



# Self-Control of Knowledge of Performance Leads to Learning Benefits in Children

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## Introduction

- Previous research has shown that having control over one's own feedback schedule (self-control) when practicing a skill leads to learning benefits in comparison to practicing under an experimenter-defined feedback schedule. This phenomenon has been shown in both adults and children for a wide variety of tasks, but the mechanism behind it remains unclear. Some of the proposed mechanisms include increased use of self-regulatory processes, deeper information processing on the part of the learner and feedback being better suited to the learners' needs.
- The self-regulatory processes believed to have a role in self-control of learning are:
  - **Self-efficacy:** an individual's belief in their ability to perform a certain task
  - **Intrinsic Motivation:** an individual's motivation that is a result of interest and/or enjoyment in the task being performed

## Purposes

- The first purpose of this experiment was to determine if self-control over knowledge of performance (KP) leads to motor learning benefits in children.
- The second purpose was to examine the possible role of the self-regulatory processes of self-efficacy and intrinsic motivation in motor learning.

## Participants

- One hundred male and female children (M= 46, F= 54) between the ages of 7 and 15 years (M= 11.1, SD= 1.87), with no previous experience on double-mini trampoline,

## Methods

- Participants moved through a progression of double-mini trampoline routines increasing in difficulty.
- The self-control group could view a video of their performance (KP) at their own request. The experimenter-defined group (yoked) received KP according to the schedule of an age and gender matched participant in the self-control group.

