

Enhancing Math On-Task Behavior: A Contextual Validity Analysis Suggests Avoiding the Lights and Buzzers

Jade Bennett, Virginia McClurg, Jessica Eshbaugh, Christopher Skinner, and Tara Moore

Introduction

Educators who deliver rewards to everyone or no one in a group (e.g., a class) contingent upon some aspect of the groups' performance (e.g., assignment score) are applying interdependent group rewards. Three studies that used interdependent group-oriented bonus rewards to enhance on-task behavior in elementary and middle school students indicated that these interventions were effective. However, a contextual analysis suggests that the intervention which used momentary time sampling, unknown randomly selected rewards, and unknown randomly selected target students had numerous applied advantages.

Purpose

The purpose of this analysis is to evaluate multiple studies that evidence adding group-oriented bonus rewards can be effective within classrooms. Furthermore, the purpose is to analyze the contextual validity of the methods used within these studies in regards to the variation between them. It is clear that with differing methodologies that certain procedures have more contextual validity because they are easier to install and maintain and may occasion fewer negative side effects.

Methods

We reviewed studies that examined the effectiveness of implementing interdependent group-oriented contingencies to increase on-task behaviors in math class. Two studies used similar methodology by having a clock run continuously when all students in the class were engaged in on-task behaviors (Andrews & Williams, 1971; Greenwood, Hops, Delquadri & Guild, 1974). Off-task behavior resulted in the clock being stopped and either a light or a buzzer going off until on-task behavior commenced. Students were told that the class would earn free time equal to the amount of time they were on-task. Both studies revealed immediate increases in on-task

behaviors when the interdependent group-oriented contingency was applied. The first study found that on task behavior increased from 67% to 90% after the bonus reward program was added and the second study found similar effects. In the third study, Heering and Wilder (2006) also applied an interdependent group-oriented contingency to enhance on-task behavior but also address concerns associated with such studies. They randomly selected a row of students that would be observed at four different moments and noted if they were on-task with a yes or a no. If all students were scored on-task for three of the four moments then each class member earned a reward. Students were unaware of the row chosen or the rewards and were not given feedback until the end of the class period. Across both classes, after the contingencies were applied, on-task levels immediately increased from below 50% to above 80%.

