Part-Task Training versus Whole-Task Training for Simple versus Complex Tasks

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ABSTRACT

Purpose: To examine whether part-task or whole-task training is superior for teaching complex versus simple tasks. The researchers also will measure performance at two different times (3 weeks apart) to distinguish between measures of immediate performance and measures of actual retention or skill acquisition.

There is a plethora of approaches to training people on complex tasks. There are many part-training methods, and because of this, some researchers suggest that the components of a task that a trainer chooses to focus on determines whether part-task training will show more favorable results than whole-task training (Wightman & Lintern, 1985). Wightman & Lintern (1985) suggest that the effectiveness of part-task training in part depends on the schedule in which the parts are practiced. Other researchers suggest that the qualities of the task, not the training method, determine which method will be superior. (Naylor & Briggs, 1963; Anderson, 1968; So, Proctor, Dunston, & Wang, 2013). One measure that has been neglected throughout most research is retention. Most studies have either only measured immediate performance or measured retention the same day as training or a day after.

Hypothesis: Part-task training will be superior for training complex tasks.

METHODS

Pilot

A pilot test was run to determine the specific tasks to be assigned. Graduate students played a variety of Wii games in one sitting. The games consisted of archery, bowling, tennis, and sword fighting. After sampling each game, the students filled out a scale adapted from Maynard and Hakel in 1997. This scale included items that assessed the subjective complexity and difficulty of each game as well as measuring the motivation of each student playing the game. The Likert scale consisted of 7 ratings ranging from Totally Disagree to Totally Agree. Subjective task complexity consisted of five items, and motivation consisted of four items. Each variable was scored by taking the averages of the items coinciding with each variable. The researchers chose sword fighting as the simple task to be compared because it had the lowest subjective task complexity rating of 2.12 out of 7. Respondents also reported having the least motivation with this game, with an average motivation rating of 5.5 out of 7. The researchers chose archery as the complex task because it had the highest average subjective task complexity rating of 5.72 out of 7. Respondents also reported an average higher motivation rating of 6.4 out of 7.

Participants

For this study, approximately 300 students from Middle Tennessee State University (150 males and 150 females) will be randomly assigned to conditions part/whole and simple/complex. A SONA research pool will be used to recruit participants, and these students will receive research credit for their participation. Students will receive one credit for showing up for the first session, but they will not receive a second credit until they show up for the second session. Variables that were taken into account include age, class, gender, and dominant hand.

Apparatus

All training sessions and tests will be performed using the Wii. The researchers will use the archery game as the complex task and the sword fighting game as the simple task. The archery game was chosen as the complex task due to the fact that it has three different difficulty levels. These different levels allowed the researchers to break down the entire game into smaller parts that could be trained. It also had the highest average subjective task complexity score. Sword fighting was chosen as the simple task because it also consisted of different difficulty levels, and it had the lowest subjective task complexity score.

ARCHERY

SWORDPLAY

Experimental Task and Design

The simple task chosen by the researchers was the sword fighting game on the Wii, and the complex task was the archery game on the Wii. In the part-task condition of the archery task, participants will practice three different levels of difficulty for the archery game: beginner, intermediate, and expert. Each level has four targets to hit, and the individual has three opportunities to hit each target. The whole-task condition consists of only the expert level. The objective of the game is to aim as closely to the bullseye as possible. The closer one gets to the bullseye, the more points an individual receives. The researchers will determine training method effectiveness by measuring individual performance on the highest level of the game. Performance will be measured by total points scored by each individual participant. More points indicate higher performance, which will in turn show which training method is more effective. All participants will be measured at two different points in time: immediately after training and approximately three weeks after training. The initial test measures immediate performance, and the second test measures retention, which in turn measures skill acquisition.

DATA ANALYSIS

A two-way MANOVA will be conducted to test the effects of training method (part task, whole task) and task type (simple, complex) on skill acquisition (session 1, session 2), resulting in one MANOVA per session. Before training, participants will be surveyed to determine if they have used a Wii before and if they have played their assigned task before. If they have, they may be asked approximately how many times they have played. After the retention test, the researchers will administer a post-experimental questionnaire to the students in each condition. This questionnaire asks if any student had ever played the assigned game on the Wii prior to this study. The students will also be asked if they have played the game in between the time the immediate test of performance was taken the retention test. If students answer yes, then they will be asked how often they played and for how long. An additional variable that was not included in the analysis but will still be measured is state affect before and after training. The researchers want to observe whether there is a correlation between state affect and performance.

ANTICIPATED RESULTS

The researchers anticipate an interaction where people in the part-task condition for the archery task will perform better during the second session. As for the sword fighting condition, the researchers have no hypothesis for how each condition will perform. As for immediate performance during the first session, the researchers have no hypothesis for how any of the four groups will perform. However, the researchers anticipate that the results may depend on how many trials of the game each individual completes in one practice session.

Adapted Task Complexity Scale from: Maynard & Hakel, 1997