Sample APA Research Paper

Sample Title Page

Place manuscript page headers one-half inch from the top. Put five spaces between the page header and the page number.

Full title, authors, and school name are centered on the page, typed in uppercase and lowercase.

Running on Empty:
The Effects of Food Deprivation on
Concentration and Perseverance

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Sample Abstract

Abstract

This study examined the effects of short-term food deprivation on two cognitive abilities—concentration and perseverance. Undergraduate students (N-51) were tested on both a concentration task and a perseverance task after one of three levels of food deprivation: none, 12 hours, or 24 hours. We predicted that food deprivation would impair both concentration scores and perseverance time. Food deprivation had no significant effect on concentration scores, which is consistent with recent research on the effects of food deprivation (Green et al., 1995; Green et al., 1997). However, participants in the 12-hour deprivation group spent significantly less time on the perseverance task than those in both the control and 24-hour deprivation groups, suggesting that short-term deprivation may affect some aspects of cognition and not others.

The abstract summarizes the problem, participants, hypotheses, methods used, results, and conclusions.

An APA Research Paper Model

Thomas Delancy and Adam Solberg wrote the following research paper for a psychology class. As you review their paper, read the side notes and examine the following:

- The use and documentation of their numerous sources.
- The background they provide before getting into their own study results.
- The scientific language used when reporting their results.

Center the title one inch from the top. Double-space throughout.

The introduction states the topic and the main questions to be explored.

The researchers supply background information by discussing past research on the topic.

Extensive referencing establishes support for the discussion.

Running on Empty: The Effects of Food Deprivation on Concentration and Perseverance

Many things interrupt people's ability to focus on a task: distractions, headaches, noisy environments, and even psychological disorders. To some extent, people can control the environmental factors that make it difficult to focus. However, what about internal factors, such as an empty stomach? Can people increase their ability to focus simply by eating regularly?

One theory that prompted research on how food intake affects the average person was the glucostatic theory. Several researchers in the 1940s and 1950s suggested that the brain regulates food intake in order to maintain a blood-glucose set point. The idea was that people become hungry when their blood-glucose levels drop significantly below their set point and that they become satisfied after eating, when their blood-glucose levels return to that set point. This theory seemed logical because glucose is the brain's primary fuel (Pinel, 2000). The earliest investigation of the general effects of food deprivation found that long-term food deprivation (36 hours and longer) was associated with sluggishness, depression, irritability, reduced heart rate, and inability to concentrate (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950). Another study found that fasting for several days produced muscular weakness, irritability, and apathy or depression (Kollar, Slater, Palmer, Docter, & Mandell, 1964). Since that time, research has focused mainly on how nutrition affects cognition. However, as Green, Elliman, and Rogers (1995) point out, the effects of food deprivation on cognition have received comparatively less attention in recent years.

The relatively sparse research on food deprivation has left room for further research. First, much of the research has focused either on chronic starvation at one end of the continuum or on missing a single meal at the other end (Green et al., 1995). Second, some of the findings have been contradictory. One study found that skipping breakfast impairs certain aspects of cognition, such as problem-solving abilities (Pollitt, Lewis, Garza, & Shulman, 1983). However, other research by M. W. Green, N. A. Elliman, and P. J. Rogers (1995, 1997) has found that food deprivation ranging from missing a single meal to 24 hours without eating does not significantly impair cognition. Third, not all groups of people have been sufficiently studied. Studies have been done on 9–11 year-olds (Pollitt et al., 1983), obese subjects (Crumpton, Wine, & Drenick, 1966), college-age men and women (Green et al., 1995, 1996, 1997), and middle-age males (Kollar et al., 1964). Fourth, not all cognitive aspects have been studied. In 1995 Green, Elliman, and Rogers studied sustained attention, simple reaction time, and immediate memory; in 1996 they studied attentional bias; and in 1997 they studied simple reaction time, two-finger tapping, recognition memory, and free recall. In 1983, another study focused on reaction time and accuracy, intelligence quotient, and problem solving (Pollitt et al.).

The researchers explain how their study will add to past research on the topic.

Clear transitions guide readers through the researchers' reasoning.

According to some researchers, most of the results so far indicate that cognitive function is not affected significantly by short-term fasting (Green et al., 1995, p. 246). However, this conclusion seems premature due to the relative lack of research on cognitive functions such as concentration and perseverance. To date, no study has tested perseverance, despite its importance in cognitive functioning. In fact, perseverance may be a better indicator than achievement tests in assessing growth in learning and thinking abilities, as perseverance helps in solving complex problems (Costa, 1984). Another study also recognized that perseverance, better learning techniques, and effort are cognitions worth studying (D'Agostino, 1996). Testing as many aspects of cognition as possible is key because the nature of the task is important when interpreting the link between food deprivation and cognitive performance (Smith & Kendrick, 1992).

The researchers support their decision to focus on concentration and perseverance.

The researchers state their initial hypotheses.

Therefore, the current study helps us understand how short-term food deprivation affects concentration on and perseverance with a difficult task. Specifically, participants deprived of food for 24 hours were expected to perform worse on a concentration test and a perseverance task than those deprived for 12 hours, who in turn were predicted to perform worse than those who were not deprived of food.

