory, we expected that the multisensory benefits reported for memory extend to navigation. Nineteen participants explored three virtual mazes consisting of 10 nodes and 13 corridors. The nodes in each maze contained either visual, auditory or audiovisual objects. Each maze was explored for 90 seconds. After each exploration, participants performed the following tasks in fixed order 1) draw a map of the maze, 2) recall adjacent objects for three objects, 3) place all objects on a map of the maze, and 4) navigate through the maze to locate five objects in fixed order. Favorable effects of exploration with multisensory objects over exploration with unisensory presentation were present in the maze drawing task (i.e. more objects correctly reported and more connections correctly drawn; p<.001), the adjacency task (i.e. more objects correctly reported; p<.01), and the navigation task (i.e. faster wayfinding; p<.05). We observed no differences for unisensory and multisensory object presentation in the object placement task (p=.66). Overall, the results mirror the multisensory effects previously reported for memory. We conclude that in comparison to unisensory presentation, multisensory presentation improves spatial memory and navigation performance.

Priming and suppression by attending to one tone: measurements over a wide frequency range
Borra, T.1, Versnel, H.2 and Van Ee, R.1
1 Faculty of Physics & Astronomy, Department Physics of Man, Neuroscience & Cognition Utrecht
2 Department Otorhinolaryngology and Head & Neck Surgery, University Medical Center Utrecht, Neuroscience & Cognition Utrecht
t.borra@uu.nl

Attending to a particular tone frequency increases detection performance for auditory targets at or near the attended frequency, while decreasing performance for targets outside of the attended range. This phenomenon is called frequency priming (FP) and the frequency range within which FP is active is called the attention band. No evidence exists to date to suggest how detection performance for targets well outside the attention band is modulated. A possible scenario could be that detection performance returns to a baseline-level when the target frequency is sufficiently removed from the cued frequency.

We applied the probe-signal paradigm, in which a cue tone is presented, followed by two temporally separated intervals, marked by a 1 and a 2 on screen, only one of which contains the target tone to be detected.

We found a relative increase in performance on the cue frequency (as expected) but also on the octaves below the cued frequency and, to a lesser extent, on the octaves above the cued frequency. Performance for target frequencies in between the octaves is significantly decreased with respect to the octaves. Preliminary results suggest that locally increased
performance at the octaves is maintained for imagined cue frequencies that were not physically presented.

A tentative explanation for this "octave-effect" would be relatively strong cortical connections between neurons with best frequencies that differ by one octave. The existence of such connections have been first indicated by the finding of so-called ‘pitch neurons’ in auditory cortex which respond specifically to harmonic complexes (Bendor & Wang, 2005).

Sound affects the speed of visual processing
Jean Vroomen, Mirjam Keetels
Tilburg University
j.vroomen@uvt.nl

We examined the effects of a task-irrelevant sound on visual processing. Participants were presented with revolving clocks at, or around, central fixation and reported the hand position of a target clock at the time an exogenous cue (one clock turning red) or an endogenous cue (a line pointing towards one of the clocks) was presented. A spatially-irrelevant sound presented 100 ms before the cue speeded-up visual latency if compared to a sound presented 100 ms after the cue. The effect of the sound was larger the farther the target was from fixation, and it was larger for endogenous than exogenous cues. A visual temporal warning signal had different effects on perceptual latency. These results demonstrate that an asynchronous sound can: 1) shift the perceived time of occurrence of a visual cue (temporal ventriloquism); and 2) speed-up the velocity of the attentional shift towards the target. Sounds thus have multiple effects on visual perception.

Reweighting visual cues by touch
Robert J. van Beers, Christa M. van Mierlo, Jeroen B.J. Smeets, Eli Brenner
Research Institute MOVE, Faculty of Human Movement Sciences, VU University Amsterdam
r.j.van.beers@vu.nl

It is well established that if multiple cues provide information about the same quantity, the information from these cues is combined in a statistically optimal way by weighting each cue by the inverse of its variance. This implies that cue weights are determined by the cue variances only. However, this view is challenged by earlier studies that showed that feedback about the actual value of the estimated quantity can induce changes in the cue weights. Here we measured the time course of this reweighting. Subjects placed an object flush onto a slanted surface whose slant was indicated by monocular and binocular cues, that could be consistent or inconsistent with one another. Subjects received haptic feedback about the actual slant when placing the object. This feedback was consistent with either the monocular or the binocular information. The results show that the weight given to the cue consistent with the feedback increased relatively fast, leading to a mean weight change of 0.18 after 52 conflict trials. These results suggest that cue weights may not be fully determined by the cue variances, but may also depend on the accuracy of each cue.
Parallel Session 2A

Feed forward versus feedback competition in saccadic target selection
Jeroen Goossens, Bert van den Berg, Joke Kalisvaart
Donders Institute for Brain, Cognition and Behaviour
J.Goossens@donders.ru.nl

Humans have evolved a highly efficient search process, in which the visual environment is sequentially sampled with a series of rapid eye movements (saccades). The neural process that selects a goal for the next saccade is believed to operate on a ‘target salience map’. Target salience depends on feature contrast between objects and can be modulated by cognitive factors.

Under natural conditions, many targets compete for selection. The nature of the competition may involve cross-inhibition by feed forward connections (i.e., signals related to the competing stimuli), or signals related to the output (i.e. the upcoming saccade signals). How can we distinguish between feed forward and feedback competition? Key is the effect of changing stimulus salience. Feed forward cross-inhibition between two simultaneously (< 200 ms) presented targets, will promote choice of the stimulus with the highest final level, because it amplifies the contrast of the input stage. A network with feed back cross-inhibition will stabilize into a choice that is determined by the initially strongest of two competing stimuli even when the stimulus strengths are reversed later on. This holds because the initial ‘winner’ maintains its advantage by suppression of the input of the competing channel. To test these predictions, we investigated the effect on saccadic choice probability of breaking the stimulus ambiguity briefly by a small contrast step early or late during saccade preparation. Eye movements were recorded with the scleral search coils. Our findings support the notion that target selection processes rely on feed back rather than feedforward cross-inhibition.

