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## Breakfast: how important is it really?

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Littlecott *et al.*<sup>(1)</sup> report a positive *association* between breakfast consumption and educational performance in 9- to 11-year-old children. This is an impressive study. It has a large sample size and the outcome is Summative Teacher Assessments<sup>(2)</sup>, which use standardised materials to evaluate student learning and skills. The study was reported widely in the print and broadcast media in the UK. These reports, like the publication itself and accompanying press release, were mostly careful in describing the findings. Nonetheless, a strong impression is given that learning in school benefits from eating breakfast. For example, the authors are quoted as saying that the study provides “robust evidence of a link between eating breakfast and doing well at school,” and “embedding health improvements into the core business of the school might also deliver educational improvements,”<sup>(3)</sup> and this is supported with quotes from a head-teacher, including “By around 10 am they (children who miss breakfast) start flagging. It has an effect on their behaviour and concentration – some even fall asleep.”<sup>(3)</sup> The clear implication here is that getting children to eat breakfast will improve educational performance in school. The authors also appear to suggest this in the abstract of their paper: “Future research should aim to explore the mechanisms by which breakfast consumption and education outcomes are linked, and *understand how to promote breakfast consumption among school children* (italics added).”<sup>(1)</sup>

While the importance of breakfast seems to be firmly embedded in our culture, it is important to recognise that this is not strongly evidenced based. An interpretation of Littlecott *et al.*'s<sup>(1)</sup> results is that consumption of breakfast benefits educational attainment, but it is equally or more plausible that consumption of breakfast at home is a marker for the quality of a child's home environment and parenting, and it is that which influences educational attainment. Indeed, consumption of breakfast may be a particularly good marker in this respect, better for example than free-school-meal (FSM) entitlement or measures of socio-economic status, as it may reflect well at an individual level the motivation and capacity of caregivers to provide a nurturing environment for their children. (It may even predict aspiration towards educational achievement partly because the belief in the importance of breakfast for learning encourages caregivers with such aspirations to provide breakfast). When a teacher sees a child who has missed breakfast being difficult to teach, being tired and lacking in concentration they attribute this to the child not having eaten recently. That is not unreasonable, but they may well be losing sight of the possibility that the child's

problems in class stem instead primarily from other aspects of their home life, perhaps including lack of sufficient sleep.

So what is the evidence that eating breakfast is important for performance in school? In an earlier paper<sup>(4)</sup> from the same group on the same cohort of children (*n* 4500) it was reported that universal breakfast provision did not improve cognitive function versus a wait-list control group. Furthermore, no interaction was found between the effect of the intervention and socio-economic deprivation measured by FSM entitlement. Only results for episodic memory were reported (briefly), but the implication is that other cognitive test outcomes showed a similar lack of effect of universal breakfast provision. Relevant intervention studies have been carried out since at least the 1980s. These present a mixed picture, particularly of the acute effects of missing breakfast in relatively well-nourished children.<sup>(5)</sup> In perhaps the earliest such study,<sup>(6)</sup> 9- to 11-year-old children who missed breakfast were tested mid-morning 18 hours after their last meal. Performance was little affected compared with when they ate breakfast. On a component of one task, performance was improved after missing breakfast, whilst on another task missing breakfast led to impaired performance in subgroup of the participants. In contrast, studies of school breakfast programmes in nutritionally-at-risk populations have found more consistently positive effects of breakfast provision on educational and cognitive test outcomes, it is suggested in part due to increased school attendance that providing breakfast encourages.<sup>(5)</sup>

This discrepancy between evidence and belief in the importance of breakfast for educational performance is very similar to Brown *et al.*'s<sup>(7)</sup> conclusion for the proposed effect of breakfast on obesity. As they demonstrate very nicely, an association between missing breakfast and higher risk of obesity is well established, while the evidence from the relatively few relevant intervention studies does not clearly confirm or refute a causal effect. Brown *et al.* also show that there is considerable bias in the reporting and interpretation of this evidence in both scientific and popular publications, resulting in "belief beyond the evidence" for this particular effect of breakfast. Plausibly, the correlation between missing breakfast and higher weight is explained largely by overweight and obese people trying, in their efforts to eat less, to delay eating for as long as possible in the day. In non-obese individuals, at least, this appears to succeed, as missing breakfast has been found to lead to reduced energy intake over the whole day<sup>(8)</sup>. Such results then beg the question as to why eating breakfast is advocated for healthy weight management<sup>(9)</sup>. Indeed, a case could be made that if there is little or no appetite for breakfast this meal can be safely missed by those who are well nourished, including children, because this will not adversely affect performance (body energy reserves can be readily mobilised to fuel muscle and brain activity), but will likely help reduce excessive energy intake.

From the perspective of public health and informing investment in cost-effective interventions it is important that evidence from research is examined dispassionately and in the round. This includes evidence concerning the importance or otherwise of eating breakfast.

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