(Th 1): cancelled

(Th 2): Title of the Project: Competition: Stroop and PWI
Supervisor name: Wido La Heij
Course Requirement: -
Number of positions available: -
Description: Sometimes a stimulus activates different – conflicting response tendencies. In our building – the Pieter de la Court - we are all familiar with the XAFAX card that we use in our copy machines: the back arrows suggest that the left side of the card is the front end, but the two red arrows suggest the opposite. The Stroop color-naming task too, is often viewed as a situation in which two responses – one to the color and one to the word – compete for production. The picture-word interference (PWI) task is a similar paradigm, in which pictures have to be named and participants are required to ignore a superimposed word. For example, participants are presented with the picture of a table in combination with the to-be-ignored word CHAIR. Although Stroop and PWI look very similar, Dell’Acqua et al. (2007) presented evidence that very different processes may underlie the two tasks, with the Stroop task as an example of conflicting responses and the PWI as an example of conflicting conceptual representations.
In our project we investigate this issue by creating a version of the PWI task that is as similar as possible to the color-word Stroop task.
Literature

(Th 3): Title of the project: How to structure your math curriculum: automatic and controlled processes in mathematical cognition
Supervisor name: Dr. B.R. Bocanegra
Course requirements: none
Number of positions available: 2
Description: In this project you will investigate what factors influence the speed of solving arithmetic problems. Solving arithmetic problems (e.g. addition, subtraction, multiplication), requires quite a bit of conscious cognitive control. You have to perceive the numbers and symbols correctly, you have to retrieve knowledge from memory, keep information active in working memory while applying operations. On the other hand, previous studies have shown that numbers can also be processed automatically without any effort. The interesting question then becomes: How does the automatic and controlled processing of mathematical information interact? Do automatic processes help or hinder your ability to solve arithmetic problems? These finding have a wide range of implications for the design of math curricula. In this project you will perform experiments to investigate these questions.
(Th 4): Title of the Project: Color psychology: the effect of red and blue on stopping on time
Supervisor name: Lorenza S. Colzato
Course Requirement: geen
Number of positions available: 3
Description: The color red is known to induce an arousing effect while the color blue is recognized to have a calming effect. In this project we will investigate the effect of these two colors on the ability to stop on time, a core cognitive control function.

(Th 5): Title of the Project: Food supplement tyrosine: a way to reverse drug-induced cognitive decline
Supervisor name: Lorenza S. Colzato
Course Requirement: geen
Number of positions available: 3
Description: The long term use of cocaine is known to reduce the availability of dopamine receptors and it is associated with cognitive decrements. In this project we will investigate whether the supplementation of the food-supplement tyrosine, the precursor of dopamine, may reverse the drug-induced cognitive decline.

(Th 6): Title: Catching the eye with movies
Supervisor name: Marnix Naber
Requirements: Some experience with Matlab, Python, or C-related programming languages.
Number of positions available: 2
Description: When you walk through a shopping mall or when you watch television, some billboards and advertisements with bright colors seem to be striking while others do not even reach your awareness. Similarly, when you are driving a car or your bicycle to the university, the traffic signs may grab your attention while the appearance of the grey pavement is not of your interest. Here we question what is it that determines whether an object or design attracts your attention and comes into awareness.

Graphical designers, artists, and media producers often rely on their intuitive feelings when it comes to the conspicuity and saliency (i.e., eye-catching) of their designs. While intuition might be a useful guide for experts, it is a subjective process prone to error. Thus, designers are generally clueless why their designs are better than others in terms of saliency. A reoccurring design problem is thus the lack of knowledge of objective indicators that attract people’s attention.

One way to investigate saliency is to test how often a design attracts gaze by experimental participants. Such experiments are, however, time consuming and designers typically do not have the financial resources for such projects. A better alternative is to determine consistencies across designs that are known to attract attention and gaze. These consistencies are then implemented in a general computational model which can be applied on any design to investigate its saliency properties.

Many of such models exist and they accurately predict a person’s gaze by indicating the brightest, most colorful, and symmetrical parts in a stable design. These models start by converting a digital image as input and filter this into a so called “saliency map” that tells which parts of a design attract the most attention. The application of such models on dynamical inputs is, however, rare. In this project we develop a similar computational model that converts the input of movies into dynamical saliency maps. The aim is to make ultrafast and efficient predictions of gaze behavior in observers that view videos.
Selection by competition (or not?)
Supervisor name: Wido La Heij
Requirements:
Number of positions available:
Description: Models of language production often assume that in the process of word retrieval several candidate words compete for selection. For instance, when asked to name the picture of a chair, words like “table”, “sit”, and perhaps “stoel” compete with the correct word “chair” for selection and production. This competition was thought to be responsible for all kinds of "Stroop-like" interference effects in word-production tasks. Recently, however, this view was challenged by a group at Harvard University headed by Alfonzo Caramazza. This group proposed a new model (REH) in which Stroop-like interference effects are attributed to the removal of a distractor word from an output buffer. In the thesis project, predictions of the REH will be tested.

