

Effects of a Breakfast Program on On-Task Behaviors of Vocational High School Students

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ABSTRACT The purpose of this research was to determine if an in-school breakfast program could increase on-task behaviors of 18 high school students. The effects of the in-school breakfast program were examined in a vocational and an academic setting. A multiple-baseline design across settings and students was employed to assess the effects of the in-class breakfast program. Results indicated that an in-school breakfast program was effective in increasing on-task behaviors in both settings. Questionnaires administered to students before and after implementation of the in-school breakfast program indicate positive change toward breakfast by those who participated. These outcomes indicate that an in-school breakfast program may positively influence on-task behaviors of high school students in a vocational setting and an academic setting.

The value of starting the school day with a well-balanced breakfast has been observed by many researchers (Fleck, 1971; Hanes, Vermeersch, & Gale, 1984; Levinger, 1984). The School Breakfast Bill was passed by Congress in 1966 so that low-income children would have the opportunity to receive a nutritious breakfast upon entering school. Of the population of schoolchildren who qualify for a school breakfast program, Mauer (1984) estimated that only 39% are provided the opportunity for a nutritious breakfast.

The consequences of hunger may interfere with the learning process and the well-being of children. Skipping breakfast will likely have a negative effect on children's performance in the classroom. According to Pauk (1983), this deficiency cannot be made up later in the day. Leverton (1965) and Fleck (1971) corroborated that nutrients received at lunch or later meals do not make up for this deficiency. Skipping breakfast over time leads to poor nutrition that reduces the body's ability to resist disease and infection (Grohen, 1988).

A contributing factor for poor nutrition, aside from poverty, is the lifestyle of the American family. According to

Birch, Marlow, and Rotter (1984) and Rand and Kuldau (1986), previous generations of parents were more reliable food providers than parents of today. Breakfast has increasingly become an individual meal because of family members following separate morning schedules. Children who are expected to prepare their own breakfast when their parents leave early for work often skip the morning meal. As children grow older, the number who skip breakfast increases.

Numerous studies (Parker, Krebs-Smith, Gardner, Winder, & Sharpe, 1989) give evidence of students performing better in the classroom when they ate breakfast. Cooney and Heitman (1988) credited the school breakfast program with increased educational achievement, improved child health, increased school attendance, and decreased classroom disruptions. Stein, Foucar-Szocki, and Kauffman (1984) observed a greater gain in reading scores of intermediate schoolchildren who participated in an experimental school breakfast program. Meyers, Sampson, Weitzman, Rogers, and Kayne (1989) reported improvements on achievement tests for elementary schoolchildren who participated in the school breakfast program over those who qualified, but did not participate. Other research (Koonce, 1976) did not find academic gains for students who participated in the school breakfast program.

With recent political interest in school nutrition programs, the present research provides a daily assessment of the effects of an in-class breakfast program. In this paper we extended, as well as replicated, the earlier findings of Bro, Shank, Williams, and McLaughlin (1994) with different sample populations and in another type of classroom setting where academic instruction took place. Also, we used a different experimental design to evaluate the breakfast program. Finally, in the present paper we evaluated the effects of

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an in-class breakfast program on on-task behavior of high school students in a vocational classroom and a learning center where students earned academic credit. We also gathered data on student perceptions of the breakfast program.

Method

Participants and Settings

The participants in the first classroom were 11 male and 1 female Caucasian high school students ranging in age from 15 to 19 years. Of the 12 students, 9 were classified as at-risk students, 8 were identified as students with special needs, and 3 were enrolled at alternative schools. At risk was defined as (a) living alone, (b) living with one parent, (c) living with other than natural parent or parents, and/or (d) teen-aged single parent.

The participants in the second classroom were 6 Caucasian high school boys ranging in age from 16 to 18 years. All 6 students were identified as at risk for dropping out of school, and they were enrolled at the vocational school full time.

The settings were two separate classrooms in a vocational school in a large urban high school district. Classroom 1 was a prevocational welding program. The students received instruction and hands-on experience with fabrication and welding. For example, gas welding, arc welding, wire feed welding, and heli-arc welding were taught. Students read materials from a text and welded under the supervision and instruction of the classroom teacher.