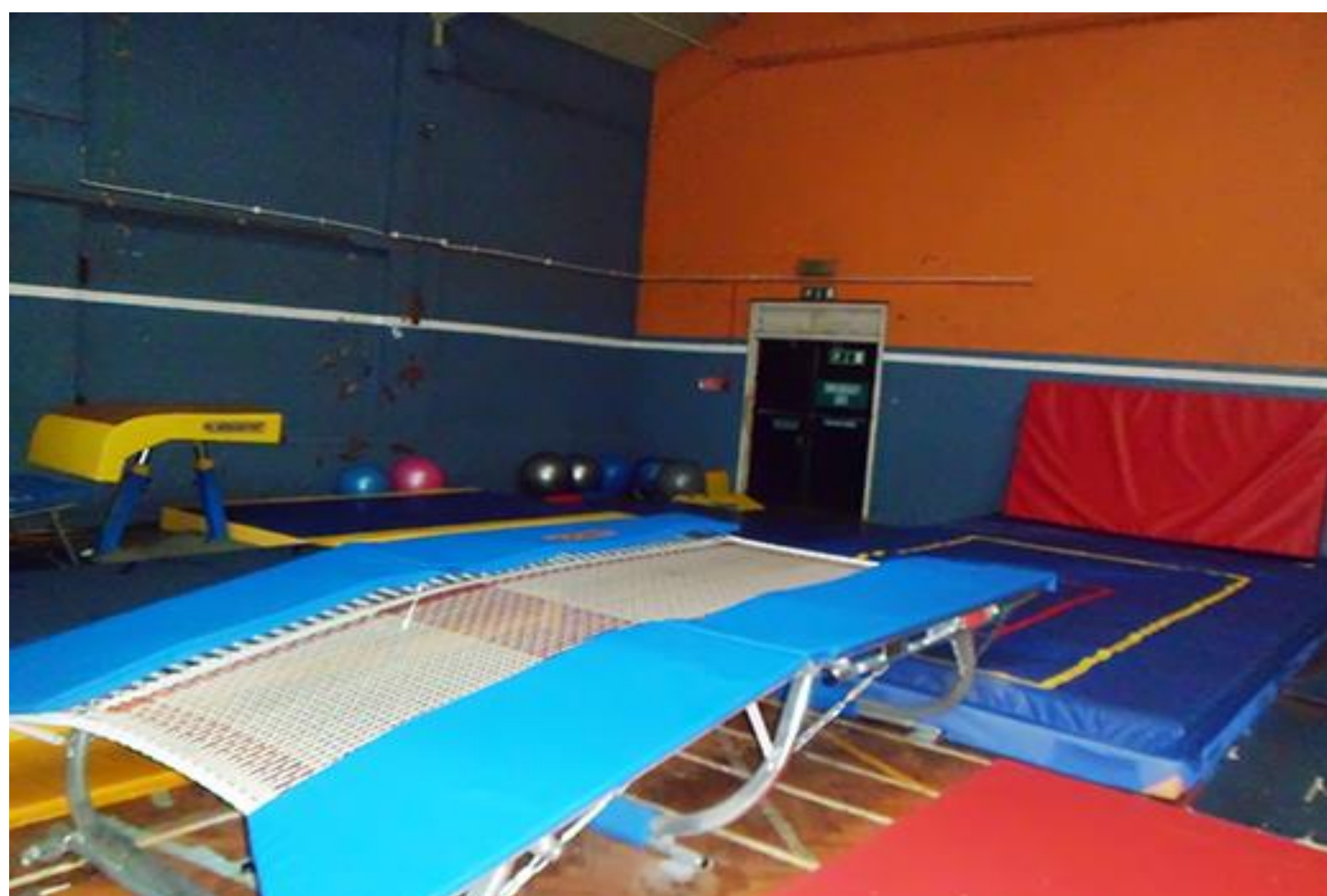


Figure 1. A double-mini trampoline like the one used by the children in this experiment.

- The Intrinsic motivation inventory (IMI) is a questionnaire consisting of four sub-scales related to self-regulatory processes, and the interest/enjoyment subscale of the IMI was used as the direct measure of intrinsic motivation for analysis.
- A self-efficacy questionnaire was used as a measure of the children's belief in their ability to perform the double-mini progressions at the beginning of each day. Figure 2 outlines the procedure followed in this experiment.

