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# The Effects of Pretest Incentives on Exam Scores

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The Effects of Pretest Incentives on Exam Scores

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### Abstract

Students were given exams 1 with no incentives, 2 where pretests counted as half the exam grade, and 3 where pretest was extra credit. Scores were worst with no incentive (55%) while negative (68%) and positive (69%) motivators produced equal scores. Over 80% of the students took pretest to avoid hurting their grade but none of them (0%) took the pretests enough to maximize their extra credit. It is suggested that professors increase student preparation for exams by offering point incentives but that positive motivators are preferable since negative motivators did not further increase scores.

### Introduction

In this study we're going to discuss the effects of positive and negative reinforcement on motivation. Positive reinforcement is giving students a reward for doing something good which increases the chance that they will do something good later. Negative reinforcement is taking something away in order to produce a positive response to the stimulus. Negative reinforcement is a more powerful motivator because students are more affected by a loss than a gain.. "losses loom larger than gains" (Kahneman & Tversky, 1979). Which is the principle idea behind loss aversion. It is thought that the pain of losing is psychologically about twice as powerful as the pleasure of gaining. People are more willing to take risks (or behave dishonestly; e.g. Schindler & Pfattheicher, 2016) to avoid a loss than to make a gain.

The basic principle of loss aversion can explain why penalty frames are sometimes more effective than reward frames in motivating people (Gächter et al., 2009) and has been applied in behavior change strategies. People's cultural background may influence the extent to which they are averse to losses (e.g. Wang et al., 2017).

Drawbacks of using negative reinforcement for motivation are as follows: the decrease in intrinsic motivation. (ex. Fewer students may choose that subject for a major or they will at least not enjoy the topic.) While everyone is more motivated by negative reinforcement it is not ideal. We want to increase our ability to work for positive reinforcement because students will do things they enjoy and students will do things they want to do. Without positive reinforcement students may only do things out of obligation, mental health decreases increasing depression, anxiety and the feeling of being trapped. Lack of positive goals is particularly prevalent in low SES populations like Lincoln University. In low SES populations there is a prevalence of learned helplessness. Learned helplessness is when students have learned to fail because others have failed before them. We need to teach students to work for positive reinforcement.

We hypothesized the following: H1: We hypothesis that reinforcement of any kind will improve exam scores. H2: Negative Reinforcement will be more motivating than positive reinforcement; and H3: Negative Reinforcement will produce higher scores than positive reinforcement.

## Methods

### Participants

Participants were N=29 college students enrolled in a Psychology class at an HBCU (Historically Black College or University) in Jefferson City, Missouri.

### Procedure

Condition 1 is the control group and a study guide was available. Before the first exam students were given a copy of the previous year's exam as a study guide to take home and review. The students were then tested on the exam date.

Condition 2 is where the study guide was worth half of the exam points and is the negative reinforcement condition. Before the second exam students were required to take 10 pretests in which they were required to score 100% 10 times which counted as half of their exam grade. Thereafter, the students were given the actual exam on the exam date.

