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**Healthy Happy Family Eating: Development and feasibility of an online
intervention to improve family eating behaviours**

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Abstract

Unhealthy eating in children is a global problem, associated with poor long-term health outcomes and evidence indicates that unhealthy eating habits developed early in life may track into adulthood. Increasingly, description of behaviour change intervention development is encouraged. This paper describes the development and refinement of an online intervention designed to improve family eating behaviours. Part 1 describes three pilot studies designed to collect quantitative and qualitative feedback about the intervention to inform its development. This is followed by Part 2, which describes an additional study covering other formative work involved in developing the intervention, including theoretical approaches, evidence-base review and stakeholder input. The resulting, robustly refined intervention is described, the efficacy of which is being evaluated by a Randomised Controlled Trial.

Introduction

Increasingly, description of intervention development (as well as evaluation) is encouraged, especially within the field of health behaviour change (Hoddinott, 2015; Wood et al., 2016). This improves transparency and facilitates replication of successful interventions. This paper describes the development and refinement of an online intervention designed to improve family eating behaviours.

Unhealthy eating in children is a global problem (WHO, 2015) and is associated with poor long-term health outcomes (Ogden, 2012). Neophobia (the fear of new foods) is an acknowledged developmental stage in very young children, which if unchallenged can lead to restricted food decisions in later life (Nicklaus, Boggio, Chabanet, & Issanchou, 2005). Food preferences are also believed to develop early in life, specifically the first five years (Savage, Fisher, & Birch, 2007). There is, therefore, a need to address the problem of unhealthy eating in children and young people as early and efficiently as possible.

Parents cite time constraints and stress as primary barriers to healthier eating and feeding behaviours (Fulkerson et al., 2011; Norman, Berlin, Sundblom, Elinder, & Nyberg, 2015). There is also some suggestion that parents may employ more positive feeding strategies if they are not anxious themselves (Norman et al., 2015; Ogden, 2014; Peters, Parletta, Lynch, & Campbell, 2014). Multi-component interventions are considered the gold-standard approach to tackling eating behaviour change (Bray, Fruhbeck, Ryan, & Wilding, 2016; Brownell & Cohen, 1995). Nevertheless, there are few descriptions of dynamic family-focussed healthy eating interventions in the literature (McLean, Griffin, Toney, & Hardeman, 2003).

Interventions to improve healthy eating in children should therefore be delivered in a flexible and easily accessible format. Further, they should focus not only on teaching parents healthy eating habits and feeding strategies, but also on encouraging a relaxed and stress-free environment in which to implement them. It is imperative that these interventions are also acceptable to their users who need to view the intervention as appropriate, based on ‘anticipated or experienced cognitive and emotional responses to the intervention’ (Sekhon, Cartwright & Francis, 2017). Mobile health (mHealth) interventions are defined as, ‘medical health practice supported by mobile devices’ (WHO, 2017) (e.g. mobile phones, tablets and other wireless technology) and are becoming increasingly popular (Marcolino et al., 2018, Snuggs et al., in preparation). They provide users with a flexible way of engaging in health behaviour change interventions at their own convenience; they appear to be a suitable delivery mode for this type of intervention.

Netmums is a UK-based parenting website with a monthly audience of over 11 million people. It is the most frequently visited parenting social networking site in the UK and its visitors are more socio-economically representative of the population than other similar websites. With a strong focus on family and health, the Netmums website presents an ideal

platform from which to deliver a healthy eating intervention to a large number of parents and families.

In 2009, Netmums created The Healthy Happy Family Eating (HHFE) course in consultation with the UK Department of Health. This consisted of nine emails, delivered to parents over a 4-week period. The emails provided information on food swaps, healthy recipes, tips to encourage fussy eaters and ideas for activities to focus the family on food and cooking. Throughout the intervention, there was an emphasis on enjoyment and happy mealtimes. A pilot study was conducted to assess the effectiveness of the HHFE, with positive pre/post results (Court, Vince-Cain, & Jefferson, 2010). Although this was encouraging, there was a clear need to evaluate the HHFE more robustly and to make substantial changes to it based on user feedback, the evidence base and developing behaviour change theories.

It has been observed that intervention development is not always a ‘standalone step’ (Hoddinott, 2015). Thus, this paper begins with a description of three studies designed to assess and inform the feasibility and acceptability of the HHFE in terms of prospective, concurrent and retrospective acceptability as defined by Sekhon et al. (2017). This is followed by an account of the intervention refinement. Some specific challenges associated with collecting user feedback from this population and the methods we employed to overcome these are also discussed.

Part 1: HHFE pilot studies

Study 1: long-term (6 years) Follow-Up of Pilot study participants

Background.

Initially, in 2009, Netmums recruited 1861 participants to a pilot study investigating the acceptability of the newly developed HHFE intervention (Court, Vince-Cain, & Jefferson, 2010). They were asked to complete a short online questionnaire before receiving the nine emails that formed the HHFE intervention, and then another questionnaire immediately after

intervention completion. Seven Likert scale statements were administered at each time point that focused on enjoyment and confidence around cooking and choosing healthy family food. Five hundred and twenty eight (28%) participants provided data at both time points and analyses revealed significant positive increases on each of the seven statements. Given this initial success, the aim of the long-term Follow-Up study was to establish whether these positive changes were sustained over a longer period (6 years).

