Hörmetjan Yiltiz

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Education Background

Department of Psychology, Peking University **Beijing**
B.S. in Psychology *2010–2014*
Key Courses: Cognitive Psychology, Experimental Psychology, Psychological Assessment, Social Cognition, Neuropsychology, Functional Anatomy of Central Nervous System, Social Psychology, Engineering Psychology, Psychological Statistics, Data Structure and Algorithm, Introduction to Computation, Probability Theory and Statistics

Areas of Research Interest

Affective computing, computational modeling, emotions, decision-making, crossmodal perception.

Academic Experience

Research Activities

Center for Brain and Cognitive Sciences, Peking University **Beijing**
Supervisor: Prof. Lihan Chen, clh20000@gmail.com *2014–Present*

- 2014 — Present: **Yiltiz, H.** & Chen, L. (2014). Tactile input and empathy ability modulate the perception of ambiguous biological motion. *Frontiers in Psychology*. (Manuscript in preparation, abstract accepted).
- 2013 – 2014: **Tactile Input Resolves Complex Biological Motion Visual Perception.** Undergraduate thesis (received A+).
- 2012 – 2013: **Meaningful Biological Motion Perception Affected by Tactile Cue.** Supervised independent project, funded by *Beijing Innovation Projects for Undergraduate Students.*

Key Laboratory of Noise and Vibration Research, Chinese Academy of Sciences **Beijing**
Lab Assistant, supervisor: Prof. Ming Bao, baoming@mail.ioa.ac.cn *2012–2013*
Helped set up a new Auditory Localization Lab, responsible for lab space design, test parameters and technical assistance.

Motor Control Lab, Department of Psychology **Beijing**
Research Assistant, supervisor: Prof. Kunlin Wei, wei.kunlin@gmail.com *2011–2013*
Implemented virtual reality experiment program for automatic hardware-aided targeting of flying objects.

International Conferences

- **Yiltiz, H.** & Chen, L. (2013). Tactile inputs resolve the ambiguous perception of biological point light walkers. *Vision Science Society*, USA, Naples, Florida. doi: 10.1167/13.9.190
- **Yiltiz, H.** & Chen, L. (2013). Tactile temporal groupings bias perception of ambiguous point light walkers. *The 9th Asia-Pacific Conference on Vision.* China, Jiangsu, Suzhou. doi: 10.1002/pchj.32

Internships & Social Activities

Xinjiang Education Institute **Urumqi, Xinjiang**
Instructor for Developmental Psychology *July – Sept 2014*
Delivered 40 class lectures on Preschool Child Psychology, organized five class activities and a final examination.

The 23th World Philosophy Congress (23th WCP) **Athens, Greece**
The Secretary-General, Delegation of Peking University for 23th WCP *Aug 2013*
Responsible for official business, paper submission, publicity and socializing with related participants.

International Congress for Traditional Chinese Medicine **Xinmi, Henan**
Simultaneous interpretation from English to Chinese for the keynote speakers. *Oct 2012*

Beijing Huilongguan (Psychiatric) Hospital — **Beijing**
Mental Health Evaluation, supervised by Prof. Mingyi Qian, qmy@pku.edu.cn — *May 2013*

Weixiuyuan Kindergarten & Pei–Chi School for Intellectually Disabled Children — **Beijing**
Psychological Development Consultant, supervised by Prof. Yanjie Su, yjsu@pku.edu.cn — *Nov 2012*

Western Cultural Exchange Association, Peking University — **Athens, Greece**
Leader of the Financing Division — *2012 – 2014*
Sought funding from relevant companies and provided lecture opportunities for financial support.

Arts of Declamation Association, Peking University — **Beijing**
Leader of the International Division — *2010 – 2012*
Recruited international students and cooperated with other students' association for interdisciplinary lectures.

Honors & Awards

2012 – 2014, each year: Awards for Outstanding Campus Social Activities.

2010 – 2014, each year: National Scholarship for College Students.

2013: Best Translator of The Year by *National Literature* for translating **The Old Man and the Sea** to Uyghur.

2011: Awards for Outstanding Class Leader.

Languages & Standardized Tests

Uyghur: First language — *Native, orally fluent, academic competent*

Mandarin: Second language — *Native, orally fluent, academic competent*

English: Foreign language — *orally fluent, academic competent*

- TOEFL – 109 (Reading 29, Listening 30, Speaking 23, Writing 27) Oct 2014.
- GRE – 325 (Verbal 158, 78%; Quantitative 164 ,90%; Analytically Writing 3.0, 15%) Oct 2014.

Arabic: Foreign language — *Basic words, phrases and daily communication*

Computer Skills & Projects

Numerical: Proficient at MATLAB® & Python for experimental design, visualization, data cleansing & analysis, pattern recognition, probabilistic models, digital analog I/O; also at R & SPSS for statistics.

OS: Proficient at Linux & Windows for OS administration, networking and database management (MySQL).

Misc: Familiar with LaTeX, Endnote for academic writing, and Lisp for optimization & pattern recognition.

Projects

Point Light Walkers: An open source MATLAB® toolbox for biological motion research providing:
https://github.com/hyiltiz/PLW

- Various straightforward psychophysics experimental design;
- 4 dimensional data transformation representing biological motion animation in 3D space;
- Visual, auditory and tactile simulation with high precision response capturing;
- Semi-automated data cleansing and data analysis (ANOVA, MAVONA, rANOVA and more);
- Easy producing various academic plots for publishing or presentation.

QuiCK Customizable K(q)uestionnaire: An open source MATLAB® toolbox for social survey providing:
https://github.com/hyiltiz/QuiCK

- Several ready-to-use basic structures as templates;
- Support for multiple choice questions with several and/or several answers with reaction time capturing;
- Seamless integration with psychophysics experiments using Psychtoolbox library;
- Customizable instructions for each item or each sub-scale separately;
- Automatic encoding to generate the result for each sub-scale.