Can we predict categorization from our gaze behaviour?
Mijke O. Hartendorp, Stefan Van der Stigchel, Ignace Hooge and Albert Postma
Experimental Psychology, Helmholtz Institute, Utrecht University, the Netherlands
m.o.hartendorp@uu.nl

Our gaze behaviour can inform us which information we use from the visual input to categorize an object. For instance, when we perceive a living object, we prefer to look at the head of the animal, possibly because most information about the animal is gathered from this feature. Furthermore, a switch in interpretation of an ambiguous figure is associated with a shift in eye-fixation. These findings suggest that our gaze behaviour is related to our interpretation of an object. In the current study, we make use of morphed figures to investigate whether the interpretation pattern of these unclear objects is reflected in the eye-movement pattern. Morphed figures are created by slowly changing one object into another object. The intermediate steps represent figures that contain both objects, but all in different proportions. For instance, one morphed figure can consist for 70% of object A (dominant object) and for 30% of object B (nondominant object). It is known from previous studies that observers tend to categorize a morphed figure as its dominant object. We investigated whether a similar eye-movement pattern was registered when looking at a morphed figure that was interpreted as its dominant object and when looking at the actual dominant object. Our preliminary data suggest a strong correlation between what we see in a morphed figure and where we look in a morphed figure. The next step is to reveal the direction of this correlation: can we predict the eye-movement pattern on the basis of the interpretation or can we predict the interpretation on the basis of the eye-movement pattern?

Judging an unfamiliar object’s distance from its retinal image size
Sousa R, Brenner E, Smeets JBJ
Research institute MOVE, Faculty of Human Movement Sciences, VU University
ritass@gmail.com

How do we know how far an object is? If an object’s size is known, its retinal image size can be used to judge its distance. To some extent, the retinal image size of an unfamiliar object can also be used to judge its distance, because some object sizes are more likely than others. To examine whether assumptions about object size are used to judge distance we had subjects indicate the distance of virtual cubes in complete darkness. In separate sessions the simulated cube size either varied slightly or considerably across presentations. Most subjects indicated a further distance when the simulated cube was smaller, but subjects relied twice as strongly on retinal image size when the range of simulated cube sizes was smaller. We conclude that this is caused by the variability in perceived cube size on previous trials influencing the range of sizes that are considered to be likely.

Interpretation of the scene influences judgments of surface reflectance
Eli Brenner, Jeroen JM Granzier and Jeroen BJ Smeets
Faculty of Human Movement Sciences Vrije Universiteit
e.brenner@fbw.vu.nl

An object’s colour is determined by how well it reflects light of various wavelengths. The visual system only has access to the reflected light. Nevertheless, people can judge surface reflectance quite reliably under natural conditions by also considering the light reflected by neighbouring surfaces. The present study examines to what extent the interpretation of the scene is considered when doing so. People indicated the judged reflectance of a small patch that was shown briefly on a simulation of a colourful ball by naming its colour. The ball was rotating slowly under a lamp. Patches were shown at two positions on the ball. People’s judgments were less sensitive to differences in the colour of the surrounding when the differences were simulations of different surface colours than when they were simulations of differences in illumination. The simulated origin of the colour change made no difference when asked to match the colour rather than to name it. We conclude that the interpretation of the scene can help people judge surface reflectance, but the extent to which this occurs depends on the task.
Parallel Session 2B

Mapping Tonotopy in Human Auditory Cortex using Minimally Salient Tone Stimuli
Dave Langers, Pim van Dijk
UMCG - University Medical Center Groningen
d.r.m.langers@med.umcg.nl

Tonotopy is a primary organizational principle in the entire auditory processing pathway. However, in spite of numerous neuroimaging studies, the layout of tonotopic gradients in human auditory cortex is still debated. In this functional magnetic resonance imaging (fMRI) study, we identified tonotopic maps using minimally salient (i.e. soft and unattended) auditory stimulation to avoid widespread activation.

20 subjects with normal hearing (?20 dB HL at 250-8000 Hz) were presented with 100-ms tones at a frequency of ¼, ½, 1, 2, 4, or 8 kHz, a level of approx. 20 or 40 dB HL, and a rate of 5 Hz. At the same time, subjects performed a task that involved the emotional assessment of displayed pictures (negative/neutral/positive); this task was chosen to be highly engaging, but completely unrelated to the sound stimuli. A sparse fMRI sequence (TA 2 s; TR 10 s; 1.5×1.5×1.5 mm3 resolution) was used to record evoked responses in the temporal lobe.

Activation to all twelve conditions (6 frequencies × 2 levels) was extracted with a standard fMRI regression model. Activation to low-frequency stimuli peaked in lateral Heschl's Gyrus (HG); with increasing frequency, activation progressively shifted to bordering regions in the anterior and posterior flank of medial HG. In addition, we performed principal component analysis on the responses of all activated voxels, identifying a component that reflected differential activation to low or high frequency stimuli in a pattern consistent with the aforementioned gradients.

Our results suggest the existence of at least two abutting tonotopic gradients more or less perpendicular to HG. This diverges from previous literature that suggests gradients along the axis of HG, but closely agrees with other recent findings (e.g. Humphries et al., Neuroimage 2010).

The present study shows that reliable tonotopic maps can be obtained with fMRI using minimally salient sound presentations.

Grey matter differences associated with tinnitus
Kristiana Boyen, Dave R.M. Langers, Emile de Kleine, Pim van Dijk
University Medical Center Groningen
k.boyen@med.umcg.nl

Tinnitus is a hearing disorder characterized by the perception of sound in the absence of an acoustic stimulus. The underlying pathophysiology of tinnitus is still poorly understood. In three recent studies (MÃ¼hlau et al., 2006; Landgrebe et al., 2009 and Husain et al., 2011), alterations in the volume and concentration of grey matter (GM) in tinnitus patients have been detected. Structural MRI scans in 31 tinnitus subjects and 16 controls were performed. All participants had moderate sensorineural hearing loss. All subjects filled out the Hyperacusis Questionnaire (HQ). Additionally, the tinnitus subjects filled out the Tinnitus Handicap Inventory (THI). Region of interest (ROI) analyses were performed on the whole brain, left and right auditory cortex, bilateral cingulate gyrus and bilateral medial frontal gyrus (WB, LAC, RAC, BCG and BMFG). For each ROI, increased GM volumes were found for the tinnitus group compared to the control group. Differences were significant for the LAC and BCG only. No significant correlations between the THI or HQ scores and the GM volumes were found. In general, high THI scores tended to coincide with high GM volumes.
The pupil response shows an effect of semantic context in background sound
Thomas Koelewijn¹, Adriana A. Zekveld¹,²,³, Joost M. Festen¹, Sophia E. Kramer⁴
¹ Dept. of ENT/Audiology, VU University medical center, Amsterdam
² Linnaeus Centre HEAD, Sweden
³ Linköping University, Sweden
t.koelewijn@vumc.nl

