

## Affordances for Stair Climbing Is Induced by Standing Conditions and Perceptual Systems

Chia-Sheng Huang,<sup>1</sup> Chih-Mei Yang,<sup>1</sup> Chih-Hui Chang,<sup>2</sup> and Hank Jwo<sup>1</sup>

<sup>1</sup>Department of Physical Education, National Taiwan Normal University

<sup>2</sup>Department of Physical Education, National Kaohsiung Normal University

Affordances in ecological psychology refer to a specific relation between the individuals and their environment. The definition for the properties of environment should refer to the characteristics of animals and be interpreted through the concept of body scale. This study, based on the ecological approach, was designed to investigate haptically and visually guided stair climbability. Affordances were examined for perceived maximum riser heights by changing individual's standing heights. Twenty-four adults were recruited, and randomly assigned to either haptic judgement group or visual judgement group. Participants were asked to judge whether each stair height is climbable if raised single leg only. The judgments were made through two perceptual modalities, viewing and exploring with a white cane. Three experimental conditions were arranged when participants made their judgments either standing on the real floor, standing on 10-cm height raised floor, or wearing 10-cm height blocks. An adjustable stair was used to measure perceived maximum raiser heights of participants, and the critical ratio was calculated by comparing the height to the leg length of participants. The results showed that perception of affordances for maximum riser heights would not be influenced by standing heights. The relation between the lengths of the individual's legs and the stair heights would maintain invariant. Despite individuals perceived maximum raiser heights with different perceptual systems, the accuracy and confidence of haptic and visual judgment did not differ. Our finding was identical with the viewpoint of perceptual equivalence. The perceived maximum raisers height by the haptic exploration might not be specified merely by the concept of body scale with leg length. Future research could examine the factors such as the properties of body components and objects to clarify the affordances of climbing stair.

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