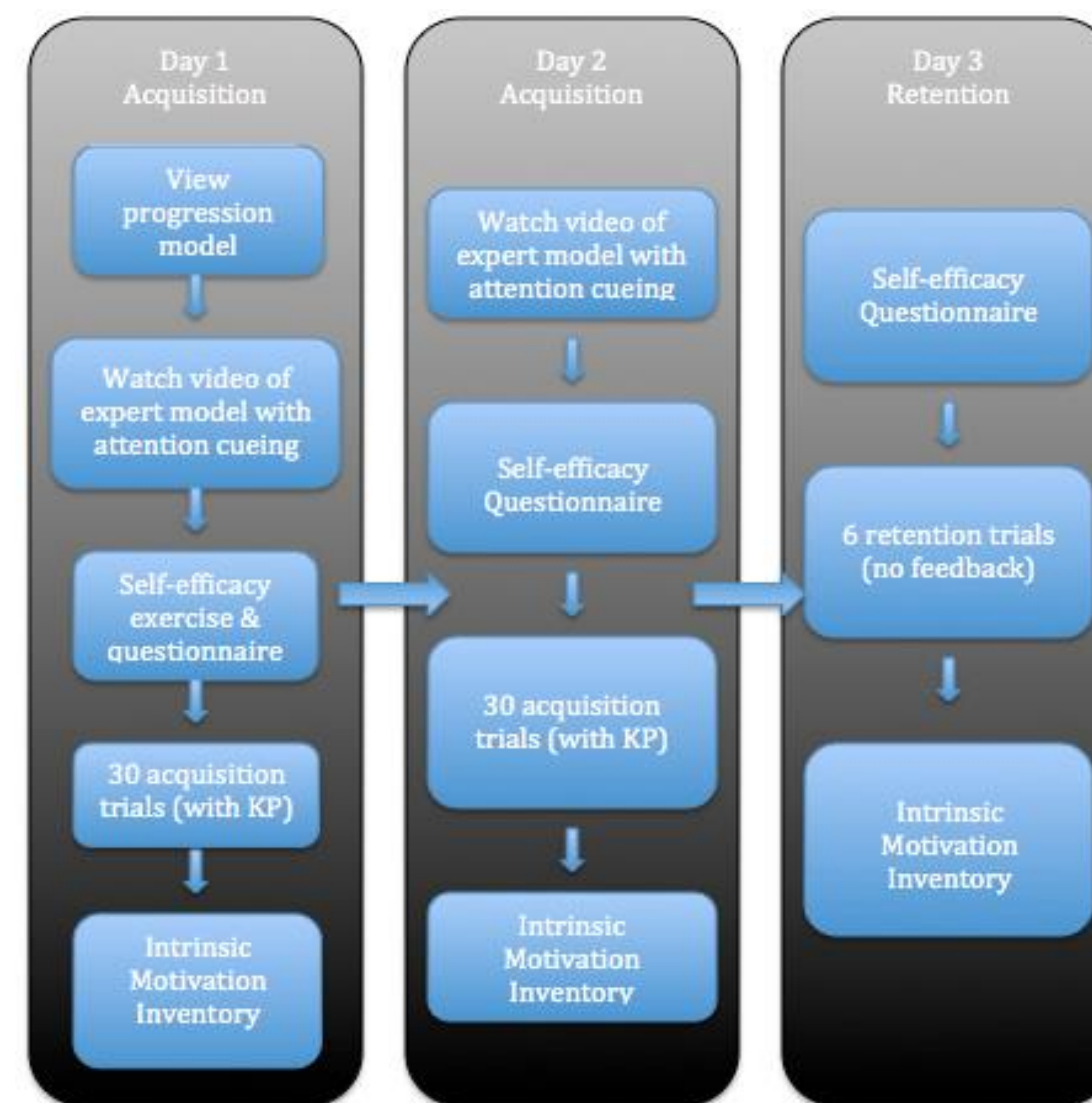


Figure 2. Procedure followed during acquisition and retention phases of this experiment.

## Results

- The acquisition performance scores were analyzed in a 2 Group (self-control vs. yoked) x 10 (blocks) analysis of variance (ANOVA) with repeated measures on the last factor. This revealed that there was no significant difference between the groups ( $p > 0.05$ ) during acquisition.

