

Influence of different macronutrient ratios of breakfast cereals on postprandial glucose metabolism, cognitive performance, hunger, and satiety

Projekt: 320

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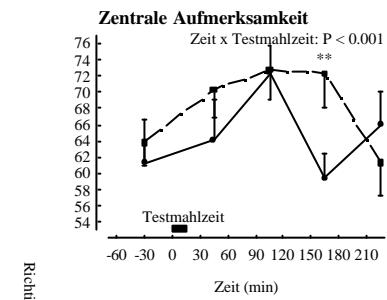
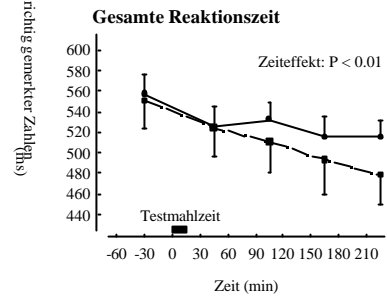
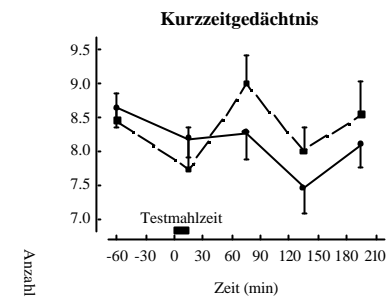
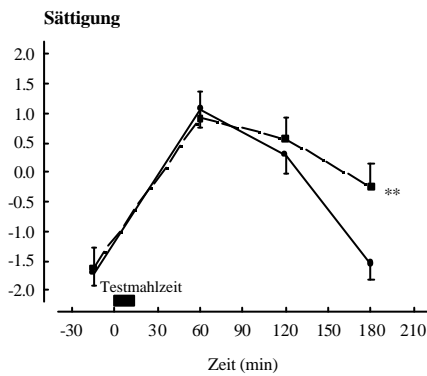
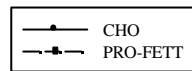
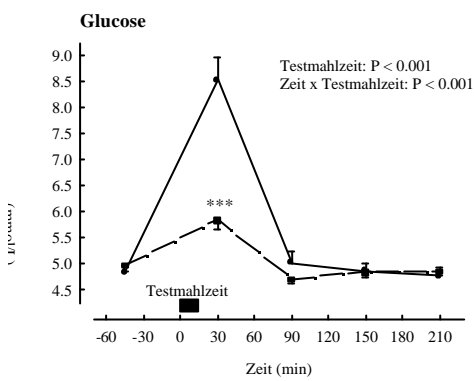
Introduction

The macronutrients carbohydrates, protein, and fat can differently influence cognitive performance. Depending on the daytime, the intake of carbohydrates and protein exhibit partly differing or antagonistic acute effects, while fat intake induces a non-specific, but stabilizing effect. The importance of the acute postprandial effects on cognitive performance is increasing, since mental tasks and intellectual demands are increasingly requested in the workplace environment. Food intake can influence cognitive performance at least during three to four hours after meal intake. To achieve an enduring optimal cognitive performance in the postprandial phase, a high intake of carbohydrates seems unreasonable. In contrast and in particular during the morning, a protein-rich and/or fat-rich meal positively influences different cognitive functions and concomitantly leads to a higher satiety.

Methods

The study was performed as a balanced, crossover experiment with repeated measurements. Eleven young men (24 ± 3 years, body mass index = 21 ± 2 kg·m²) were given two different breakfast cereals and postprandial glucose level, cognitive performance, hunger and satiety were assessed. The carbohydrate-rich cereals (CHO) had a carbohydrate:protein:fat ratio of 78:8:14 energy percent, and the protein- and fat-rich cereals (PRO-FAT) had a ratio of 30:41:29. The cereals were served after assessment of the basal values (cognitive test I, blood glucose, cognitive test II, questionnaire) on the test mornings. The measurements were repeated hourly for four hours. The cognitive performance was assessed with the aid of computer tests for short-time memory, reaction time, and attentiveness. Hunger and satiety was assessed with questionnaires.

Results



Temporal changes in capillary blood glucose, subjective satiety, short-time memory, total reaction time and attentiveness after ingestion of carbohydrate-rich (CHO) and protein- and fat-rich (PRO-FAT) cereals. Mean and standard error for 11 subjects. P-values are given for the meal effect, time effect, and interaction time X meal (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$).

Conclusion

The PRO-FAT cereals caused a more stabile glucose response and a trend towards better cognitive performance during the morning compared to the CHO cereals. Furthermore, the satiety was more enduring after the PRO-FAT cereals.