The pupil response is a well-validated and objective measure to quantify cognitive processing load or mental effort. Recent studies show stronger pupil dilation in response to lower speech intelligibility in noise. Differences in speech to noise ratio yield differences in mental effort required for speech processing. Whether the content of a background sound has an additional influence on mental effort, has never been measured by means of pupillometry. In the current study we recorded the pupil response of 24 young and 24 middle-aged adults while they listened to speech in different background sounds. The behavioral outcomes show lower speech reception thresholds for fluctuating noise and a single interfering speaker compared to stationary noise, which replicates previous results. In contrast, the pupil response was larger in the single interfering speaker condition compared to the other masker conditions. This effect was independent of the intelligibility level and age. We conclude that when intelligibility levels are kept constant, ignoring an interfering speaker requires more mental effort than filtering out meaningless sounds.

Multisensory perception in schizophrenia
Jeroen Stekelenburg¹, Jan Pieter Maes², Arthur van Gool², Margriet Sitskoom¹, Jean Vroomen¹
¹ Tilburg University, ² Yulius, Mental Health Institute
jj.stekelenburg@uvt.nl

The current study investigated the brain mechanisms underlying the impairment of multisensory integration processes in schizophrenia using event-related potentials. Previously we have found that that auditory neural activity (N1 component of the ERP) induced by speech is suppressed and speeded up when a speech sound is accompanied by concordant lip movements. This particular audiovisual interaction is not speech-specific but is induced by visual information (either naturalistic or artificial) that both precedes and reliably predicts sound onset. Here, we presented speech (e.g. /bi/) and naturalistic non-speech events (e.g. handclapping) in auditory, visual and audiovisual modalities to 18 schizophrenic patients and 18 age-matched healthy controls. Normal controls showed the usual N1-suppresion by visual information, but this suppression was completely lacking in schizophrenic patients. The results suggest that the fast direct corticocortical pathway that conveys visual motion parameters to the auditory cortex is severely impaired in schizophrenia.
Parallel Session 3A

The neural correlates of viewing priority

Jan-Bernard Marsman, Remco Renken, Frans W. Cornelissen
Laboratorium voor Experimentele Oogheelkunde / Neuroimaging Centrum Universitair
Medisch Centrum Groningen
J.B.C.Marsman@med.umcg.nl

We continuously redirect our gaze to potentially important locations in the environment. How does our brain determine what is worth a closer look? Some theories suggest that the brain combines image-based salience and task-related relevance to determine the priority of viewing specific locations. However, whether the human brain indeed combines such image- and task-derived information into a priority representation is still unknown. Here, we use concurrent fMRI and eye tracking to search for such a representation. We introduce a measure of viewing priority based on gaze data recorded under natural dynamic conditions. Neural correlates of this measure were found in the right Temporal Parietal Junction, the Precuneus, and area V5/MT, indicating that these areas represent viewing priority. The involvement of V5/MT indicates that this visual motion area not only represents perceptual information as such, but also the priority of this information for the observer’s viewing behavior.

Pointing from pictorial space into real space

Technische Universiteit Delft Perceptual Intelligence Laboratory
h.t.nefs@tudelft.nl

Perspective pictures are only "geometrically correct" when seen from a specific, unique viewpoint. That is, only then will they project into the eye as the real world would have done if the eye were placed at the location of the camera or the artist’s eye. Pictures and photographs are however typically not viewed from the geometrically correct viewpoint. In fact, artists and designers give little attention to geometrically correct rendering. We investigated the influence of viewing angle relative to the picture plane on the perceived pointing directions from the image to the physical space. We filmed a stone penguin with a camcorder and showed it on a television screen to the observer. Participants were asked to rotate the penguin with a remote control until it seemed to gaze in the direction of a specified target in real space. We found that settings were both highly accurate and precise for all target positions, but that all settings turned one-on-one with the viewing angle. We concluded that for picture viewing, humans do not correct for their viewing angle relative to the screen even when it is perfectly visible that the picture plane is slanted.

Understanding packaging design from a holistic perspective

Gelici-Zeko, M.M
Universiteit Twente
m.m.gelici-zeko@ctw.utwente.nl

At point of purchase, package design is the main source of information concerning the product and brand. Therefore, it becomes a crucial factor in the decision making process. Research has shown that specific package cues, such as colors can influence consumers’ perceptions and preferences regarding products. However, such studies are not representative for most real life situations, since one or a selected number of packaging cues are manipulated. The aim of this study is to understand consumers’ perceptions and
responses towards holistic packaging design that provide us a better understanding of actual purchase decisions.

The study is divided in two steps. First, the structural and graphical packaging characteristics which consumers’ associate with product attributes were defined, using perceptual mapping. Consumers were asked to compare 90 existing packaging in 30 minutes to force the participants to perceive packaging from a holistic perspective. The results show us how similarities and differences between packages were perceived. In all cases, a combination of cues influenced consumers’ perceptions, and not one or singular packaging cue. In step 2, design guidelines were formulated to express the relation between product attributes and impression. Dairy products were used as product categories in this research. The design guidelines can be used by marketers and packaging designers in the package design process to develop and design better packaging that in turn predict consumer outcomes. Formulating design guidelines based on consumers views on products found in today’s market might limit design freedom, but it can also serve as a tool in defining a potential design space for new products.