Past Studies

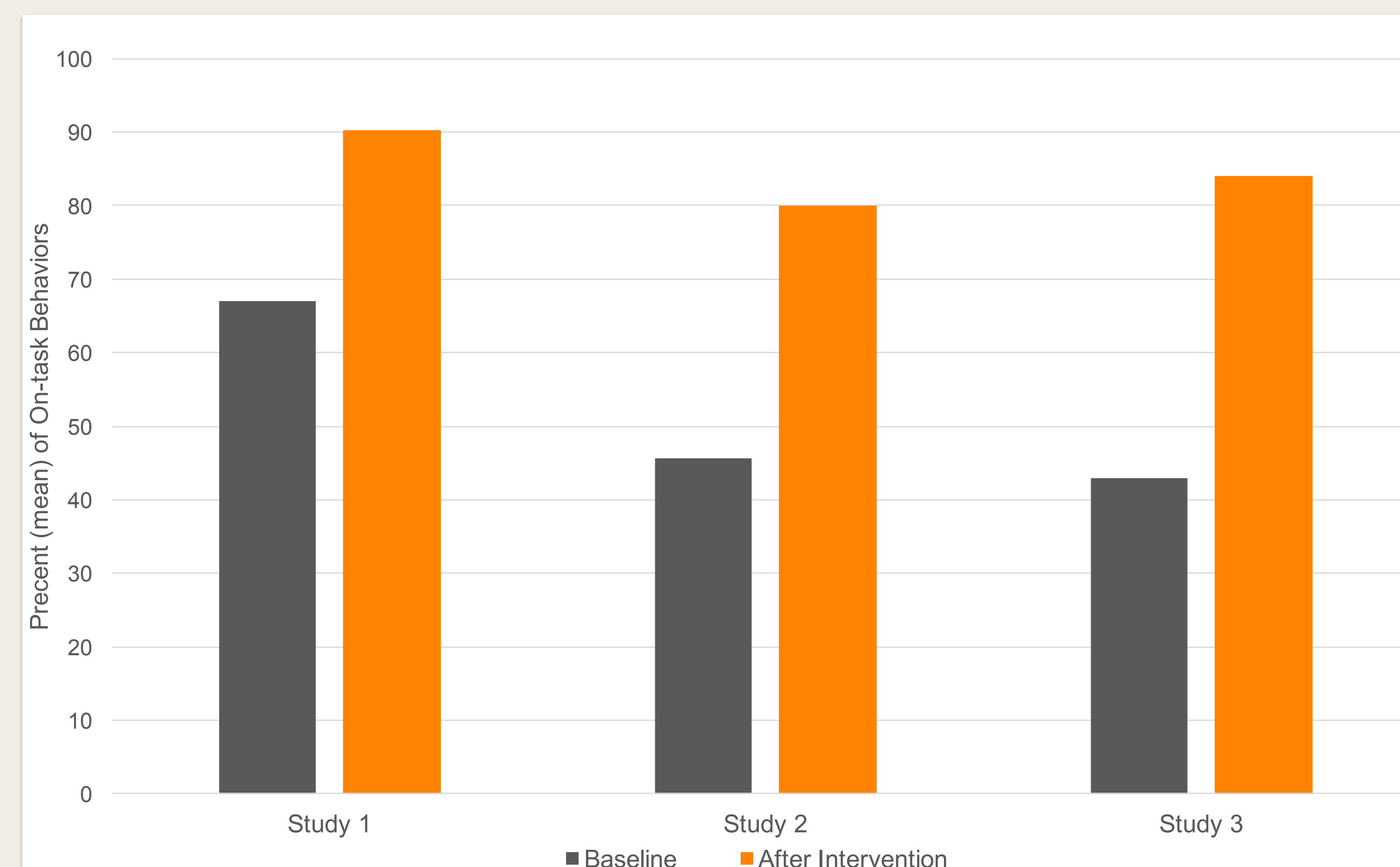


Figure 1. Effectiveness of group-oriented bonus rewards
Note. Study 1: Andrews and Williams, 1970; Study 2: Greenwood, Hops, Delquadri, and Guild, 1974; Study 3: Heering and Wilder, 2006

Contextual Validity

- Heering and Wilder's (2006) momentary time sample at 4 separate instances requires much less time than the continuous monitoring procedures used by other researchers which required educators to constantly stop and start clocks. Thus, because their procedures require less teacher time, it is easier to install and maintain and may be less likely to disrupt teaching and learning activities (Scott et al., 2017; Skinner & Watson, 2000).
- With Heering and Wilder's procedures, because students do not know when they will be observed and which row will be scored, it is difficult for students to determine which classmate(s) caused them to fail to earn a reward. The lights or buzzers used by the other researchers are likely to signal students to observe classmates and determine whose behavior is causing them to fail to earn additional free time. Thus, these cues may increase off-task behavior and the probability of students blaming or aggressing against classmates (Skinner, Skinner, & Burton, 2009).
- Heering and Wilder's use of randomly selected rewards may enhance the strength of the rewards (Murphy, Theodore, Aloisio, Alric-Edwards, & Hughes, 2007)

Contact Information

Jade Bennett, Virginia McClurg, Jessica Eshbaugh,
Christopher Skinner, and Tara Moore

Department of Educational Psychology and Counseling

535 Jane and David Bailey
Education Complex
1122 Volunteer Blvd
Knoxville, TN 37996

Email:
jbennett@utk.edu
vjacobs@vols.utk.edu
eshbaugh@vols.utk.edu
cskinne1@utk.edu
tara.moore@utk.edu