

## INVITED COMMENTARY

### How important is breakfast?

It is popularly said that 'breakfast is the most important meal of the day'; however, like many apparently simple statements this raises questions that turn out to be rather difficult to answer. An obvious question is: important for what? It seems that the phrase usually implies some short-term benefit, such as the avoidance of hunger later in the morning, or the optimization of performance at school or work. There are, though, some anomalies here. Despite the fact that breakfast follows the longest 'fast' of the day and, therefore, would seem to be an important opportunity for 'refuelling', a significant minority of people rarely eat breakfast, and for those who do, breakfast is typically the smallest of the three 'main' meals. Is this simply because we do not leave ourselves enough time to eat before starting out on our daily routine, or is it that we are not really very hungry so soon after waking? Perhaps this is partly the origin of the phrase, to encourage more enthusiasm for a meal which collective experience has shown to be beneficial. What then are the effects of breakfast on human health and functioning?

The review article by Ruxton & Kirk (1997) provides evidence for some of the nutritional benefits of breakfast. They come to the cautious conclusion that eating breakfast, particularly when this includes breakfast cereals, is 'a marker for an appropriate dietary pattern'. This is based on findings of associations of breakfast consumption with a lower percentage intake of fat, a higher percentage intake of carbohydrate, higher intakes of dietary fibre and certain micronutrients, and also lower blood cholesterol levels and lower body weight. In other words, the nutritional impact of breakfast appears to be very positive. Why, then, is any caution needed? The various findings present a mostly consistent picture, but as Ruxton & Kirk (1997) note, a vast majority of the studies they review are epidemiological (i.e. correlational) in nature.

Determining the contribution of a particular meal or food to physical or mental well-being is a cause-and-effect question, and accordingly correlational evidence cannot give definitive answers. For example, the often-cited inverse relationship between meal frequency and body weight or body mass index may indeed be partly explained by the relatively prolonged satiating effects gained by eating at breakfast time and/or eating breakfast cereals which have a high-carbohydrate content. However, it probably also reflects the (perhaps misguided) strategy adopted by many overweight dieters who miss breakfast in an attempt to start the day as they mean to go on – that is, to eat as little as possible. Additionally, there is evidence from studies of animal models of obesity suggesting the existence of a negative feedback influence of body fat on appetite which acts primarily to reduce the tendency to initiate eating, resulting in decreased meal frequency (Mela & Rogers, 1997). A variety of physiological and cognitive influences may therefore underlie relationships between body weight and meal frequency and whether or not breakfast is eaten. Questions such as the efficacy of eating breakfast in promoting weight loss can only be addressed convincingly by conducting specific intervention trials. (Actually, the association of human obesity with a 'gorging' pattern of intake characterized by relatively large, infrequent meals, like the idea that energy taken later in the day is more fattening, has not been confirmed by results from the majority of recent studies; Mela & Rogers, 1997.)

Ruxton & Kirk (1997) also highlight the fact that rather few of the studies included assessments of nutrient status. Given that measured intakes can correlate very imperfectly with micronutrient status, the direct measurement of the latter is clearly a priority for future work. But even if more data on the effects of nutrient status were available, these would need to be interpreted carefully. Almost by definition, well-nourished individuals can be expected to benefit little, if at all, from increased intake and blood concentrations of selected micronutrients.

This suggests that the importance of eating breakfast has to be viewed in the context of the whole diet, a point which is illustrated by the results of research on breakfast and cognitive performance. Thus, the widespread view that missing breakfast can have adverse effects on behaviour and cognitive efficiency is not generally supported by the outcomes of the 'intervention' studies conducted in Europe and the USA. Even in experiments imposing fairly long periods of food restriction on young people (e.g. 9- to 11-year-old children food-deprived overnight and at breakfast for a total of 18 h before testing), minimal impairments of performance were detected. Such results indicate that cognitive performance is relatively invulnerable to short-term fasting. Or at least this is the case in relatively well-nourished children and adults. In contrast, for populations where greater numbers of children are nutritionally at-risk, or where such children have been specifically targeted, both short- and longer-term studies have shown consistently that consumption of breakfast can improve cognitive performance (Pollitt, 1995).

Finally, returning to the point about correlational evidence, it is also worth noting that the insignificant effect of missing breakfast seen in many of the former studies is not necessarily inconsistent with the belief or casual observation that children who miss breakfast tend to perform less well or are more disruptive in the classroom. A correlation between bad eating habits and bad behaviour can be explained in a variety of ways, including a probable association between difficult home circumstances and relatively poor academic performance. Here, irregular meal times and poorer nutrition may well be a feature of the individual's socio-economic circumstances, but only a trivial factor in directly influencing their behaviour either at home or school. Accordingly, the consumption of breakfast, and certain breakfast foods including breads and cereals, is doubtless a marker for more than just an appropriate dietary pattern.

Notwithstanding the difficulties of determining the functional effects of any particular dietary habit, it can be safely concluded that increasing the consumption of breakfast is more likely than not to be beneficial. This would also seem to be a relatively simple dietary change to communicate and to achieve, and it is possible that its impact might be amplified if preferences established for high-carbohydrate foods at breakfast generalized to other meals.

PETER J. ROGERS  
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#### REFERENCES

- Mela, D. J. & Rogers, P. J. (1997). *Food, Eating and Obesity: The Psychobiological Basis of Appetite and Weight Control*. London: Chapman and Hall. (In the Press).
- Pollitt, E. (1995). Does breakfast make a difference in school? *Journal of the American Dietetic Association* **95**, 1134–1139.
- Ruxton, C. H. S. & Kirk, T. R. (1997). Breakfast: a review of associations with measures of dietary intake, physiology and biochemistry. *British Journal of Nutrition* **78**, 199–213.