Avoiding Obstacles: Strategy Changes as a Result of Visual Field Limitation
Sander E.M. Jansen, Alexander Toet, Peter J. Werkhoven
Universiteit Utrecht TNO
sanderj@cs.uu.nl

Unrestricted, the human visual field is approximately 200° wide and 135° tall. As a consequence of certain hardware and eye-disease, this can be severely limited. Recently, the importance of peripheral visual cues in the online guidance of locomotion has been recognized. Here, we present two experiments performed to investigate how visual field limitation influences obstacle avoidance behavior during human locomotion. Participants performed two separate obstacle avoidance tasks while wearing visual field restricting goggles. The first task involved stepping over a single obstacle situated in the pathway. For the second task participants were required to steer through a multiple obstacle environment. Using full-body motion capture we investigated the changes in motor behavior that occurred as a consequence of visual field limitation. We observed that for both obstacle avoidance tasks, participants choose to prioritize safety over energy conservation as a consequence of visual field limitation. Furthermore, it seems that only with a small visual field, safety concerns were substantial enough to warrant a decrease in speed.
Parallel Session 3B

Number magnitude to finger mapping is disembodied
Myrthe A. Plaisier Jeroen B.J. Smeets
Faculteit Bewegingswetenschappen, Research Institute Move, Vrije Universiteit Amsterdam
m.a.plaisier@vu.nl

There is a vast amount of research showing that there are associations between specific fingers and certain numbers (embodied mapping). Some studies suggest that this is related to finger-counting strategies. Recently, it has been shown that rightward eye movements correlated with larger numbers and leftward eye movements with smaller numbers (Loetscher et al., Curr. Biol., 2010). In the present study we investigated whether there is an association between number magnitude and finger position. To this end human subjects were instructed to call out a random number every second while simultaneously tapping a random finger. Our results show that subjects consistently selected a larger number when tapping a finger to the right of the previous finger. This was independent of the distance between the fingers and whether the arms were crossed such that the left hand was on the right side of the body mid-line and vice versa. This shows that number magnitude to finger mapping is topological and disembodied.

“Nattigheid voelen” - haptic perception of wetness
Wouter M. Bergmann Tiest, N. Dolfine Kosters, Hein A. M. Daanen, Astrid M. L. Kappers
Helmholtz Instituut, Universiteit Utrecht, TNO Defence, Security and Safety, Soesterberg
W.M.BergmannTiest@uu.nl

The sensation of wetness is well-known but barely investigated. There are no specific wetness receptors in the skin, but the sensation is mediated by temperature and pressure perception. In our study, we have measured discrimination thresholds for the haptic perception of wetness of three different textile materials (thick and thin viscose and cotton) and two ways of touching (static and dynamic). Subjects repeatedly felt two samples of different wetness and had to say which was the wetter. Discrimination thresholds ranged from 0.5-1.4 ml. There was no significant difference between the two methods of touch. There was a significant effect of material: discrimination was better in the thinner material (thin viscose). This suggests that discrimination depends on relative water content in the materials, but not on how they are touched.

Higher and lower order somatosensory processing in Anorexia Nervosa
Anouk Keizer, MSc.1, Dr. Monique Smeets², Dr. H. Chris Dijkerman1, Prof. dr. Marcel van den Hout², Dr. Annemarie van Elburg, MD.3, Prof. dr. Albert Postma1
1 Department of Experimental Psychology, Helmholtz Research Institute, Faculty of Social and Behavioural Sciences, Utrecht University
2 Department of Clinical and Health Psychology, Faculty of Social and Behavioural Sciences, Utrecht University
3 Rintveld centre for Eating Disorders, Altrecht Mental Health Institute
a.keizer@uu.nl

One of the main characteristics of Anorexia Nervosa (AN) is a disturbance in body representation, meaning that AN patients experience their body shape and weight in a distorted way. In a series of studies we focused on somatosensory perception in AN patients. Extensive research on the visual component of body representation shows that AN patients overestimate their body size in visual tasks, however research on the tactile aspects of body representation in this population is scarce. Using a Tactile Estimation Task we asked
blindfolded participants to estimate the distance between two simultaneously applied tactile stimuli by varying the separation between their right thumb and index finger. Stimuli were presented to the forearm and abdomen. The results showed that, compared to healthy controls, AN patients overestimated the size of tactile distances on both body areas. To further investigate the nature of this disturbance in tactile perception we administered the Two Point Threshold task and Von Frey task. The results indicated that AN patients have a higher Two Point Threshold on both the arm and abdomen, and a lower threshold to detect single tactile stimuli (Von Frey) on the abdomen, but not the arm. Taken together it appears that both higher and lower order somatosensory processing is different in AN patients compared to controls.

**Influence of Edges as Salient Features in Haptic Shape Perception of 3D Objects**

*Virjanand Panday, Wouter M. Bergmann Tiest and Astrid M. L. Kappers*

Helmholtz Institute, Utrecht University

[V.Panday@uu.nl](mailto:V.Panday@uu.nl)

Salient features help identify objects. However, they can also influence subsequent comparison between objects. In this study, we investigate the influence of edges on perception of the shape of 3D objects. We tested two conditions in which subjects were asked to indicate the orientation of a block by exploring it either statically without touching the edges or freely. When edges were excluded, the threshold to determine the orientation of a block was an aspect ratio of 1.030. When the edges were explored, the threshold was 1.045. We conclude that edges disrupt the precision at which 3D objects can be perceived.
Population receptive field mapping in visual cortex following retinal lesions
Koen Haak, Heidi Baseler, Andre Gouws, Tony Morland, Frans W. Cornelissen
University Medical Center Groningen, University of York, UK
f.w.cornelissen@med.umcg.nl

