

Integrative Processes in the Perception of Tactile Apparent Movement

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OBJECTIVES

- To evaluate the optimal parameters for presentation of apparent motion on a vibrotactile display on the abdomen, using arrays with different numbers of tactors while manipulating parameters of stimulation such as timing of vibratory bursts and tactor separation.
- To determine whether a perceptual illusion (sensory saltation) could be used as effectively for presentation of good apparent motion as a display with twice as many active sites.

ACCOMPLISHMENTS

- Designed and developed tactor software and hardware system for testing apparent motion with vibrotactile stimulation on the abdomen using 4 - 36 tactors with precise control of temporal parameters;
- Conducted studies evaluating the effects of spatiotemporal parameters on several qualities of tactile apparent motion;
- Conducted studies directly comparing the effectiveness of two presentation modes (illusory vs. veridical) on tactile apparent motion to determine whether they can substitute for one another, potentially reducing weight and system complexity in the case of the saltatory mode;

PUBLICATIONS/ PRESENTATIONS

- Schwab, A. (in preparation). Dissertation based on these studies for the doctoral degree for the Social Science Faculty, University of Mannheim, Mannheim, Germany.

- Cholewiak, R. W. Schwab, A., Beede K. (2003). *Vibrotactile apparent motion on the abdomen: A comparative analysis of presentation mode*. Presentation at the Psychonomic Society meetings, November 7, Vancouver BC, Canada.

ASSOCIATES:

Research Assistants:

Anja Schwab, Kristen Beede, and Kelly Johnson, LT, USN



Project Title: Perceptual integration among the tactile, visual, and vestibular senses

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with Anja Schwab, Kristy Beede, and LT Kelly Johnson, USN**

Perceptual Integration	2001				2002				2003			
	1	2	3	4	1	2	3	4	1	2	3	4
Milestone (including Studies, Presentations)												
<i>Initial IRB Submission/Approval</i>	X	X										
<i>Apparent Motion software & hardware preparation</i>	X	X			X		X		X		X	
Schwab visit to Princeton Lab for training – <i>Sept 11, 2001</i>			X									
Perception of direction of tactile apparent motion on the abdomen (8 Ss)					X							8
Perception of saltation as a function of tactor separation on the abdomen (11 Ss)					X							11
Perception of quality of tactile apparent motion on the abdomen – pilot studies (10 Ss)						X						10
Presentation to Psychonomics Society, Kansas City								X				
Perception of quality of tactile apparent motion on the abdomen [at 250 Hz / 80 Hz] (23 Ss)						X	X					23
Discrimination of veridical versus salutatory tactile apparent motion on the abdomen [250 Hz] (21 Ss)						X	X					21
Discrimination of veridical versus salutatory tactile apparent motion on the abdomen [80 Hz] (21 Ss)							X	X				21
Discrimination of veridical versus salutatory tactile apparent motion on the abdomen [7 tactors] (22 Ss)							X					22
Discrimination of veridical versus salutatory tactile apparent motion on the abdomen [7-tactors sp navel] (24 Ss)								X	X			24
Discrimination of veridical versus salutatory tactile apparent motion on the abdomen [250 Hz] (20 Ss)						X	X					20
Discrimination of veridical versus salutatory tactile apparent motion on the abdomen [80 Hz] (20 Ss)							X	X				21
Presentation to Eurohaptics'01, Birmingham, GB											X	
Presentation to Psychonomic Society, Vancouver CA											X	
Total number of subjects tested (not including c. 19 whose data were unusable)												181