

Low-carb diets can affect dieters' cognition skills

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A new study from the psychology department at Tufts University shows that when dieters eliminate carbohydrates from their meals, they performed more poorly on memory-based tasks than when they reduce calories, but maintain carbohydrates. When carbohydrates were reintroduced, cognition skills returned to normal.

"This study demonstrates that the food you eat can have an immediate impact on cognitive behavior," explains Holly A. Taylor, professor of psychology at Tufts and corresponding author of the study. "The popular low-carb, no-carb diets have the strongest potential for negative impact on thinking and cognition."

Taylor collaborated with Professor Robin Kanarek, former undergraduate Kara Watts and research associate Kristen D'Anci. The study, "Low-carbohydrate weight-loss diets. Effects on cognition and mood," appears in the February 2009 edition of the journal *"Appetite."*

While the brain uses glucose as its primary fuel, it has no way of storing it. Rather, the body breaks down carbohydrates into glucose, which is carried to the brain through the blood stream and used immediately by nerve cells for energy. Reduced carbohydrate intake should thus reduce the brain's source of energy. Therefore, researchers hypothesized that diets low in carbohydrates would affect cognitive skills.

Study participants included 19 women ages 22 to 55 who were allowed to select the diet plan they preferred -- either a low-carbohydrate diet or

a low-calorie, macronutrient balanced diet recommended by the American Dietetic Association. Nine women chose a low-carbohydrate diet and 10 selected the low-calorie diet.

"Although the study had a modest sample size, the results showed a clear difference in cognitive performance as a function of diet," says Taylor.

The 19 dieters completed five testing sessions that assessed cognitive skills, including attention, long-term and short-term memory, and visual attention, and spatial memory. The first session was held before participants began their diets, the next two sessions occurred during the first week of the diet, which corresponded to the week when low-carb dieters eliminated carbohydrates. The final two sessions occurred in week two and week three of the diets, after carbohydrates had been reintroduced for those on the low-carb diet.

"The data suggest that after a week of severe carbohydrate restriction, memory performance, particularly on difficult tasks, is impaired," Taylor explains.

Low-carb dieters showed a gradual decrease on the memory-related tasks compared with the low-calorie dieters. Reaction time for those on the low-carb diet was slower and their visuospatial memory was not as good as those on the low-calorie diet. However, low-carb dieters actually responded better than low-calorie dieters during the attention vigilance task. Researchers note that past studies have shown that diets high in protein or fat can improve a person's attention in the short-term, which is consistent with the results in this study.

Participants were also asked about their hunger levels and mood during each session. The hunger-rating did not vary between participants on a low-carb diet and those on a low-calorie diet. The only mood difference between dieters was confusion, which was higher for low-calorie dieters

during the middle of the study.

"Although this study only tracked dieting participants for three weeks, the data suggest that diets can affect more than just weight," says Taylor. "The brain needs glucose for energy and diets low in carbohydrates can be detrimental to learning, memory and thinking."

Source: Tufts University

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