Retinal lesions caused by eye diseases such as age-related macular degeneration can, over time, eliminate stimulation of parts of visual cortex. Electrophysiology studies have claimed large-scale remapping of adult primary visual cortex (V1) following such retinal lesions. However, such approaches may have inadvertently sampled different neuronal populations pre- and post-lesion, leaving the issue unsettled. Here, we used functional magnetic resonance imaging (fMRI) to measure V1 population receptive field (pRF) properties in participants with macular degeneration (MD), age-matched healthy controls, and controls to simulate pre- and post-lesion conditions. In MD, compared with age-matched controls, we found displaced and extended pRFs in the V1 lesion projection zone (LPZ). However, we observed comparable changes in pRFs following simulated lesions. Hence, apparent remapping can be caused solely by an altered pattern of cortical stimulation. Consequently, our fMRI results provide no evidence of remapping, and question the current view that the early visual areas of the adult human brain have the capacity to reorganize extensively.
<table>
<thead>
<tr>
<th>Board #</th>
<th>Poster title and authors</th>
</tr>
</thead>
</table>
| 1       | Visual processing dysfunctions in children with intellectual disabilities  
F.H. Boot¹², J.J.M. Pel¹, H.M. Evenhuis¹, and J. Van der Steen¹ |
|         | ¹ Vestibular and ocular motor research group, dept. of Neuroscience, Erasmus MC, Rotterdam  
² Intellectual Disability Medicine, dept. of General Practice, Erasmus MC, Rotterdam |
| 2       | Physiological responses to emotional pictures and sounds  
Anne-Marie Brouwer, Nelleke van Wouwe, and Christian Muehl  
TNO perceptual & Cognitive Systems  
TNO Human Performance  
Institute of Human Media Interaction, University of Twente |
| 3       | Vergence and version interactions during spatial memory (updating)  
Joyce Dits, Johan Pel, Angelique Remmers, and Hans van der Steen  
department of Neuroscience, Erasmus MC, Rotterdam, The Netherlands |
| 4       | Binocular onset rivalry at the time of saccades and stimulus jumps.  
Joke Kalisvaart, Sumientra Rampersad, and Jeroen Goossens  
Radboud University Nijmegen Medical Centre, Donders Institute for Brain, Cognition and Behaviour  
Nijmegen, The Netherlands |
| 5       | Distinct Influences of Contrast and Coherence on the temporal dynamics of binocular motion rivalry  
Artem Platonov and Jeroen Goossens  
Radboud University Nijmegen Medical Centre, Donders Institute for Brain, Cognition and Behaviour  
Nijmegen, The Netherlands |
| 6       | Changing the mood of elderly with ambiences  
Andre Kuijsters, Judith Redi, Boris de Ruyter, Willem-Paul Brinkman, and Ingrid Heynderickx  
Delft University of Technology |
| 7       | The effect of delayed visual feedback on synchrony perception in a tapping task  
Mirjam Keetels and Jean Vroomen  
Tilburg University, The Netherlands |
| 8       | The reference frame of the ventriloquist effect  
Denise van Barneveld, Marc van Wanrooij, and John van Opstal  
Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour  
Department of Biophysics |
| 9       | Perceptual grouping of contour elements survives saccades  
Maarten Demeyer Peter De Graef Karl Verfaillie Johan Wagemans  
University of Leuven, Belgium |
| 10      | Attentional modulation of auditory and visual processing in a 1-back task with distractors.  
Ana I.A. Amaral¹², Dave R.M Langers¹³  
¹ Department of Otorhinolaryngology/Head and Neck Surgery, University Medical Center Groningen, Groningen  
² Champalimaud Neuroscience Programme at Instituto Gulbenkian de Ciência, Oeiras, Portugal  
³ Faculty of Medical Sciences, School of Behavioral and Cognitive Neuroscience  
University of Groningen, Groningen |
11 Phonetic recalibration does not depend on working memory
Martijn Baart & Jean Vroomen
Tilburg University, Dept of Medical Psychology and Neuropsychology, Tilburg, The Netherlands

12 The influence of mood on the masked detection threshold for pure tones
Anne Bolders Guido Band Pieter Jan Stallen
Leiden University Leiden Institute for Brain and Cognition

13 Do the Gestalt principles of proximity and similarity apply in a serial haptic search task?
Krista E. Overvliet, Ralf Th. Krampe, Johan Wagemans
KU Leuven

14 Updating of remembered visual space during passive translation.
Ivar A.H. Clemens, Luc P.J. Selen, W. Pieter Medendorp
Radboud University Nijmegen, Donders Institute for Brain, Cognition, and Behaviour

15 Visual depth order of a real, complex scene.
M.W.A. Wijntjes
Perceptual Intelligence Lab TU Delft

16 Effects of a disturbed visual percept on visuospatial memory
Angelique Remmers, Joyce Dits, Johan Pel, Hans van der Steen
Afdeling Neurowetenschappen, Erasmus MC, Rotterdam

17 Mediated eye-contact is determined by relative pupil position within the sclera
Raymond H. Cuijpers, David van der Pol and Lydia M.J. Meesters
Eindhoven University of Technology

18 How Practice Affects Context - Dependencies in Perceptual-Motor Skills
Marit F.L. Ruitenberg, Elian De Kleine, Rob H.J. Van der Lubbe, Willem B. Verwey and Elger L. Abrahamse
University of Twente

19 Using a stick does not necessarily alter judged distances or reachability
De Grave1,2, D.D.J. Brenner, E.1 Smeets, J.B.J.1
1 Research Institute MOVE, Fac. Human Movement Sciences, VU University, Amsterdam
2 Sensation, Perception & Behaviour, Unilever R&D, Vlaardingen

20 Getting a Firmer Grip on Grasping Characteristics
Rebekka Verheij, Eli Brenner, Jeroen B. J. Smeets
Research Institute MOVE, Faculty of Human Movement Sciences, VU University, Amsterdam