Methods.

The Follow-Up study had a within-subjects longitudinal design with three time points (T1 (baseline) and T2 (baseline + 4 weeks) were Pilot Study time points, T3 was the long-term Follow-Up time point (baseline + ~ 6 years)).

The sample consisted of Netmums members who had taken part in the Pilot study (i.e. had provided data at both T1 & T2), the majority of whom were female and from the UK. All had previously agreed to being re-contacted as part of the study. The study was granted approval to proceed by the University of Reading Research Ethics Committee (reference: 2016-018-KM).

At T1, T2 and T3, participants were asked to indicate their level of agreement on a scale of 1 (no agreement) to 10 (complete agreement) with seven statements (Table 1). At T3, they were also asked to provide demographic data (gender, age, location, number of children and oldest child's age) which had not been collected in the Pilot Study.

All 528 of the original Pilot participants were sent an email which explained why they were being contacted and requested that they complete an online questionnaire similar to the previous one in order to see how people who had completed the HHFE intervention were getting on several years later. Participants who did not complete the questionnaire were sent a reminder 1 and 3 weeks later.

Results.

Data were analysed from participants who provided information at T1, T2 and T3 (N=120, i.e. 23% of the cohort in the Pilot study).

Participants.

Participants all identified as female, with one participant declining to state their gender. They all stated that they were either a parent or step-parent of at least one child and 36% remembered taking part in the Netmums HHFE intervention. Participants' mean age was 43.41 years (SD = 5.88).

Changes on the Happy Family Eating measure over time

In the Pilot study, paired sample t-tests showed a significant and positive increase in the mean statements for all seven statements on the Netmums Happy Family Eating Measure. In this Follow-Up study, scores on five of these statements remained significantly higher (i.e. improved) than at baseline (table 1).

Table 1: Paired sample t-tests on Netmums HHFE items at T1 and T3. P < 0.005 indicated in bold. Statements with (r) have had their scores reversed such that a higher number indicates a positive change.

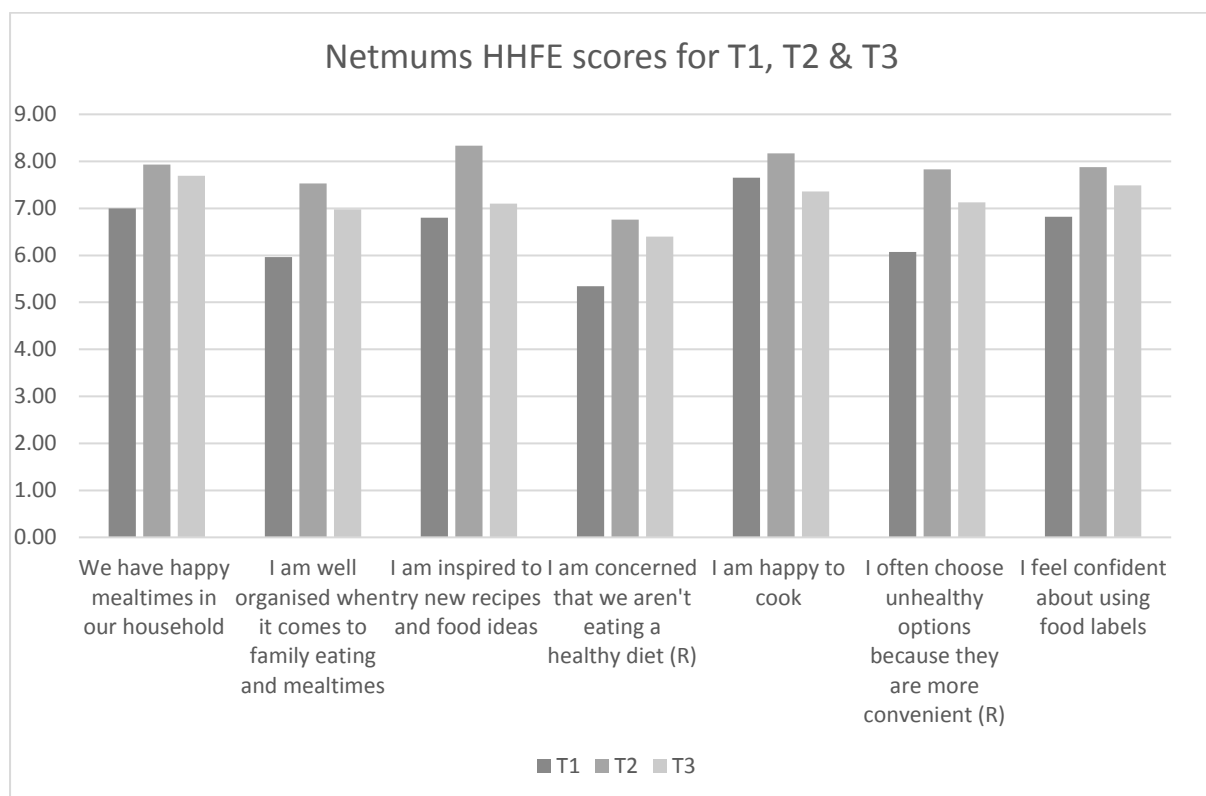
	T1 Mean (SD)	T3 Mean (SD)	t	df	Sig. (2-tailed)
We have happy mealtimes in our household	7.00 (1.798)	7.69 (2.144)	-3.185	120	.002
I am well well organised when it comes to family eating and mealtimes	5.96 (1.989)	6.98 (2.223)	-5.186	120	.000
I am inspired to try new recipes and food ideas	6.80 (2.060)	7.10 (2.296)	-1.317	120	.190
I am concerned that we aren't eating a healthy diet (r)	5.34 (2.189)	6.40 (2.584)	-4.147	120	.000
I am happy to cook	7.65 (1.792)	7.36 (2.217)	1.364	120	.175
I often choose unhealthy options because they are more convenient (r)	6.07 (2.411)	7.13 (2.322)	-4.399	119	.000