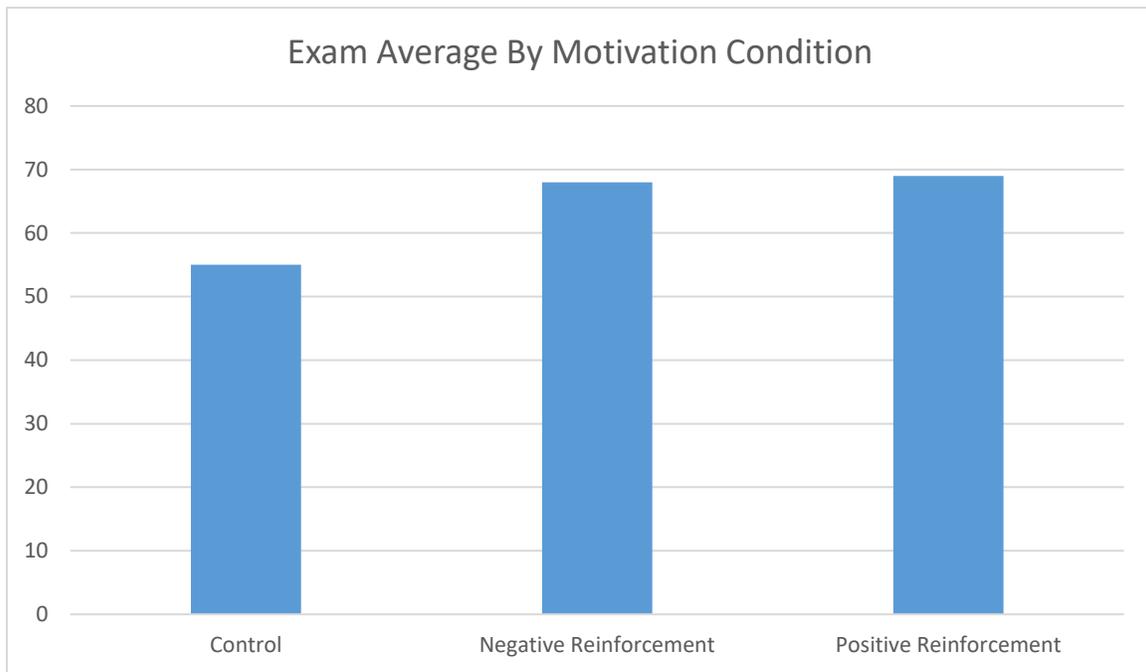
Condition 3, a study was given for extra credit and is the positive reinforcement condition. Students were required to take 1 pretest at 100%. It was suggested that students take the pretest 10 times for extra credit. Thereafter, the students were given the actual exam on the exam date.

### Results

Our first hypothesis was that both positive and negative incentives for studying would improve exam scores. This hypothesis was supported. Exam scores in the control (no incentive) condition ( $M=55$ ) were significantly lower than both the negative reinforcement ( $M=68$ ) and positive reinforcement ( $M=69$ ) conditions.

The second hypothesis was that negative reinforcement would be more motivating than positive reinforcement. This hypothesis was also supported. It was found that the students repeated the pretest 91% of the times necessary to prevent hurting their grade, but only 8.3% of the times necessary to maximize extra credit points. In addition, while 83% of the students took the pretest the required 10 times at 100% to avoid losing points, not a single student took the pretest 10 times at 100% to gain the maximum extra credit points.

Finally, the third hypothesis that negative reinforcement will produce higher scores than positive reinforcement was not supported. Scores were not significantly different between the two conditions ( $M=68$ ;  $M=69$ ).



### Discussion

In our results we found that both reinforcement conditions were significantly better than the no reinforcement condition. Therefore, it is suggested that professors should use some type of reinforcement to improve exam scores.

With regard to the type of incentive used to motivate students, we found that, consistent with the concept of loss aversion, that negative reinforcement was more motivating than positive reinforcement. However, even if this is true, the question remains as to whether the use of aversives (or threatened aversives) is the optimal strategy to enhance student motivation. Students from disadvantaged backgrounds in particular are more likely to be exposed to negative motivators and have less exposure to positive motivators. For example, an authoritarian parenting style that emphasizes obedience, punishment, and negative reinforcement is prevalent in this population. While it is beyond the scope of this paper, the short-term benefit of

improving the overall class grade by a few percentage points may not be worth the cost to these students in terms of the loss of agency and interest in the subject.

One puzzling finding was that exam scores did not differ between positive and negative conditions despite students taking the pretest 8 times more in the negative reinforcement condition. While the professor's intent was to force deliberate practice, it is believed that the additional exposure to the exam material was not true deliberate practice. Since students were taking the practice exams outside of class, the professor could not prevent students from using their notes and writing down answers when repeatedly taking the exam. In order to make the pretest true deliberate practice, the professor could require the students to complete the pretest in a certain time limit. The professor could also change the wording of the questions and change the order that the questions appear. Even with these changes, however, professors are bound by the limits of what they can do in the testing software of their LMS (Learning Management System).

Overall, we found that incentives were useful in helping students to improve their exams scores. While negative incentives can be effective, the potential long-term drawbacks of the use of aversive methods of motivation may not be worth the small short-term gains and positive incentives should be emphasized.

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