21 Response latencies to visual target perturbations during the control of fast movements
Leonie Oostwoud Wijdenes Eli Brenner Jeroen Smeets
Faculty of Human Movement Sciences VU University Amsterdam
### List of participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Institute</th>
<th>E-mail</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ronald M. Aarts</td>
<td>Philips Research / TU Eindhoven</td>
<td><a href="mailto:ronald.m.aarts@philips.com">ronald.m.aarts@philips.com</a></td>
<td></td>
</tr>
<tr>
<td>Hani Alers</td>
<td>TU Delft</td>
<td><a href="mailto:h.e.b.al-ers@tudelft.nl">h.e.b.al-ers@tudelft.nl</a></td>
<td>0619330049</td>
</tr>
<tr>
<td>Ana Amaral</td>
<td>UMCG Groningen</td>
<td><a href="mailto:a.i.a.amaral@med.umcg.nl">a.i.a.amaral@med.umcg.nl</a></td>
<td>0647956632</td>
</tr>
<tr>
<td>David Arnoldussen</td>
<td>Donders Centre for Neuroscience</td>
<td><a href="mailto:dm.arnoldussen@gmail.com">dm.arnoldussen@gmail.com</a></td>
<td>+4359867345987</td>
</tr>
<tr>
<td>Martijn Baart</td>
<td>Tilburg University</td>
<td><a href="mailto:M.Baart@uvt.nl">M.Baart@uvt.nl</a></td>
<td></td>
</tr>
<tr>
<td>Denise van Barneveld</td>
<td>Donders Institute for Brain Cognition and Behavior</td>
<td><a href="mailto:d.vanbarneveld@donders.ru.nl">d.vanbarneveld@donders.ru.nl</a></td>
<td></td>
</tr>
<tr>
<td>Rob van Beers</td>
<td>Bewegingswetenschappen, VU</td>
<td><a href="mailto:r.j.van.beers@vu.nl">r.j.van.beers@vu.nl</a></td>
<td>0205982574</td>
</tr>
<tr>
<td>Wouter M. Bergmann</td>
<td>Helmholtz Instituut, Universiteit Utrecht</td>
<td><a href="mailto:W.M.BergmannTi@ee.nl">W.M.BergmannTi@ee.nl</a></td>
<td>0302537715</td>
</tr>
<tr>
<td>Mieke Bijveld</td>
<td>Bartiméus</td>
<td><a href="mailto:mbijveld@bartimeus.nl">mbijveld@bartimeus.nl</a></td>
<td></td>
</tr>
<tr>
<td>A.C. Boer</td>
<td>Erasmus MC - Neuwetenschappen</td>
<td><a href="mailto:aleid_87@hotmail.com">aleid_87@hotmail.com</a></td>
<td>0645057885</td>
</tr>
<tr>
<td>Anne Bolders</td>
<td>Leiden University - Cognitive Psychology Unit</td>
<td><a href="mailto:abolders@fsw.leidenuniv.nl">abolders@fsw.leidenuniv.nl</a></td>
<td>0715274026</td>
</tr>
<tr>
<td>Fleur Boot</td>
<td>Erasmus MC</td>
<td><a href="mailto:f.boot@erasmusmc.nl">f.boot@erasmusmc.nl</a></td>
<td>0107043368</td>
</tr>
<tr>
<td>Tobias Borra</td>
<td>Neuroscience &amp; Cognition Utrecht</td>
<td><a href="mailto:t.borra@uu.nl">t.borra@uu.nl</a></td>
<td></td>
</tr>
<tr>
<td>Jelte Bos</td>
<td>TNO Human Factors, Soesterberg</td>
<td><a href="mailto:Jelte.Bos@tno.nl">Jelte.Bos@tno.nl</a></td>
<td>0653943475</td>
</tr>
<tr>
<td>Kris Boyen</td>
<td>UMCG Groningen</td>
<td><a href="mailto:k.boyen@med.umcg.nl">k.boyen@med.umcg.nl</a></td>
<td>0503637157</td>
</tr>
<tr>
<td>Eli Brenner</td>
<td>Bewegingswetenschappen, VU</td>
<td><a href="mailto:e.brenner@fbw.vu.nl">e.brenner@fbw.vu.nl</a></td>
<td></td>
</tr>
<tr>
<td>Anne-Marie Brouwer</td>
<td>TNO Perceptual &amp; Cognitive Systems</td>
<td><a href="mailto:anne-marie.brouwer@tno.nl">anne-marie.brouwer@tno.nl</a></td>
<td></td>
</tr>
<tr>
<td>Erik van der Burg</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:e.van.der.burg@psy.vu.nl">e.van.der.burg@psy.vu.nl</a></td>
<td>0205986744</td>
</tr>
<tr>
<td>Ivar Clemens</td>
<td>Donders Institute for Brain Cognition and Behavior</td>
<td><a href="mailto:ivar.clemens@donders.ru.nl">ivar.clemens@donders.ru.nl</a></td>
<td>0243612595</td>
</tr>
<tr>
<td>Frans W. Cornelissen</td>
<td>UMCG Groningen</td>
<td><a href="mailto:f.w.cornelissen@med.umcg.nl">f.w.cornelissen@med.umcg.nl</a></td>
<td>0503634793</td>
</tr>
<tr>
<td>Raymond Cuijpers</td>
<td>TU Eindhoven - HTI</td>
<td><a href="mailto:r.h.cuijpers@tue.nl">r.h.cuijpers@tue.nl</a></td>
<td></td>
</tr>
<tr>
<td>Nienke Debats</td>
<td>VU University Amsterdam</td>
<td><a href="mailto:n.b.debats@vu.nl">n.b.debats@vu.nl</a></td>
<td>0205988557</td>
</tr>
<tr>
<td>Marian Dekker</td>
<td>Tilburg University / Philips Research</td>
<td><a href="mailto:marian.dekker@philips.com">marian.dekker@philips.com</a></td>
<td>0618189107</td>
</tr>
<tr>
<td>Maarten Demeyer</td>
<td>University of Leuven</td>
<td><a href="mailto:maarten.demeyer@psy.kuleuven.be">maarten.demeyer@psy.kuleuven.be</a></td>
<td></td>
</tr>
<tr>
<td>Joyce Dits</td>
<td>Erasmus MC</td>
<td><a href="mailto:j.dits@erasmusmc.nl">j.dits@erasmusmc.nl</a></td>
<td>0643271395</td>
</tr>
<tr>
<td>Isabel Dombrowe</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:i.dombrowe@psy.vu.nl">i.dombrowe@psy.vu.nl</a></td>
<td></td>
</tr>
<tr>
<td>Mieke Donk</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:w.donk@psy.vu.nl">w.donk@psy.vu.nl</a></td>
<td></td>
</tr>
<tr>
<td>Ronnie Duisters</td>
<td>Philips Research</td>
<td><a href="mailto:ronnie.duisters@philips.com">ronnie.duisters@philips.com</a></td>
<td>0402746814</td>
</tr>
<tr>
<td>Serge Dumoulin</td>
<td>Utrecht University</td>
<td><a href="mailto:s.o.dumoulin@uu.nl">s.o.dumoulin@uu.nl</a></td>
<td>0302533824</td>
</tr>
<tr>
<td>R van Ee</td>
<td>Universiteit Utrecht/KU Leuven/Philips Research</td>
<td><a href="mailto:r.vanee@uu.nl">r.vanee@uu.nl</a></td>
<td>0615588917</td>
</tr>
<tr>
<td>Jan van Erp</td>
<td>TNO</td>
<td><a href="mailto:jan.vanepp@tno.nl">jan.vanepp@tno.nl</a></td>
<td>0888665982</td>
</tr>
<tr>
<td>Onno Feikema</td>
<td>Erasmus MC</td>
<td><a href="mailto:w.feikema@erasmusmc.nl">w.feikema@erasmusmc.nl</a></td>
<td>0107033436</td>
</tr>
<tr>
<td>Mariana Gelici</td>
<td>Universiteit Twente</td>
<td><a href="mailto:m.m.gelici-zeko@ctw.utwente.nl">m.m.gelici-zeko@ctw.utwente.nl</a></td>
<td>0534892554</td>
</tr>
<tr>
<td>Jeroen Goossens</td>
<td>Donders Institute for Brain Cognition and Behavior</td>
<td><a href="mailto:J.Goossens@donders.ru.nl">J.Goossens@donders.ru.nl</a></td>
<td>0243613699</td>
</tr>
<tr>
<td>Marieke van der Graaff</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:m.c.w.vandergraaff@vu.nl">m.c.w.vandergraaff@vu.nl</a></td>
<td></td>
</tr>
<tr>
<td>Denise de Grave</td>
<td>Unilever R&amp;D - Sensation, Perception &amp; Behaviour</td>
<td><a href="mailto:Denise.de.Grave@unilever.com">Denise.de.Grave@unilever.com</a></td>
<td>0104607162</td>
</tr>
<tr>
<td>Koen Haak</td>
<td>University Medical Center Groningen</td>
<td><a href="mailto:k.v.haak@med.umcg.nl">k.v.haak@med.umcg.nl</a></td>
<td></td>
</tr>
<tr>
<td>Mijkie Hartendorp</td>
<td>Universiteit Utrecht</td>
<td><a href="mailto:m.o.hartendorp@uu.nl">m.o.hartendorp@uu.nl</a></td>
<td>0302532655</td>
</tr>
<tr>
<td>Ben Harvey</td>
<td>Utrecht University</td>
<td><a href="mailto:b.m.harvey@uu.nl">b.m.harvey@uu.nl</a></td>
<td>0631592842</td>
</tr>
<tr>
<td>Simon Jan Hazenberg</td>
<td>Donders Institute for Brain Cognition and Behavior</td>
<td><a href="mailto:s.j.hazenberg@donders.ru.nl">s.j.hazenberg@donders.ru.nl</a></td>
<td></td>
</tr>
<tr>
<td>Dik Hermes</td>
<td>TU Eindhoven - HTI</td>
<td><a href="mailto:d.j.hermes@tue.nl">d.j.hermes@tue.nl</a></td>
<td>0402475214</td>
</tr>
</tbody>
</table>
Prof. Dr. Ingrid Heynderickx  
Philips Research Eindhoven  
ingrid.heynderickx@philips.com  
0402747855

