

K. ISHIHARA, K. OOGOMORI, M. NAGAMACHI, S. ISHIHARA. An electromechanical whack-a-mole-type game for older people. *Gerontechnology* 2010;9(2):294;

doi:10.4017/gt.2010.09.02.140.00 **Purpose** A 'whack-a-mole'-type electromechanical game for an older player to maintain his cognitive abilities. The game is intended to incorporate tests for reaction time, short-term memory, shift of visual attention and action control. Players of our whack-a-mole-type game move their bodies with easy rules, unlike small game-machines, such as Nintendo DS, where they move only their fingers. Our proposed game machine is portable and inexpensive, whereas some whack-a-mole of arcade game machines, such as Namco Waniwani Panic, used for old people's physical rehabilitation in hospitals or care facilities are immovable and expensive. **Method** The machine (Figure 1) has twelve pairs of lights and a push button placed in a box 32 cm wide and 23.5 cm deep. It is small enough for a player to see in a view field. Each push button has a switch 3 cm in diameter, settled on a spring that is large and flexible enough for an elderly person to push. The player is required to push a button whose light is on within a time limit. The game is composed of seven levels of difficulty; simple reactions to the light are required in the lower levels. In the higher level, the player is required to wait until the second or third light turns on and react to it. Time limits are varied from 1000 to 1500 msec. The intervals of lighting from the last light to the next one were randomly changed between 500 and 1200 msec. The time limits and intervals become shorter as the game progresses. The game program is run on an Arduino MEGA, an electronic circuit board loaded with Atmel AVR micro-controller ATmega1280, and has pins for digital/analog input and output. Thirty-three people who attended a meeting held at the local public hall played our game one by one. They were men and women aged between 55 and 88 years old. The results, whether the player succeeded or failed and the reaction time for each trial, were recorded. Each player was interviewed after finishing the game to collect his/her impression. **Results & Discussion** The participants showed a gradual reduction in task completion as their age and the game level increased. The participants who were younger than 70 years old completed all tasks with little effort, although young students who were around 20 years old completed easily. Older participants showed difficulty waiting for or shifting attention to the second or third lights turning on in later levels of the game. The oldest group, who were older than 80-years of age, sometimes failed to react in even the early levels. According to the results of the game, the setting of game levels was considered to be suitable for older people. In the interview, 91% of the participants answered the game was interesting, and 98% of them answered that they would like to play the game again.

**Keywords:** cognitive abilities, electromechanical game

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Figure 1. The proposed electromechanical whack-a-mole-type game for older people