The HealthPAC project received its funding from the EU 7th Framework Programme Marie-Curie FP7-PEOPLE-2013-ITN under IDP Grant agreement nr. 604063

Name ESR and number in HP: Andrea Bertana, 11
Nationality: Italian
Research work-package (select): WP3 (HEAR), WP4 (FEEL), **WP 5 (SEE), WP 6 (ACT)**

Starting date ESR: 01/10/2014
Supervisor and co-supervisor: Janneke Jehee & Sam Ling
Host-institution - Department: DCCN

RESEARCH

RESEARCH PROJECTS AND RESULTS FROM **01/01/2014** UNTIL **31/12/2017** ***(use 1-2 pages)***
(for each project give title, its goal(s), the main results and conclusions, with a representative photo/figure which we can use on the Website!
Indicate, where appropriate, Milestone/Deliverable number (see Annex 1 pp 25-26)

Project 1-3: Confidence in perceptual decision making

Although confidence is commonly believed to be an essential element in decision making, it remains unclear what gives rise to our sense of confidence. In these projects, we investigated the mechanisms that underlie our ability to evaluate our own beliefs.

Recent probabilistic theories propose that confidence is computed, in part, from the degree of uncertainty in sensory information. If confidence indeed reflects the imprecision of perceptual evidence, then this gives rise to several predictions. Specifically, greater levels of confidence should predict 1) less variable behavior, and 2) smaller biases in perception, as both behavioral variability and perceptual biases are linked to uncertainty.

In the first series of experiments, we tested these predictions using a combination of psychophysics and computational modeling. Participants viewed a stimulus that consisted of an array of 36 gabor patches, and reported both the mean orientation of the array, and their confidence in this estimate. Patches were variable in orientation (drawn from a Gaussian distribution), and five noise levels were used to parametrically manipulate uncertainty (s.d. = 0.5, 2, 4, 8 and 16).

Corroborating the first prediction, we found that for a given stimulus orientation, confidence reliably predicted behavioral variability. Specifically, orientation estimates were more precise with higher confidence, both across and within levels of orientation noise. Surprisingly, however, the results deviated from our predictions when comparing between stimulus orientations: although orientation judgments were more accurate for cardinal orientations (a phenomenon known as the oblique effect), confidence was higher for oblique orientations. In addition, we observed no reliable link between

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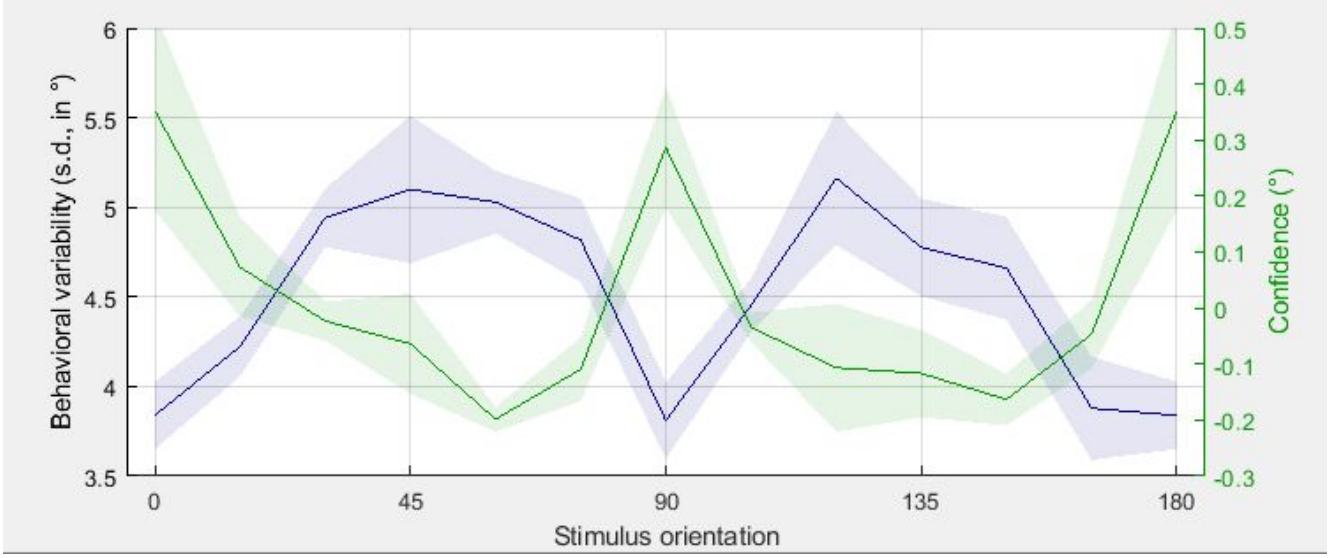
confidence and the magnitude of behavioral biases. Rather than being consistent with Bayesian decision theory, we argue that these results are better explained by the ability of observers to perceive the degree of orientation noise in the stimulus – a heuristic to confidence.