Frank Hoeben  
Bartiméus  
Fhoeben@bartimeus.nl  
0570661800

Mark Houben  
TNO  
mark.houben@tno.nl  

Hannie Huigsloot  
nederlandse vereniging voor slechthorenden  
nvvs_hann@hotmail.com  
0617807100

Sander Jansen  
Universiteit Utrecht / TNO  
sanderj@cs.uu.nl  

Mirela Kahrimanovic  
Helmholtz Institute, Universiteit Utrecht  
m.kahrimanovic@uu.nl  

Joke Kalisvaart  
Donders Institute for Brain Cognition and Behavior  
j.kalisvaart@donders.ru.nl  
0243613326

Astrid Kappers  
Helmholtz Instituut, Universiteit Utrecht  
a.m.l.kappers@uu.nl  
0302532834

Mirjam Keetels  
Tilburg University  
m.n.keetels@uvt.nl

Sander Jansen  
Universiteit Utrecht / TNO  
sanderj@cs.uu.nl  

Armin Kohlrausch  
TU Eindhoven - HTI / Philips Research  
armin.kohlrausch@philips.com  

Armin Kohlrausch  
TU Eindhoven - HTI / Philips Research  
armin.kohlrausch@philips.com  

Arno Koning  
Donders Institute for Brain Cognition and Behavior  
a.koning@donders.ru.nl  
0243612615

Renske Koornstra  
Visio Onderwijs  
renskekoornstra@visio.org  
0885858330

André Kuijsters  
TU Delft  
andrekuijsters@gmail.com

Irene Kuling  
TU Eindhoven  
i.a.kuling@student.tue.nl

Sarah van der Land  
VU University Amsterdam  
sland@feweb.vu.nl

Dave Langers  
UMCG Groningen  
d.r.m.langers@med.umcg.nl  
0503638806

Natasja van der Leden  
Nvdleden@hotmail.com  
0651930049

Paul Lemmens  
Philips Research  
paul.lemmens@philips.com  
0402749661

Rob van Liër  
Donders Institute for Brain Cognition and Behavior  
r.vanlier@donders.ru.nl  
0243615698

Jan-Bernard Marsman  
UMCG Groningen - Neuroimaging Centre  
J.B.C.Marsman@umed.umcg.nl  
0503638801

Danya Muijlwijk  
Erasmus MC  
d.muijlwijk@erasasmusmc.nl  
0620428591

Harold Nefs  
TU Delft  
h.t.nefs@tudelft.nl

Floris van Nes  
TU Eindhoven - ERGONES  
f.l.v.nes@tue.nl  
0402475233

Han Neve  
Koninklijke Visio  
hanneve@visio.org

Philip Newton  
Philips Research  
philip.newton@philips.com  
0402747550

Leonie Oostwoud Wijdenes  
VU University Amsterdam  
I.oostwoudwijdenes@vu.nl

Krista Overvliet  
KU Leuven  
kristica.overvliet@gmail.com

Virjanand Panday  
Helmholtz Institute, Utrecht University  
V.Panday@uu.nl  
0312532831

Sven Panis  
KU Leuven  
sven.panis@psy.kuleuven.be  
0473507794

Tom Philippi  
Universiteit Utrecht / TNO  
tomp@cs.uu.nl

Myrthe Plaisier  
Vrije Universiteit Amsterdam  
m.a.plaisier@vu.nl

Artem Platonov  
Donders Institute for Brain Cognition and Behavior  
A.Platonov@donders.ru.nl  
0634383627

David van der Pol  
TU Eindhoven - HTI  
d.v.d.pol@tue.nl  
0641261494

Vonne van Polanen  
Helmholtz Instituut, Universiteit Utrecht  
v.vanPolanen@uu.nl

Judith A. Redi  
Delft University of Technology  
J.A.Redi@tudelft.nl

Angelique Remmers  
Erasmus MC  
a.remmers@student.eur.nl  
0107043368

Marit Ruitenbergh  
University of Twente  
m.f.l.ruitenbergh@utwente.nl  
0534894173