Classroom 2 was a learning center in which students worked to earn academic credit. Students were given their daily assignments in various core subject matter areas such as English, history, mathematics, and science. The students were allowed to complete their work on an individualized, self-paced basis with teacher assistance only as needed.

The students attended both classrooms five times weekly for 2 1/2 hr sessions. From teacher observations and baseline data collection in both classroom settings, we found that the students failed to display appropriate on-task behaviors. In the breakfast program we emphasized the increase of students' on-task behavior during 60-min shop/classroom sessions.

Dependent Variables and Measurement Procedures

The dependent variable was on-task behavior. It was defined differently in each classroom; both teachers provided input. On-task behavior in Classroom 1 consisted of (a) going to the supply room and checking out equipment, (b) getting the equipment set up in the welding booth, (c) welding in the booth during class time, and (d) cleaning up and returning the equipment to the supply room and checking it in during a 60-min period. If all students were on task when the room was scanned, they scored a "+." If any student was observed being off task, we scored the time sample as off task.

The dependent variable measured in Classroom 2 was on-task behavior in a learning center. On-task behavior in

Classroom 2 consisted of (a) retrieving a folder consisting of a study guide, (b) retrieving the necessary book the student was currently reading, (c) silently reading from the book, (d) answering the study guide questions in writing, and (e) completing written tests.

Data for on-task behavior were collected using a momentary time-sampling schedule. At the end of each 5-min interval, the teacher would scan the class and record the number of students on task. The percentage on task was calculated by dividing the number of students scored as on task by the total number of students observed and multiplying by 100.

Questionnaire Data

Surveys were administered to the students before and after the in-school breakfast program intervention. These questions were presented with a 7-point Likert-type scale. The questions asked the students to rate if having breakfast helped them complete their daily work, helped them stay on task and attend class, and if they felt that breakfast programs should be part of the school program. A copy of the questionnaires can be seen in Figures 1 and 2.

Experimental Design and Conditions

We used a multiple-baseline design across settings (Kazdin, 1982; McLaughlin, 1983) to evaluate the effectiveness of the breakfast program for on-task behavior.

Baseline. During the baseline period, the teacher of Classroom 1 instructed the students to proceed with their assigned welding and related tasks. The baseline in Classroom 1 was in effect for 5 school days. During the baseline period, the teacher of Classroom 2 instructed the students to

Figure 1. The Presurvey

Presurvey						
1. Do you eat breakfast in the morning?						
1	2	3	4	5	6	7
Never			Sometimes		Always	
2. Rate your paying attention in class.						
1	2	3	4	5	6	7
Never			Sometimes		Always	
3. Do you agree that breakfast improves work completion?						
1	2	3	4	5	6	7
Strongly Disagree		Agree			Strongly Agree	
4. Do you agree that breakfast helps you stay on task?						
1	2	3	4	5	6	7
Strongly Disagree		Agree			Strongly Agree	

proceed with their assigned academic tasks. This condition was in effect for 9 school days.

School breakfast program. Breakfast that was cooked by the teacher in Classroom 1 was served to the students upon entering the classroom. Meals consisted of fruit juice, milk, English muffins, blueberry muffins, bagels, cream cheese, eggs, toast, hot cakes, etc. After breakfast, students were instructed to proceed to their respective classrooms for their assigned tasks. The total cost of the program was approximately \$350. This condition was in effect from 21 to 30 school days.

Reliability

Reliability for on-task behavior was checked during the breakfast program intervention for both rooms by an instructional assistant in the building. The instructional assistant and each teacher would independently record on-task behavior by the students during the 60-min session. Reliability was calculated by dividing the number of agreements by the number of agreements plus the number of disagreements and multiplied by 100. Interobserver agreement for on-task behavior of the students in the welding program was 85% (range 80% to 91%). Interobserver agreement for on-task behavior of students in the learning center was 79% (range 70% to 100%).

Results

On-Task Data

The results of the study showed an increase in the percentage of on-task behaviors in Classroom 1 and in Classroom 2 once the breakfast program was implemented. These outcomes can be seen in Figure 3.

During baseline for Classroom 1, the overall mean percentage on-task behavior averaged 49%, with a range from 42% to 53%. During the implementation of the breakfast program, the mean percentage of students on task increased to 90%, with a range from 75% to 100%.

