Table 3. Simple Feeding Elements Scale (SFES) bivariate correlation matrix of mean scores.

	Setting	Positioning	Mood and atmosphere	Child participation	Pacing	Feeding while distracted	Feeding while disengaging	Qualitative verbal	Quantitative verbal	Fruit and vegetables
Setting	1.00									
Positioning	0.21	1.00								
Mood and atmosphere	0.41	0.09	1.00							
Child participation	0.11	−0.42**	0.19	1.00						
Pacing	0.18	−0.48**	0.14	0.62**	1.00					
Feeding while distracted	0.50**	−0.09	0.41	0.39*	0.62**	1.00				
Feeding while disengaging	0.08	−0.36*	0.24	0.48**	0.65**	0.60**	1.00			
Qualitative verbal	0.06	−0.70**	0.09	0.65**	0.69**	0.31	0.51**	1.00		
Quantitative verbal	0.07	0.07	0.45	−0.13	0.00	0.08	−0.03	−0.16	1.00	
Fruit and vegetables	0.21	−0.17	0.17	0.40**	0.27	0.35*	0.46**	0.21	−0.07	1.00

Spearman's correlation test.
*Correlation is significant at the <0.05 level (two-tailed).
**Correlation is significant at the <0.01 level (two-tailed).

most did not assume a more ideal alignment of faces to facilitate social interaction, and as such tended to exhibit an average or less ideal score on the positioning item. This is further addressed in the sections 'Discussion' and 'Limitations'.

Analysis by country

Differences in feeding interactions by country were not significant (Figure 3). However, trends revealed more positive mealtime interactions within the UK sample. This could be explained by the observation that UK babies' mean age and weight at filming were greater than for the Israeli women (Table 2), and significantly more UK women breastfed their infants during the filmed feeding.

Discussion

In this study, we aimed to investigate mealtime interactions in mother–infant dyads when the infants were aged between 2 and 6 months. No differences were seen between mealtime interactions for healthy weight women and overweight or obese women or by country. However, breastfeeding was associated with a more positive mealtime experience than other modes of feeding. Breastfeeding mothers were more in tune with their baby's signals during feeding and were less distracted by external cues. Thus, in this study, breastfeeding mothers provided a more positive interaction during feeding by distracting the baby less, providing a more ideal environment, pausing the feed to respond to infants' signals to stop and facilitating independence through self-feeding. In addition, the longer the duration of the meal, the more mothers responded to their infant's disengagement by pausing during the expression of a satiety cue (e.g. arching the back or moving away from the breast). This was supported by a slightly longer duration of feeding for mothers who initiated breastfeeding.

Fewer commands were issued by mothers when self-feeding was encouraged. The more mothers enjoyed the mealtime interaction (positive mood and atmosphere), the more they encouraged self-feeding (allowing the baby to hold and touch the breast while breastfeeding, holding the bottle or finger food for solid food). Enjoyment did not differ by mode of feeding. These findings are similar to Farrow and Blissett (2006) who demonstrated that breastfeeding predicts fewer negative mealtime interactions in 1-year-old infants, mainly as mothers are less likely to pressure their infants to eat. In support, Brown and Arnott (2014) noted that mothers who follow an infant-led feeding approach (positively associated with breastfeeding) were more aware of their infant's hunger and satiety cues. Thus, breastfeeding can facilitate sensitivity to the infant's appetite (Caton et al., 2012; Ong et al., 2006).

Breastfeeding mothers showed more positive outcomes in relation to pacing, responding to disengagement cues

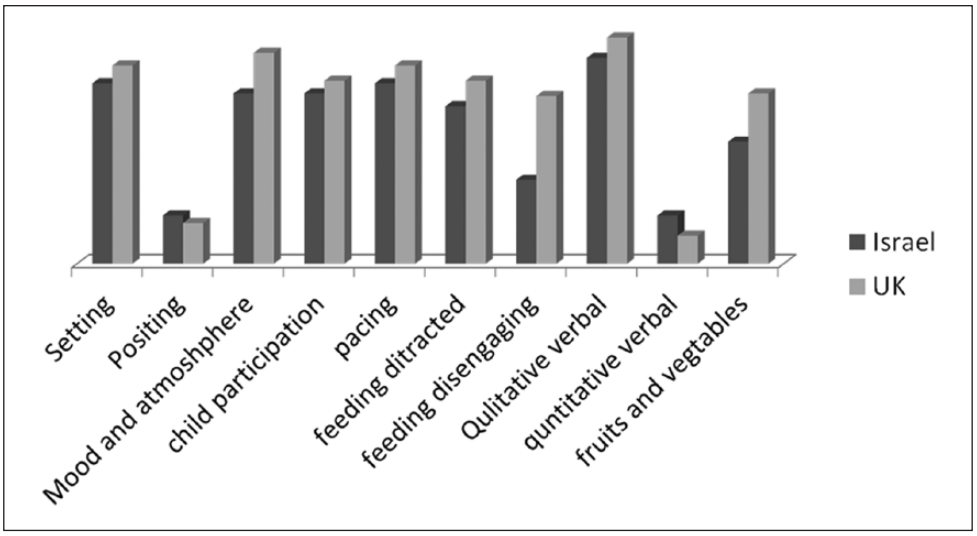

Figure 3. Percentages of participants with more ideal scores distributed by country.
No significant differences.