Boris De Ruyter  
Philips Research  
boris.de.ruyter@philips.com

Lisa Schmidt  
Vrije Universiteit Amsterdam  
LJ.Schmidt@psy.vu.nl

Rick Schoffelen  
UMC Utrecht  
r.i.m.schoffelen@umcutrecht.nl  
0887564245
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willemijn Schot</td>
<td>VU University - Research Institute</td>
<td><a href="mailto:w.d.schot@vu.nl">w.d.schot@vu.nl</a></td>
<td>0205988566</td>
</tr>
<tr>
<td>Alisha Siebold</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:a.siebold@psy.vu.nl">a.siebold@psy.vu.nl</a></td>
<td>0610827230</td>
</tr>
<tr>
<td>Jeroen Smeets</td>
<td>VU University - Human Movement Sciences</td>
<td><a href="mailto:J.B.J.Smeets@vu.nl">J.B.J.Smeets@vu.nl</a></td>
<td>0205982572</td>
</tr>
<tr>
<td>Rita Sousa</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:ritass@gmail.com">ritass@gmail.com</a></td>
<td>0205982627</td>
</tr>
<tr>
<td>Hans van der Steen</td>
<td>Erasmus MC - Neuroscience</td>
<td><a href="mailto:j.vandersteen@erasmusmc.nl">j.vandersteen@erasmusmc.nl</a></td>
<td>0107043572</td>
</tr>
<tr>
<td>Jeroen Stekelenburg</td>
<td>Tilburg University</td>
<td><a href="mailto:j.j.stekelenburg@uvt.nl">j.j.stekelenburg@uvt.nl</a></td>
<td>0134668171</td>
</tr>
<tr>
<td>Hans Supèr</td>
<td>University of Barcelona</td>
<td><a href="mailto:hans.super@icrea.es">hans.super@icrea.es</a></td>
<td>+340654551250</td>
</tr>
<tr>
<td>Alisha Siebold</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:a.siebold@psy.vu.nl">a.siebold@psy.vu.nl</a></td>
<td>0610827230</td>
</tr>
<tr>
<td>Jeroen Smeets</td>
<td>VU University - Human Movement Sciences</td>
<td><a href="mailto:J.B.J.Smeets@vu.nl">J.B.J.Smeets@vu.nl</a></td>
<td>0205982572</td>
</tr>
<tr>
<td>Rita Sousa</td>
<td>Vrije Universiteit Amsterdam</td>
<td><a href="mailto:ritass@gmail.com">ritass@gmail.com</a></td>
<td>0205982627</td>
</tr>
<tr>
<td>Hans van der Steen</td>
<td>Erasmus MC - Neuroscience</td>
<td><a href="mailto:j.vandersteen@erasmusmc.nl">j.vandersteen@erasmusmc.nl</a></td>
<td>0107043572</td>
</tr>
<tr>
<td>Jeroen Stekelenburg</td>
<td>Tilburg University</td>
<td><a href="mailto:j.j.stekelenburg@uvt.nl">j.j.stekelenburg@uvt.nl</a></td>
<td>0134668171</td>
</tr>
<tr>
<td>Hans Supèr</td>
<td>University of Barcelona</td>
<td><a href="mailto:hans.super@icrea.es">hans.super@icrea.es</a></td>
<td>+340654551250</td>
</tr>
<tr>
<td>Elena Torta</td>
<td>TU Eindhoven - HTI</td>
<td><a href="mailto:e.torta@tue.nl">e.torta@tue.nl</a></td>
<td></td>
</tr>
<tr>
<td>Rebekka Verheij</td>
<td>VU University Amsterdam</td>
<td><a href="mailto:r.verheij@vu.nl">r.verheij@vu.nl</a></td>
<td></td>
</tr>
<tr>
<td>S. Verheij</td>
<td>Erasmus MC</td>
<td><a href="mailto:s.verheij@erasmusmc.nl">s.verheij@erasmusmc.nl</a></td>
<td>0107043375</td>
</tr>
<tr>
<td>Meron Vermaas</td>
<td>Universiteit Utrecht - Functieel</td>
<td><a href="mailto:meronvermaas@gmail.com">meronvermaas@gmail.com</a></td>
<td>0636412131</td>
</tr>
<tr>
<td>Frans Verstraten</td>
<td>Helmholtz Instituut, Universiteit Utrecht</td>
<td><a href="mailto:f.a.j.verstraten@uu.nl">f.a.j.verstraten@uu.nl</a></td>
<td>0302533371</td>
</tr>
<tr>
<td>Jean Vroomen</td>
<td>Tilburg University</td>
<td><a href="mailto:j.vroomen@uvt.nl">j.vroomen@uvt.nl</a></td>
<td>0134662394</td>
</tr>
<tr>
<td>Marc van Wanrooij</td>
<td>Radboud University Nijmegen</td>
<td><a href="mailto:m.vanwanrooij@donders.ru.nl">m.vanwanrooij@donders.ru.nl</a></td>
<td></td>
</tr>
<tr>
<td>Richard van Wezel</td>
<td>Helmholtz Institute / MIRA</td>
<td><a href="mailto:r.j.a.vanwezel@uu.nl">r.j.a.vanwezel@uu.nl</a></td>
<td>0302432397</td>
</tr>
<tr>
<td>Sander van Wijngaarden</td>
<td>Embedded Acoustics BV</td>
<td><a href="mailto:sander@embeddedacoustics.com">sander@embeddedacoustics.com</a></td>
<td>0888770701</td>
</tr>
<tr>
<td>Maarten Wijntjes</td>
<td>TU Delft - Perceptual Intelligence Lab</td>
<td><a href="mailto:m.w.a.wijntjes@tudelft.nl">m.w.a.wijntjes@tudelft.nl</a></td>
<td>0614382500</td>
</tr>
<tr>
<td>Gerard de Wit</td>
<td>Bartiméus</td>
<td><a href="mailto:gdwit@bartimeus.nl">gdwit@bartimeus.nl</a></td>
<td>0306982354</td>
</tr>
<tr>
<td>Wietske Zuiderbaan</td>
<td>Universiteit Utrecht</td>
<td><a href="mailto:w.zuiderbaan@uu.nl">w.zuiderbaan@uu.nl</a></td>
<td></td>
</tr>
</tbody>
</table>