Mastering physical movement occurs through motor learning and experience. Motor development is needed for successful acquisition of sport and other physical skills. A lack of motor skills has been associated with decreased physical activity later in life, which has been linked to a variety of hypokinetic diseases. The current pilot experiment will examine the differences in motor skill acquisition in college aged students. The pilot experiment will lead into a larger scale experiment examining acquisition across the lifespan, specifically the differences between elementary age students, college age students, and middle aged to older adults. The first year of the project included an extensive literature review followed by a pilot examination of the number of trials it takes to master a new skill in each college age specifically.

The purpose of this literature review was to gather information for a future research project to understand differences in new skill mastery and self-regulatory feedback mechanisms across the lifespan. A secondary purpose was to determine the most successful motor skill learning methods that could be used to further expertise in the classroom, athletics, and work place.

The literature review examined skill acquisition in a variety of age groups ranging from children to older adults. The review had several key findings outlined below:

- **Young adults ages 23-42 yrs old**
- **Motor skill learning requires time and has two distinct phases:** 
  - **Fast learning:** An initial, fast improvement phase; 
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Lifespan changes in motor activation and inhibition during choice reactions: A Laplacian ERP study

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**Abstract**

Mastering physical movement occurs through motor learning and experience. Motor development is needed for successful acquisition of sport and other physical skills. A lack of motor skills has been associated with decreased physical activity later in life, which has been linked to a variety of hypokinetic diseases. The current pilot experiment will examine the differences in motor skill acquisition in college aged students. The pilot experiment will lead into a larger scale experiment examining acquisition across the lifespan, specifically the differences between elementary age students, college age students, and middle aged to older adults. The first year of the project included an extensive literature review followed by a pilot examination of the number of trials it takes to master a new skill in each college age specifically.

**Purpose**

The purpose of this literature review was to gather information for a future research project to understand differences in new skill mastery and self-regulatory feedback mechanisms across the lifespan. A secondary purpose was to determine the most successful motor skill learning methods that could be used to further expertise in the classroom, athletics, and work place.

**Methods**

Eighteen (18) subjects, ages 18-25 with no previous injuries and no previous martial arts experience, were recruited to learn, perform, and attempt to master a side kick movement. Participants completed an informed consent basic health history questionnaire. Participants were randomly assigned into one of three groups: visual feedback, auditory feedback or no feedback. Prior to the trials, subjects did a light warm-up and viewed a video of the movement. Each participant began their 20 trials using the preferred side of the body within 5 minutes of viewing the instructional video and watched the video throughout all attempts. The attempts were recorded with a video camera on a tripod set at the same angle for each trial. Participants were asked to perform the skill for 20 trials while only receiving the type of coaching feedback each participant was assigned. Visual feedback groups were placed in front of a mirror, auditory feedback groups were given verbal feedback from the research team after each attempt, and the no feedback group did not receive any form of feedback. At the start of the trials and after every 5th attempt, each participant was asked to give feedback on how confident (self-efficacy) they were that they could master the movement. Upon finishing, the research team determined what trial, if at all, mastery was met from each individual. Data was collected and analyzed using the video tripod, the research team, and the previous data collected from each individual.

**Results and Discussion**

A total of 18 subjects (9 male and 9 female) participated in the study. Six (6) subjects were assigned to each type of feedback group. Self-Efficacy

Self-Efficacy was evaluated by the following question: “How confident do you feel (0-100%) that you will master the sidekick movement within the 20 trials?” All feedback groups increased confidence with the auditory group increasing the most (18%) and the no feedback group increasing the least (8%). The auditory feedback group was the least confident at the end of 20 trials, possibly due to having many critiques over the span of 20 trials. The visual group was the most confident after 20 trials. Both genders increased confidence over 20 trials with males increasing by 7% and females increasing by 18%.

Average percent confidence (0-100%) by gender (pre to post)

- **Males:** 77%-84%
- **Females:** 74%-92%

From the pre-test to the final efficacy test, entire group percentage increased significantly.

- **Pre-test mean**= 75.94%
- **Post test mean** = 88.28%
- **P=.021**

**Mastery**

Only 7 subjects achieved mastery (5 subjects auditory and 2 subjects visual). No subjects achieved mastery from the no feedback group.

**Qualitative Results**

Most visual feedback participants weren’t watching themselves in the mirror and need to be reminded that they should view themselves while performing the movement. Some participants mastered the movement and then plateaued and regressed. This happened in all three feedback groups.

**Future Directions**

- Examining the number of trials it takes to master a new skill with a full-scale experiment in children, young adults, and older adults
- Self-regulatory feedback mechanisms that are most successful in each age category (auditory, visual, kinesthetic)
- Discover the most successful motor skill learning methods
- Examine the role that self-efficacy plays in skill acquisition
- Could be used to further expertise in the classroom, athletics, and work place

**Corrections and Human Errors**

- Tell volunteers what to wear: no baggy or too restrictive clothes
- Use an easier skill - more people need to be able to reach mastery
- Use verbal feedback to use mirror
- Use positive language critiques; “what to do”
- Ask “Do you consider yourself a better visual or auditory learner?”

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