Statement of Purpose

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Department of Brain and Cognitive Sciences
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November 13, 2014

Dear Sir or Madam,

As an Uyghur, I was raised in a conservative culture where literature, especially scientific ones, is scarce. From early on I felt a hunger for knowledge. With longing leading my way, I went to Changchun, for high school where I stood out as the first one among both local and ethnic minority students, ever since the foundation of my high school 60 years ago, to be enrolled in Peking University. The desire grew stronger.

Due to this desire, I tried to transfer to the Physics Department during my freshman year, because I thought the strict mathematical approach in Physics to measurable phenomena was the only way to clarify complex questions. I soon decided that Physics was not for me and focused on Psychology. Yet I already chose courses according to Physics Department's syllabus, and I ended up with poor grades in most of my courses taken in Physics Department which are reflected in my overall GPA.

However, this experience led me to the conclusion that Physics was not the only scientific approach to satisfy my curiosity. In the beginning of my sophormore year, I joined Prof. Lihan Chen's Multisensory Lab and learned about experimental design. He encouraged me to start my own research and pointed me into directions whenever I needed help. The research was my first dive into the scientific world and I was so excited! In the experiment, two different colored point light walkers (dots representing joints of a walking person) with opposite local walking directions (left or right) were presented on the center of the screen simultaneously where walkers were masked by grey dynamic random noise dots and were projected through anachrome optical diopter glasses. Also, I simulated the visual footfall of the walkers with tactile stimuli on participant's corresponding index finger. They reported perceived dominant direction of visual walker with two pedal switch. The question was whether this tactile input can interfere with visual perception, countering the dogma that *seeing is believing*. I found, though task-irrelevant, tactile stimuli could still resolve binocular rivalry between ambiguous walkers under mask. However the same effect did not exist for inverted walkers, suggesting that the presence of the tactile input affects *high-level* processing in visual modality. I also won the *Beijing Innovation Fund for Undergraduate Students* for this project. Immersed for over 800 research hours in designing the experiment, implementing it in mostly self-taught MATLAB, carrying out the experiment, analyzing the data and then writing out the report, I learnt how to scientifically approach a specific problem and enjoyed solving intriguing puzzles in this manner. In addition, I understood that the scientific understanding of the human mind is one of the greatest intellectual challenges of our time, far more than that of matter. The exquisite complexity and sophistication of human intelligence has made it one of the most enticing and enduring scientific mysteries.

Since then, I tried to generalize my findings and tackle the underlying mechanism. To investigate a similar phenomenon in directional depth perception (inwards vs. outwards), I applied stereoscope for 3D visual stimuli (Two different colored walkers were presented on each side of the screen slightly tilted symmetrically along azimuthal axis and therefore triggered depth perception.) The results were promising and were pre-

sented in Vision Science Society's annual conference in Naples, Florida 2013. Then I tentatively adjusted the configurations of the tactile input's temporal structure, which was published in Asian Pacific Conference of Vision in Suzhou, China the same year. Still, generalization was not enough; I needed to go deeper for a more complete explanation. Perception of a man walking towards you or away from you might be very different for people depending on their internal structure. Therefore, for my undergraduate thesis, I asked whether individual's mental states influences this modulation of the tactile input to visual perception. Measuring social *anxiety* and interpersonal reactivity such as *empathy concern*, I found the presence of a similar effect which is stronger in observers with high empathy concern level. In addition, higher interpersonal reactivity influenced the directional perception of walkers more easily when a positive face valence background (*happy face*) was presented. Subjects with higher social anxiety demonstrated a stronger facing bias than did the group with lower social anxiety. This pattern was not observed with random dot stimuli (without biological meaning). Overall, the data showed that perception of ambiguous walkers could be resolved by tactile input and modulated by high-level social cognitive styles (empathy and social anxiety).

During these three years of research on cross-modal perception, I implemented my work as a library for biological motion research through a substantial effort, reaching over 8500 lines of Matlab code. The fact that ideas could be clearly and systematically implemented into programs seemed both interesting and challenging to me. I was captivated by GNU/Linux and learned many programming languages and computation techniques such as pattern recognition, optimal control etc., and read from Gödel incompleteness theorem to Turing machine, and to Minsky's *The Emotion Machine*. I also took an advanced seminar for graduate students at Tsinghua University on *Bayesian Modeling of Perception* by Prof. Weiji Ma from New York University. Besides, I worked in Prof. Kunlin Wei's Motor Control lab, implementing a virtual reality world in Python where a participant wears a headset and uses a joystick to target flying objects in the sky. This program could be used to reduce reaction-time and operation delay in relevant tasks. Applied in military, this skill could potentially save countless lives of soldiers.

My interest in social cognitive styles and computation urged me to find an answer to this question: *Whether and to what extent can computers recognize and emulate human emotions?* Intelligence is one important dimension in humans cognitive abilities while other dimensions such as emotions and creative-thinking played an as important role interchangeably and inseparably. However, intelligence has been the main concern in the majority of AI community. I read Picard (1995) on *Affective Computing* and some of her recent papers, and felt a sense of belonging. I want to combine my psychology experience with a deepened understanding of CS theories and AI techniques to answer this question. I would like to address this questions with probability-based computational modeling, using facial-expression recognition, wearable sensors and real-time visual rendering facial expressions representing various emotions. I am also open to any interesting new approaches or even topics. I am planning to join Prof. Picard's Affective Computing Group in MIT Media Lab if I were admitted to the PhD program in Brain and Cognitive Sciences at MIT.

Yours faithfully,

Hörmetjan Yiltiz

Attached: curriculum vitæ