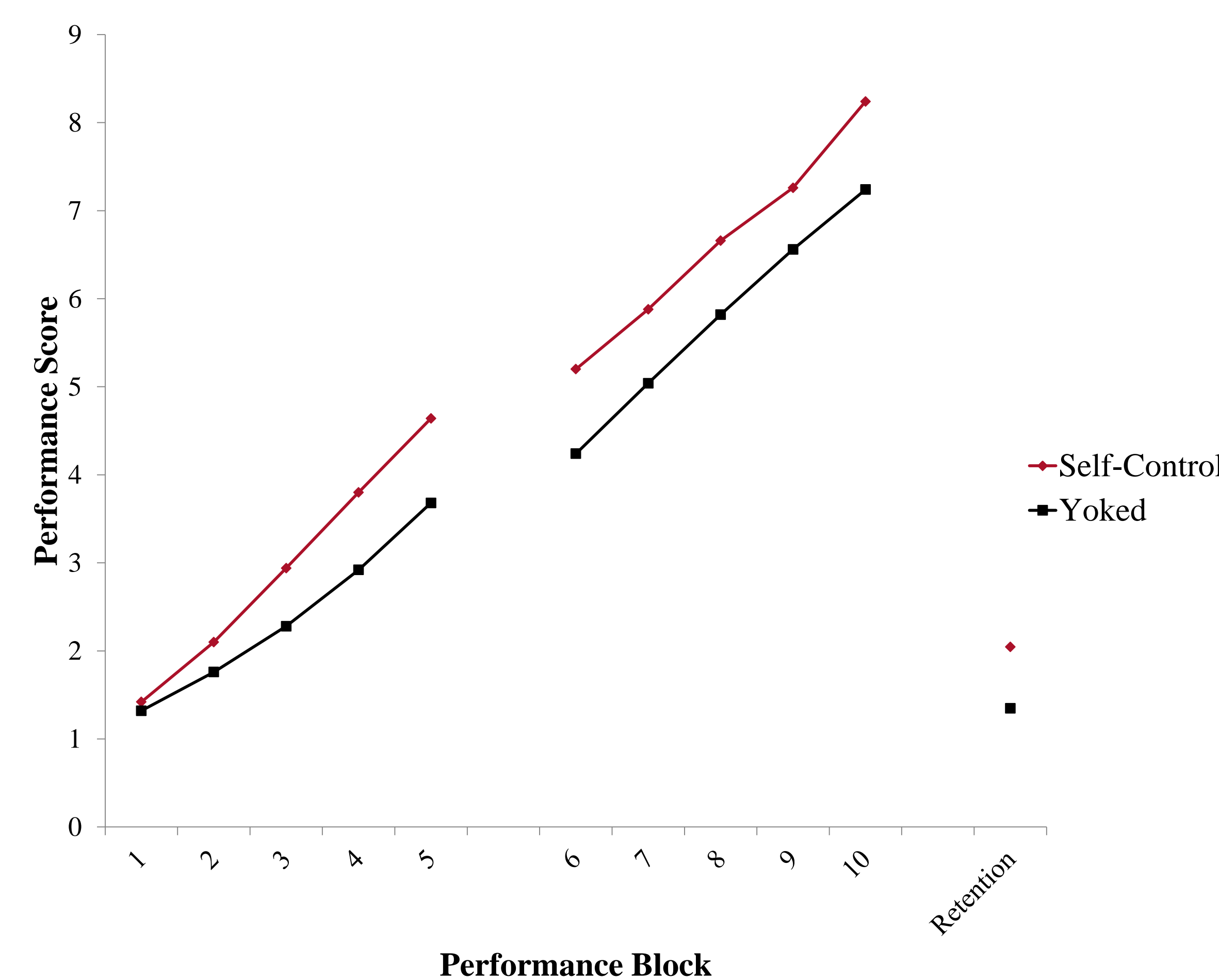


Figure 3. Performance scores of the self-control and yoked groups during acquisition and retention. Acquisition scores (blocks 1-10) represent progression level at the end of each block, and retention scores represent number of levels progressed during retention.

- Retention performance scores were analyzed in a 2 (group: self-control vs. yoked) one way ANOVA. This indicated that the self-control group performed significantly better in retention in comparison to the yoked group ( $p < 0.001$ ).

- A 2 x 2 MANOVA with repeated measures for time indicated the self-control group had higher levels of intrinsic motivation on day 2, as compared to the yoked group.

- A two-way MANOVA using retention data showed the self-control group maintained significantly higher intrinsic motivation than the yoked group during retention.

- Results from these MANOVAs indicated no significant differences in self-efficacy between the groups in acquisition or retention.