Headings and subheadings show the paper's organization.

Method

Participants

Participants included 51 undergraduate-student volunteers (32 females, 19 males), some of whom received a small amount of extra credit in a college course. The mean college grade point average (GPA) was 3.19. Potential participants were excluded if they were dieting, menstruating, or taking special medication. Those who were struggling with or had struggled with an eating disorder were excluded, as were potential participants addicted to nicotine or caffeine.

The experiment's method is described, using the terms and acronyms of the discipline.

Materials

Concentration speed and accuracy were measured using an online numbers-matching test (www.psychtests.com/tests/iq/concentration.html) that consisted of 26 lines of 25 numbers each. In 6 minutes, participants were required to find pairs of numbers in each line that added up to 10. Scores were calculated as the percentage of correctly identified pairs out of a possible 120. Perseverance was measured with a puzzle that contained five octagons—each of which included a stencil of a specific object (such as an animal or a flower). The octagons were to be placed on top of each other in a specific way to make the silhouette of a rabbit. However, three of the shapes were slightly altered so that the task was impossible. Perseverance scores were calculated as the number of minutes that a participant spent on the puzzle task before giving up.

Passive voice is used to emphasize the experiment, not the researchers; otherwise, active voice is used.

Procedure

At an initial meeting, participants gave informed consent. Each consent form contained an assigned identification number and requested the participant's GPA. Students were then informed that they would be notified by e-mail and telephone about their assignment to one of the

The experiment is laid out step by step, with time transitions like "then" and "next."

three experimental groups. Next, students were given an instruction sheet. These written instructions, which we also read aloud, explained the experimental conditions, clarified guidelines for the food deprivation period, and specified the time and location of testing.

Participants were randomly assigned to one of these conditions using a matched-triplets design based on the GPAs collected at the initial meeting. This design was used to control individual differences in cognitive ability. Two days after the initial meeting, participants were informed of their group assignment and its condition and reminded that, if they were in a food-deprived group, they should not eat anything after 10 a.m. the next day. Participants from the control group were tested at 7:30 p.m. in a designated computer lab on the day the deprivation started. Those in the 12-hour group were tested at 10 p.m. on that same day. Those in the 24-hour group were tested at 10:40 a.m. on the following day.

Attention is shown to the control features.

At their assigned time, participants arrived at a computer lab for testing. Each participant was given written testing instructions, which were also read aloud. The online concentration test had already been loaded on the computers for participants before they arrived for testing, so shortly after they arrived they proceeded to complete the test. Immediately after all participants had completed the test and their scores were recorded, participants were each given the silhouette puzzle and instructed how to proceed. In addition, they were told that (1) they would have an unlimited amount of time to complete the task, and (2) they were not to tell any other participant whether they had completed the puzzle or simply given up. This procedure was followed to prevent the group influence of some participants seeing others give up. Any participant still working on the puzzle after 40 minutes was stopped to keep the time of the study manageable. Immediately after each participant stopped working on the puzzle, he/she gave demographic information and completed a few manipulation-check items. We then debriefed and dismissed each participant outside of the lab.

Results

The writers summarize their findings, including problems encountered.

Perseverance data from one control-group participant were eliminated because she had to leave the session early. Concentration data from another control-group participant were dropped because he did not complete the test correctly. Three manipulation-check questions indicated that each participant correctly perceived his or her deprivation condition and had followed the rules for it. The average concentration score was 77.78 (SD = 14.21), which was very good considering that anything over 50 percent is labeled "good" or "above average." The average time spent on the puzzle was 24.00 minutes (SD = 10.16), with a maximum of 40 minutes allowed.

"See Figure 1" sends readers to a figure (graph, photograph, chart, or drawing) contained in the paper.

We predicted that participants in the 24-hour deprivation group would perform worse on the concentration test and the perseverance task than those in the 12-hour group, who in turn would perform worse than those in the control group. A one-way analysis of variance (ANOVA) showed no significant effect of deprivation condition on concentration, $F(2,46) = 1.06$, $p = .36$ (see Figure 1). Another one-way ANOVA indicated

All figures and illustrations (other than tables) are numbered in the order that they are first mentioned in the text.

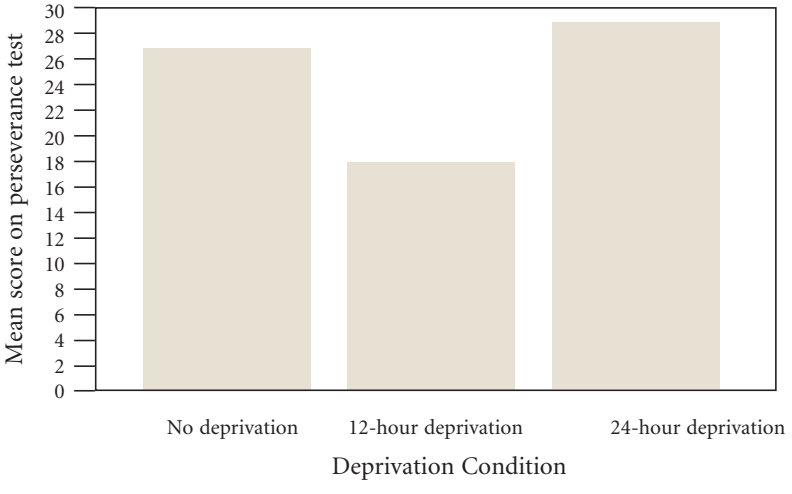
Figure 1.