During baseline for Classroom 2, the overall mean percentage of on-task behavior was 62%, with a range from 37% to 69%. During the implementation of the breakfast program, the mean percentage of students on task increased to 70%, with a range from 49% to 100%.

Survey Outcomes

Surveys administered to the students before and after implementation of the breakfast program were positive. The median ratings for both classes by question can be seen in Table I. All items increased from the presurvey to postsurvey except Item 4. The two items that were added to the postsurvey, "Do you agree that we should have a breakfast program?" and "Rate the breakfast program you received now" received the highest postsurvey rating ($M = 7.0$; range 4 to 7).

Figure 2. The Postsurvey Given to Students

Postsurvey						
1. Do you eat breakfast in the morning?						
1	2	3	4	5	6	7
Never			Sometimes			Always
2. Rate your paying attention in class.						
1	2	3	4	5	6	7
Never			Sometimes			Always
3. Do you agree that breakfast improves work completion?						
1	2	3	4	5	6	7
Strongly Disagree			Agree			Strongly Agree
4. Do you agree that breakfast helps you stay on task?						
1	2	3	4	5	6	7
Strongly Disagree			Agree			Strongly Agree
5. Do you agree that we should have a breakfast program?						
1	2	3	4	5	6	7
Strongly Disagree			Agree			Strongly Agree
6. Rate the breakfast program that you have received now.						
1	2	3	4	5	6	7
Poor			Average			Excellent

Figure 3. The Percentage of Intervals of On Task for Classroom 1 (Welding) and Classroom 2 (Learning Center) During Baseline and School Breakfast Program

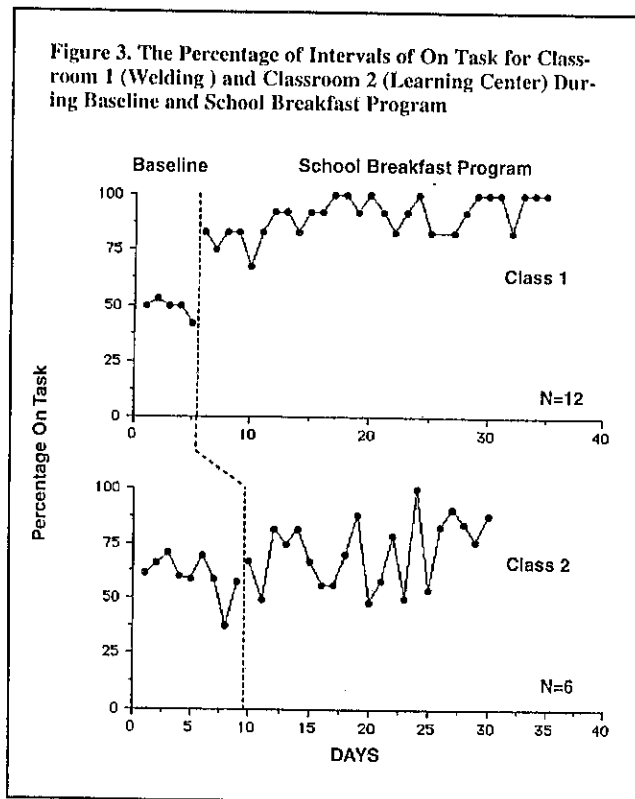


Table 1.—Median Ratings and Ranges by Question for Pre- and Postsurvey for All Students in Both Classrooms

Question	Ratings	
	Presurvey (<i>M</i>)	Postsurvey (<i>M</i>)
1	2.0 (range 1 to 5)	3.0 (range 2 to 7)
2	4.5 (range 1 to 6)	5.0 (range 1 to 7)
3	4.5 (range 1 to 7)	5.0 (range 1 to 7)
4	5.0 (range 1 to 7)	4.0 (range 1 to 7)
5	N/A	7.0 (range 4 to 7)
6	N/A	7.0 (range 4 to 7)

Discussion

The results of this study suggest that the breakfast program was effective for increasing on-task behavior of students in both Classroom 1 and Classroom 2. The procedure was useful in increasing this desired behavior. The present report replicates and extends the findings of Bro, Shank, Williams, and McLaughlin (1994). As in the first study, the on-task behavior of students enrolled in the welding class clearly improved during the implementation of the breakfast program. The first study employed an ABAB reversal design (Kazdin, 1982) to evaluate the effects of the breakfast program, whereas the present study employed a multiple-baseline design across settings. The present research extended the findings of the first study; the results suggest that the breakfast program increased the on-task behavior in two classrooms of students with a second teacher, in a classroom designed for an academic focus, rather than a vocational one.