Follow-up experiments will further investigate these and other mechanisms of perceptual decision-making.



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OUTREACH ACTIVITIES

OUTREACH ACTIVITIES FROM 01/01/2014 UNTIL 31/12/2017

(mention your public presentations on open days, participation in general public events, press, etc. etc.: when, what and where).

Your publications: those that have been submitted/published (provide all bibliographic details), and those that you are currently finishing: give title, and foreseen journal, if possible)

Are there any patents? New foreground? Applications for the general public/society?

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Outreach
HelthPAC website (2015)

Publications:
Target journal: Journal of Neuroscience (in preparation)
Confidence predicts variability but not biases in perceptual decisions*. Andrea Bertana, Ruben S. van Bergen, Sam Ling, Janneke F.M. Jehee*

TRAINING ACTIVITIES

TRAINING ACTIVITIES FROM 01/01/2014 UNTIL 31/12/2017
describe your courses (received and given), (summer)schools, and your Secondments: when, what, and where

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Courses received:

- Optimizing Cognitive function (NWIFMT021): mandatory HelthPAC course, (October – February 2014 - 2015)
- Local (at DCCN) daily courses: How to run your experiment? How to manage the HC cluster? (2015)
- Linear Algebra. A course offered by MIT online on MITopencourseware. Exam was not certified but all exercises online were completed. (2016).
- Machine Learning Course offered by Stanford University on Coursera. Exam was not certified but all exercises online were made. (2016)
- Literature review of Journals: Science, Journal of Neuroscience, PNAS, Plos Biology and Plos Computational Biology. Discussed monthly at lab meeting. (2014 – Ongoing)
- Good clinical practice (GCP-WMO) – exam certified on 2 December 2016

Teaching:

- TA at Programming I (NWI – NP033B) – (2015)
- Daily lecture to kids (8 -10 yrs) on visual illusion – (2015)
- TA at Programming in Matlab (NWI-MOL085) – (2017 – planned for 2018)

Schools:

- HealthPAC winterschool (2015)
- Cosmo summerschool (2015)
- HealthPAC business school, November/December 2017, Nijmegen and Eindhoven

Secondments:

- Visiting Sam Ling Lab @ Boston University, 15 July – 15 September, 2017.

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CONFERENCES
CONFERENCES, WORKSHOPS FROM 01/01/2014 UNTIL 31/12/2017 ***(mention which conferences and workshops you have attended: when and where)***
Conferences: - Donders discussion, November 5-6, 2015 in Nijmegen - VSS 2016, May 13-18 in Tampa (Florida) - VSS 2017, May 18-23 in Tampa (Florida)

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FUTURE CAREER PLANS
Describe your future career plan(s), after the end of the project. Note: the PhD is obtained *after* HP (31/12/2017!), so it's part of the future career plan. What are your career plans after obtaining your PhD?
My intention is to obtain the PhD in late 2017- early 2018. Then, I'd like to move back to my home country (Italy) and purse a career there; probably outside academia.