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Eating Behaviour in Studies of Child Growth, Development and Health – Measure Precisely, Early and in Context: Commentary on Ramsay, Liu & Stein, Black & Hurley, Milnes, Piazza & Carrol, Llewellyn & Wardle, and Arcan, Bruening and Story

Myles S. Faith, PhD

Gillings School of Global Public Health, University of North Carolina at Chapel Hill, USA

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Introduction

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Eating is essential for healthy growth and development. Along with physical activity, eating is the major behavioural conduit through which energy balance is regulated, through which food choices are made, and around which numerous interactions with family members and peers occur. Children's food choices and diet composition influence health status during development and, potentially, later life. Perhaps there is no better example of this than that of pediatric obesity, which tracks through adolescence and into adulthood and predicts a number of health disorders. For all these reasons, it is imperative that clinical guidelines and policy recommendations intended to foster healthy eating by children be guided by rigorous scientific studies and methodology. Quality measurement is fundamental to this endeavour and, as noted below, is a focal point of the papers[1-6] in this chapter.

The papers[1-6] reviewed in this section address a variety of topics related to the development of feeding and eating patterns throughout development, starting in infancy. The papers address biological and environmental drivers of refined eating phenotypes within "normal" populations as well as more specialized patient samples (e.g., feeding disorders).[1-6] They present some of the strongest scientific innovations in the pediatric ingestive behaviour fields, while highlighting real-world clinical and policy implications where real lives are touched. This is where the "rubber meets the road" of real-world eating behaviour.

A cross-cutting, if not unifying theme, across these papers[1-6] is the critical role of measurement in driving scientific advances. Armed with quality measurement, new insights have emerged which ultimately may better inform policy. Three conclusions can be drawn upon review of these papers,[1-6] with respect to measurement: (1) Measure eating behaviour precisely; (2) Measure eating behaviour early; and (3) Measure eating behaviour in context. These are discussed next.

Research and Conclusions

Measure eating behaviour precisely

The contributions in this chapter[1-6] reveal insights that can be gleaned by using quality assessment tools that capture precise, refined dimensions of child eating behaviour. For example, as reviewed by Llewellyn and Wardle,[5] development of the Child Eating Behavior Questionnaire[7] over the past decade has yielded critical insights into the development of children's "food responsiveness" and "satiety awareness" – both of which are linked to childhood obesity.[8,9] The tool has been used internationally and allowed for replication of findings across

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diverse populations. This suggests novel targets for intervention (e.g., training children to recognize hunger/fullness cues) that, with rare exception,[10] have not been explored to date. Milnes et al.'s[4] contribution illustrates how researchers can quantify specific parenting strategies in the context of pediatric feeding disorders (e.g., coaxing, reprimanding) and how these may impact on specific child eating patterns (e.g., bites of food, food refusal). Ramsay's[1] contribution illustrates how inefficient sucking, assessed by polygraph among young infants with gastroesophageal reflux, predicted poorer feeding skills and readiness for solid foods. Interestingly, there is other evidence that voracious sucking by infants is a risk factor for childhood obesity.[11,12] These examples underscore a point that is implicit throughout these contributions – but which needs explicit highlighting – that precise measurement has been essential for these scientific advances and will be critical to the next generation of discovery.

Measure eating behaviour early

As illustrated in this chapter,[1-6] eating behaviours can be measured reliably at earlier ages including infancy. This is illustrated by the Baby Eating Behaviour Questionnaire,[13-15] discussed by Llewellyn and Wardle,[5] the subscales of which may reflect early markers for obesity risk. As Black et al.[3] discuss, excess caloric intake during toddlerhood has been documented in population-based research, along with insufficient intake of fruits and vegetables and essential micronutrients. Ramsay's[1] contribution raises the topic of temperament and to what extent it might impact on feeding behaviour. Interestingly, there is emerging evidence that a "difficult" infant temperament in the first years of life may be risk factor for childhood obesity.[16] With the development of new tools to assess eating behaviour in early life, researchers will be able to explore new causal models for (un)healthy growth and development.

Measure eating behaviour in context

The contributions to this chapter[1-6] reveal that eating behaviour occurs in a multi-level context. This context includes individual-level factors (e.g., genetics; temperament), as well as family-level factors (e.g., parental feeding practices; family relations) and societal/cultural factors (e.g., television commercials; laws regulating advertisements). This framework is consistent with the "socio-ecological model"[17,18] and has been endorsed by an American Heart Association task force on the promotion of healthy eating.[19] Understanding multi-level systems is scientifically challenging yet a pressing research and policy need.[20] This includes research linking genetics to individual child eating behaviour (as illustrated by Llewellyn and Wardle[5]) as well as individual

child food preferences and intake to advertising policy (as illustrated by Arcan et al.[6]).

What's missing?

The contributions to this chapter[1-6] reveal the importance of measurement and its potential to provide refined characterizations of infant/toddler/child eating dimensions. This is profoundly important. Armed with these assessment tools, one of the greatest research needs can be better addressed: Better understanding the children for whom, and conditions under which, specific eating behaviours will promote or protect against disease onset. Answering these questions will require birth cohorts that are tracked across the development and – ideally – into adulthood. For example, are refined traits such as sucking intensity,[12] food neophobia,[21] food responsiveness,[8] and negative affect when eating[22] causally related to childhood obesity onset? If so, for whom and under what environmental conditions are these associations intensified or attenuated?

Development and Policy Implications

The authors provide thoughtful discussions regarding the policy implications for their respective topics. The findings, collectively, suggest an important implication for policy-level changes striving to modify child eating behaviour: It is unclear that all children necessarily will respond the same way to a given intervention. Whatever the policy may be (e.g., providing fruits and vegetables to schools; limiting the portion sizes of sugary beverages), one potentially should anticipate individual differences that drive non-uniform responses to the same policy. These individual differences might, conceivably, be related to factors such food responsiveness or satiety awareness (which may have a sizable genetic loading), temperament, family interactions, neighborhood characteristics, or other unknown factors that influence how children eat. Being positioned to assess individual differences may help to reveal the conditions under which, and children for whom, certain policy changes will be more/less effective in fostering a healthier diet.

Finally, given the many factors that potentially impact on child eating behaviour, experimental studies that allow for strong causal inference are needed to guide policy development for healthy eating and obesity prevention. Indeed, laboratory studies and quasi-experimental designs can be enormously informative in this regard. This is illustrated by a recent review by Epstein et al.[23] which examined the impact of taxes and subsidies on food purchases. The review focused on studies using experimental designs, including laboratory-based investigations.

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