Upon examination of the results between Classroom 1 and Classroom 2, we determined that the increase of on-task behavior in Classroom 1 was higher than in Classroom 2 by 20%. The teachers of Classroom 1 and Classroom 2 agreed that a possible explanation for this variation lies with the difference in the two environments. Students self-selected themselves to participate in the welding program in Classroom 1, in which there was freedom of movement; students were less restrained in the activities, which were likely more intrinsically motivating. The students in Classroom 2 were required to sit at their desks, read, take notes, and complete written tests. In Classroom 1 there were tangible end results; in Classroom 2, the end result was a written assignment and a letter grade. Other reasons for the variability seen in Classroom 2 during the breakfast program may have been a result of having fewer students enrolled in Classroom 2 ($n = 6$) than in Classroom 1 ($n = 12$). Each instance of a student being off task would have a greater effect on the level of on-task behavior in Classroom 2 because there were fewer students. This would likely increase the variability of the mean percentage of students on task each day.

The present outcomes for increased on-task behavior in the classroom replicate the findings of Parker et al. (1989). Student performance increased when students ate breakfast

in Classroom 1 and in Classroom 2. The teacher in Classroom 1 believed that student alertness and completion of tasks increased during the breakfast program. These perceived outcomes for educational achievement replicate the findings of Cooney and Heitman (1988). In Classroom 2, the teacher believed the increase in the number of on-task behaviors resulted in an improvement in the amount of time spent reading in class. Additionally, the teacher in Classroom 2 reported that students had more positive attitudes (friendly social interactions).

An additional benefit of the breakfast program was an increase in social interaction between the students of Classroom 1 and Classroom 2. Social interaction of students between programs was generally low. Students tended to socially interact with those in their own program. Contact between students of the two programs appeared to result in increased interaction by students across programs.

According to observations by the classroom teachers, student-teacher interaction also increased on a positive level. Teachers did not have the opportunity to interact with students from other programs in the building except during a daily 15-min break while monitoring student behavior. It was their view that positive student-teacher interaction increased as a result of the breakfast program.

There may be other alternative explanations of the positive effects of the in-class breakfast program. Students came to the breakfast program immediately before class began. It may have been possible that the 15-min period for breakfast acted as a settling time, which led to increased on-task behavior later in the day. The breakfast program was implemented for 25 to 29 school days, so novelty cannot be ruled out, but there were no downward trends in student performance at the end of the study. Additional research examining the long-term effects of breakfast programs needs to be implemented.

Because of the cost of a breakfast program, it requires administrative support in order for its continued operation. The building principal in this study applied for and was denied approval for a breakfast program to be implemented throughout the building.

NOTE

Preparation of this manuscript by the first two authors was in partial fulfillment of the requirement for a Master of Education degree in Special Education at Gonzaga University.

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Erratum: The following Appendix was inadvertently deleted from the article, "The Clock Is Ticking: Time Constraint Issues in Mathematics Teaching Reform," by Jane M. Keiser and Diana V. Lambdin, in the last issue (Vol. 90, No. 1, September/October 1996).

APPENDIX C
Connected Mathematics Project 6th- and 7th-Grade Units—
1993-1994

6th-Grade Units

1. *About Us*
Data Investigation
2. *Prime Time*
Number Theory
3. *Shapes and Designs*
2-D Geometry
4. *Covering and Surrounding*
2-D Measurement
5. *Bits and Pieces, Part I*
Understanding Rational Numbers
6. *What are the Chances?*
Probability
7. *Bits and Pieces, Part II*
Using Rational Numbers
8. *Ruins of Montarek*
Spatial Visualization

7th-Grade Units

1. *Around Us*
Number Sense
2. *Filling and Wrapping*
3-D Measurement
3. *Variables and Patterns*
Algebra I
4. *Similarity*
5. *Comparing and Scaling*
Using Ratio, Proportion, and Percent
6. *What Do You Expect?*
Probability
7. *Accentuate the Negative*
Integers, Distributive Property
8. *Walking a Straight Line*
Algebra II

