

HUMAN NUTRITION

Title: The effect of increasing the protein content of breakfasts on satiety and cognitive function in undergraduate students – **NPB # 12-147** revised

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Scientific abstract

The effect of protein consumption at breakfast on appetite and cognitive performance was investigated using a randomized, cross-over study design. Following an overnight fast, 33 healthy, college undergraduates (aged = 22 ± 2 yrs, BMI = 23.5 ± 1.7 kg/m²) were provided one of four breakfast treatments: no breakfast, CHO-only, high-CHO/low protein and low-CHO/high protein. Baseline appetite questionnaires and plasma samples were collected and cognitive performance tests were administered at regular intervals for 240 minutes following breakfast. An ad libitum lunch meal was provided 240 minutes after breakfast, and the amount eaten recorded. Following the lunch meal, participants were allowed to leave the laboratory and food intake was recorded using a food log and hourly appetite questionnaires completed for the rest of the day. Eating breakfast reduced subjective appetite compared to eating no breakfast ($p < 0.05$). While food intake at the lunch meal was lowest after the HP breakfast ($p < 0.05$) total daily energy intake was lowest when participants consumed no breakfast ($p < 0.05$). The macronutrient composition of the breakfast meal had no effect on subjective appetite or food intake ($p > 0.05$). Analysis of plasma samples revealed a significantly lower glucose following the low CHO/high protein treatment as compared to the CHO only breakfast. ($p < 0.05$). Plasma insulin concentration was lowest following the no breakfast condition ($p < 0.05$) but did not differ following the different breakfast meals ($p > 0.05$). Proactive interference in delay memory was sensitive to treatment ($p = .056$), the low CHO/high protein treatment reducing interference. Verbal fluency was sensitive to overall treatment ($p < .05$), and reflected a stronger effect of the low CHO/high protein breakfast over time. Verbal fluency was marginally sensitive to the treatment ($p = .068$), with the two protein treatments leading to continued improvement over time.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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