Literature

Title of the project: Enhancing cognitive control
Supervisor name: Prof. Dr. B. Hommel
Course Requirement: Fulfillment or current participation in the courses: “Cognitive Ergonomics”, and “The Art of Applying Psychology”.
Number of positions available: to be discussed
Description: Cognitive control functions are needed and responsible for configuring our cognitive system to achieve particular goals and carry out particular tasks. Current models assume that the individual performance characteristics of such functions are relatively constant and part of one's personality and genetic makeup. However, recent observations suggest that control functions are systematically affected by people’s experience and social background (e.g., religion, sexual orientation, context), which again suggests that control functions are sensitive to training and practice. If so, it should be possible to develop training procedures that enhance people's ability to control and configure their own thoughts and actions. The aim of this project to develop such procedures, based on available evidence and theoretical frameworks.

Title of the project: Enhancing human creativity
Supervisor name: Prof. Dr. B. Hommel
Course Requirement: Fulfillment or current participation in the courses: “Cognitive Ergonomics”, and “The Art of Applying Psychology”.
Number of positions available: to be discussed
Description: Human creativity is traditionally treated as a trait, which implies that there are creative and less creative people. However, recent findings from our lab suggest otherwise. Performance in creativity tasks is
systematically affected by the task context, which suggests that it should be possible to train people to become more creative, at least to some degree. The aim of this project to develop training procedures that are able to improve people’s creativity as far as possible.

(Th 10) Developing a hazard perception test

Supervisor name: William L.G. Verschuur
Course Requirement: be in possession of driving license; willing to make video registrations in traffic and edit clips.
Number of positions: minimal 2 (team)

Description

Young drivers are said to be taken more risks than older drivers and feel ‘invulnerable’ to hazards. The hampered performance of novice drivers is often considered to be the result of ‘overconfidence’. All this assumes more or less willfully actions or violations. But is this the whole or even the right picture what happens? Research of McKenna, Horswill and Alexander shows that is probably better to pose another question about novice drivers: Do they see hazards? This opens a whole new approach to study the behavior of novice drivers.

Training skills to recognize hazards appears to be promising in improving the driving behavior of the most inexperienced drivers. According to Groeger (2000), four processes play a role in hazard perception:

1. Detection of looming hazard;
2. Threat appraisal;
3. Selection of actions to avert the hazard;
4. Implementation of actions chosen.

Goal of this study is: to develop a hazard perception (HP) test (based on clips/stills) to measure how well subjects recognize where hazards might appear and how fast they react to them. Such a test should ideally include traffic situations covering the four processes mentioned before and also be applicable to other target groups in traffic like older drivers (for example by including clips/stills on intersections where older drivers experience problems).

The HP test needs to be tested on a small sample of novice drivers (< 2 years driving license) and experienced drivers (>10 years driving license).

The HP test results may be combined with performance on the Lane Change Task (simulator), the Useful Field of View test and Stroop task.

(Th11) Title of the Project: Can game training improve executive functioning?

Supervisor: Dr. K.J.F. Olfers, Room nr: 2A43
Course Requirement: -
Additional Requirement: Dutch-speaking, available from beginning of June (and through the summer). You may already have seen posters and flyers hanging throughout the FSW advertising our Lumosity study. It is an ongoing study in which we test the effects of online game-training on several measures of executive functioning, such as attention, flexibility and working memory, and their corresponding neural correlates. Participants complete four weeks of online game-training at home, using courses provided on the commercial website Lumosity.com. Before and after training, cognitive skills are assessed on several tasks, and EEG is recorded during the sessions.

We have an opening for a student in this project, for either an internship or a thesis research (or a combination). Some disclaimers: since the project is in progress and data-collection is about half-way through, you will have relatively little control/influence over the methods and design. However, the collected data is rich enough to form your own set of hypotheses to investigate for your thesis. You must be available from early on in June, and data collection will continue during the summer. Furthermore, given the nature of the instruction, you must be proficient in speaking Dutch.

(Th12) Title of the Project: The effect of lifestyle interventions on the performance of older adults.
Supervisor name: Dr. G.P.H. Band
Course Requirement: 
Number of positions available: 1
Description: A large-scale study is about to start to test the effect of a set of lifestyle interventions on cognitive performance in the Leiden elderly. Among the interventions are game-training, physical fitness, meditation, social media and cultural immersion. Neuro-cognitive health of participants is tested in pretest and posttest. Internships and theses are possible for elements of this large-scale project.

(Th 13): Light for cognitive enhancement
Supervisor Name: Dr. G.P.H. Band
Location: Philips research, Eindhoven
Requirements: EEG training, preferably Matlab experience, cognitive neuroscience
Period: 6-9 months (internship + thesis combined)
Number of positions available: 1
Description: Light has been proven to affect cognitive functioning both via its role as provider of visual information as well as its direct activating effects (bright light, oscillating light). The purpose of this assignment is to investigate properties of light relevant to memory, attention and other cognitive functions. Activities include literature review, familiarization with brain signal research (EEG), experimentation and analysis. Temporary housing in Eindhoven is facilitated for students working at Philips research.
NOTE: Philips Research starts new projects and finishes existing projects regularly. For a current overview of project options at Philips Research, contact Guido Band.