The researchers restate their hypotheses and the results, and go on to interpret those results.

a significant effect of deprivation condition on perseverance time, $F(2,47) = 7.41$, $p < .05$. Post-hoc Tukey tests indicated that the 12-hour deprivation group ($M = 17.79$, $SD = 7.84$) spent significantly less time on the perseverance task than either the control group ($M = 26.80$, $SD = 6.20$) or the 24-hour group ($M = 28.75$, $SD = 12.11$), with no significant difference between the latter two groups (see Figure 2). No significant effect was found for gender either generally or with specific deprivation conditions, $Fs < 1.00$. Unexpectedly, food deprivation had no significant effect on concentration scores. Overall, we found support for our hypothesis that 12 hours of food deprivation would significantly impair perseverance when compared to no deprivation. Unexpectedly, 24 hours of food deprivation did not significantly affect perseverance relative to the control group. Also unexpectedly, food deprivation did not significantly affect concentration scores.

Figure 2.



Discussion

The purpose of this study was to test how different levels of food deprivation affect concentration on and perseverance with difficult tasks.

We predicted that the longer people had been deprived of food, the lower they would score on the concentration task, and the less time they would spend on the perseverance task. In this study, those deprived of food did give up more quickly on the puzzle, but only in the 12-hour group. Thus, the hypothesis was partially supported for the perseverance task. However, concentration was found to be unaffected by food deprivation, and thus the hypothesis was not supported for that task.

The writers speculate on possible explanations for the unexpected results.

The findings of this study are consistent with those of Green et al. (1995), where short-term food deprivation did not affect some aspects of cognition, including attentional focus. Taken together, these findings suggest that concentration is not significantly impaired by short-term food deprivation. The findings on perseverance, however, are not as easily explained. We surmise that the participants in the 12-hour group gave up more quickly on the perseverance task because of their hunger produced by the food deprivation. But why, then, did those in the 24-hour group fail to yield the same effect? We postulate that this result can be explained by the concept of "learned industriousness," wherein participants who perform one difficult task do better on a subsequent task than the participants who never took the initial task (Eisenberger & Leonard, 1980; Hickman, Stromme, & Lippman, 1998). Because participants had successfully completed 24 hours of fasting already, their tendency to persevere had already been increased, if only temporarily. Another possible explanation is that the motivational state of a participant may be a significant determinant of behavior under testing (Saugstad, 1967). This idea may also explain the short perseverance times in the 12-hour group: because these participants took the tests at 10 p.m., a prime time of the night for conducting business and socializing on a college campus, they may have been less motivated to take the time to work on the puzzle.

Research on food deprivation and cognition could continue in several directions. First, other aspects of cognition may be affected by short-term food deprivation, such as reading comprehension or motivation. With respect to this latter topic, some students in this study reported decreased motivation to complete the tasks because of a desire to eat immediately

after the testing. In addition, the time of day when the respective groups took the tests may have influenced the results: those in the 24-hour group took the tests in the morning and may have been fresher and more relaxed than those in the 12-hour group, who took the tests at night. Perhaps, then, the motivation level of food-deprived participants could be effectively tested. Second, longer-term food deprivation periods, such as those experienced by people fasting for religious reasons, could be explored. It is possible that cognitive function fluctuates over the duration of deprivation. Studies could ask how long a person can remain focused despite a lack of nutrition. Third, and perhaps most fascinating, studies could explore how food deprivation affects learned industriousness. As stated above, one possible explanation for the better perseverance times in the 24-hour group could be that they spontaneously improved their perseverance faculties by simply forcing themselves not to eat for 24 hours. Therefore, research could study how food deprivation affects the acquisition of perseverance.

The conclusion summarizes the outcomes, stresses the experiment's value, and anticipates further advances on the topic.

In conclusion, the results of this study provide some fascinating insights into the cognitive and physiological effects of skipping meals. Contrary to what we predicted, a person may indeed be very capable of concentrating after not eating for many hours. On the other hand, if one is taking a long test or working long hours at a tedious task that requires perseverance, one may be hindered by not eating for a short time, as shown by the 12-hour group's performance on the perseverance task. Many people—students, working mothers, and those interested in fasting, to mention a few—have to deal with short-term food deprivation, intentional or unintentional. This research and other research to follow will contribute to knowledge of the disadvantages—and possible advantages—of skipping meals. The mixed results of this study suggest that we have much more to learn about short-term food deprivation.

References

All works referred to in the paper appear on the reference page, listed alphabetically by author (or title).

Each entry follows APA guidelines for listing authors, dates, titles, and publishing information.

Capitalization, punctuation, and hanging indentation are consistent with APA format.

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