and providing fewer distractions, which can be transferred to the complementary feeding period. Transitioning to solids is an important time when less maternal control and more encouragement of infant self-feeding and setting their own pace of eating (i.e. trusting the infant to know what is best) may be important in establishing healthier future eating habits. The usefulness of SFES may reside in its ability to identify elements of feeding interactions in the first year of life which may potentially impact later eating behaviours. This is unique in comparison with other existing feeding observation scales such as that developed by Hodges et al. (2013), which are applied to feeding infants aged 12 months and older.

Breastfeeding establishes a strong bond between mother and infant (Kuzela et al., 1990), and many enjoy the intimacy being established in the feeding interaction with higher levels of sensitivity to their infants 3 months postpartum (Britton et al., 2007). However, in this study, there was no difference in the level of enjoyment between mothers who breastfed or those who fed solids/formula during the meal. This could be attributable to the young age of the babies and the possibility that in the early stages of feeding the baby is less likely to exhibit food refusal and challenging behaviours, so creating a more joyful and positive experience for the mother and her baby. This might also be attributed to the selectiveness of the sample (i.e. mothers were interested in participating in a study about feeding their babies) and were thus more attuned to feeding whether they elected to breastfeed during the filmed interaction or not.

Breastfeeding produced a greater opportunity for positive mealtime interactions, even accounting for elements of the scale which favour breastfeeding such as child participation. This provides further confirmation of the benefits of breastfeeding beyond nutrition (Shah, 2013), and the psychological benefit to mother and baby. However, for the positioning element of the scale, breastfeeding mothers tended to exhibit only average or not ideal compared to other elements. Thus, one might not expect a breastfeeding mother to align her face with her child's during breastfeeding as this is challenging given that the child's mouth is facing the breast. However, a mother who fails to align her face with her child during feeding due to distractions (e.g. mobile phone, watching TV or looking elsewhere) is less interactive and therefore coded as having a less positive mealtime experience than mothers who face their baby.

No significant differences between countries emerged, and any findings were likely to be attributable to the different modes of feeding chosen for the filmed interactions. This may have been affected by the difference in paid maternity leave entitlement between Israel and the United Kingdom (see Shloim et al., 2014).

Women in our study were highly educated and of a relatively high socioeconomic status, therefore more likely to initiate and maintain breastfeeding within a generally healthy lifestyle. This supports the findings of others including Crombie et al. (2009) who described how parents' age, level of education and health knowledge all play an important role in food and feeding choices including rates of breastfeeding. Moreover, breastfeeding could serve as a learning experience for future feeding interactions, as suggested by Britton et al. (2007). Breastfeeding mothers who demonstrated more enjoyment in the feeding interactions might be more inclined to translate this into later feeding by being more in tune with their infant's feeding cues and introduce healthier foods. We intend to follow up these infants and mothers for 2 more years to explore any ongoing effect of breastfeeding on larger mealtime interactions.

Limitations

Our findings should be considered in relation to the limitations of the study. Women were self-selected and well-educated, originating from a relatively affluent sub-population. This might have impacted their decision and ability to breastfeed and might have contributed to a more positive feeding interaction. Although the power calculations showed that the sample size was sufficient to determine significant differences between Israeli and UK babies' and mothers' BMI (for the combined sample of all four follow-ups), a larger sample size with a broader range of weight categories might have permitted observing clearer differences in feeding interactions between countries and differing BMI categories. Moreover, it is possible that overweight and obese women demonstrate different mealtime interactions which were not considered here. This study combined both BMI categories into a single BMI group. Thus, future research could benefit by addressing possible differences for each category independently. This sample had a smaller proportion of overweight and obese women compared to levels for the general population (WHO, 2010), perhaps due to the skewed socioeconomic distribution or that obese mothers may be less likely to agree to be filmed during mealtime interactions. Finally, this study involved feeding interactions on one occasion and there-fore may be unrepresentative of mother–infant feeding interactions more generally. This will be addressed in the future with further follow-up periods for each dyad, over 2 years.

Conclusion and recommendations

Our findings indicate the feasibility of assessing mother–infant mealtime interactions in young infants and contribute to previous research by providing evidence of differences between breastfeeding and other feeding during mealtime interactions. The study also emphasizes the importance of exploring such interactions not only via what is given within a meal but also by understanding mother–infant levels of enjoyment and emotional interactions during a meal. Mealtime interactions offer an insight into the quality of the early feeding experience, and few studies to date have achieved this within a natural setting. There is a clear need to explore this area further within larger and more diverse populations.

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