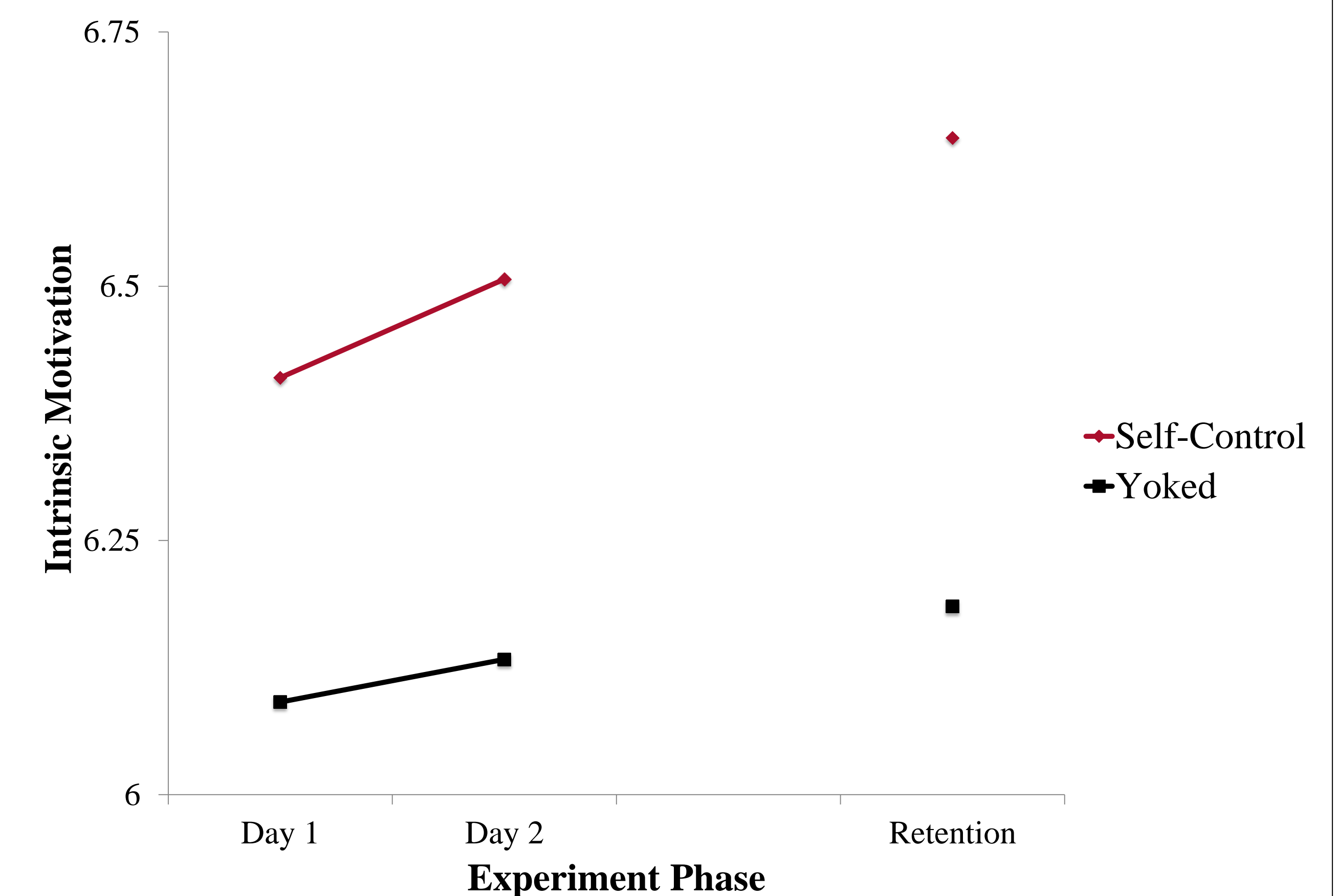


Figure 4. Level of intrinsic motivation for the self-control and Yoked groups during acquisition and retention.

## Conclusion

- The results of this study show that there are learning benefits associated with self-control of knowledge of performance in children.
- Based on the children's questionnaire responses it is proposed that having self-control over receiving knowledge of performance leads to greater levels of intrinsic motivation, which, in turn, leads to greater physical performance. Better performances then increase the self-regulatory processes of intrinsic motivation, creating a cycle that results in enhanced learning.
- Despite no significant differences being found between the self-control and yoked groups in self-efficacy it is speculated that self-efficacy has an effect on factors related to intrinsic motivation, leading to indirect benefits for learning.
- Further analysis of the results using structural equation modeling will be able to determine the exact mechanism behind the self-regulatory processes involved in self-control that lead to enhanced learning of motor skills.

## Acknowledgements

- A special thank you to my supervisor, Diane Ste-Marie, and my mentors and lab mates, Kelly Vertes and Michael Carter.
- Thank you to the Undergraduate Research Opportunity Program for the opportunity to participate in this research.

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