I feel confident about using food labels	6.82 (2.206)	7.49 (2.342)	-3.038	120	.003
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When follow-up (T3) was compared to post-intervention (T2), scores had either worsened or stayed the same ('happy mealtimes' and 'concerned about diet' items stayed the same) (figure 1).

Inter-reliability for the seven items was measured using Cronbach's α at T3, the value for which was 0.764.

Figure 1: Bar chart indicating scores for each of the statements at T1, T2 & T3.



Discussion.

Long-term follow-up suggested that positive behavioural and attitudinal changes were not only achieved by the HHFE intervention but also sustained some years later in the subset of participants who provided complete data. This provides clear rationale for investigating the effects of the intervention further. Nearly a quarter of the original sample participated in this study six years later and it is encouraging to observe that participants maintained their self-

reported improvements at long-term follow-up. There are no comparable studies with such long-term follow-up with which to compare retention rates but this appears to demonstrate a high level of engagement compared to other shorter-term online studies (Mathieu, McGeechan, Barratt, & Herbert, 2013).

This study carries limitations; there was no control group and the measures used were not validated (although the measure did demonstrate good inter-item reliability at T3).

Furthermore, long-term follow-up data collection took place six years after the original pilot; without a control group it is impossible to establish whether any maintenance of behaviour change is due to the HHFE or other factors, for example, parents might find family mealtimes less stressful as children grow older and changes in attitudes and behaviours may result from this.

Other limitations relate to the sample. Socio-demographic data for participants was only collected at T3, leaving open the possibility that those who did not remain engaged and respond to our invitation to complete the questionnaire at T3 might differ significantly from those who did. Additionally, it seems likely that people would be more likely to respond at T3 (and T2) if they had a positive experience of the intervention and/or Netmums generally. Finally, 64% of the long-term follow-up sample did not recall taking part in the HHFE intervention at all. While this would not necessarily negate intervention effects, it does pose the question as to how much influence the intervention could really have had on those who later forgot about it.

In summary, the results of this study suggest people may have benefitted from the HHFE intervention, becoming more comfortable with healthy cooking and food choices. The study was not controlled, however, and its sample may be demographically skewed in unknown ways. The Healthy Happy Family Eating intervention might provide the basis for a promising

family eating behaviour change intervention and this study provides the justification for a robust randomised controlled trial to assess its efficacy.

Study 2: Qualitative analysis of Pilot data

Background.

As part of the original Pilot study, qualitative data were collected before and after participants received the HHFE intervention. These data consisted of responses to open-ended questions about participants' hopes for the intervention beforehand, and feedback about the perceived success of the intervention afterwards. The data was not analysed at the time so the aim of Study 2 was to use this data to investigate what participants hoped to gain from the intervention, their experiences of the intervention and how closely the two aligned.

Methods.

Prior to beginning the HHFE, participants who signed up to the Pilot study (N=1865) were asked an open-ended question about what they hoped to gain from the intervention. On completing the intervention, participants were asked for feedback on the HHFE intervention. The responses to these two open-ended questions were coded by two researchers (10% were coded by both to check agreement). Open coding (Blair, 2015) was used to analyse the responses to open-ended questions. Using this process, observed phenomena are labelled and grouped into categories based on their properties.

Results.

HHFE Intervention: Expectations & objectives

Of the 1865 participants recruited to the Pilot Study, 990 provided a response to the open-ended question about what they hoped to gain from the intervention. No demographic data was collected. Inter-rater reliability for the 10% double coded was high: 100% for the principal themes of each response. The themes are listed below:

Health: Over half (n = 498) people mentioned the word ‘health’ or ‘healthy’ in their response to the question about their hopes for the intervention, making it the most prominent theme in the responses.

Healthy family: A common sentiment was, ‘I want to get the whole family healthy’.

Ideas & Inspiration: Many participants described hoping for fresh ideas from the intervention, either in the form of recipes or ideas of how to present food to their children.

Help with fussy eating: This typically meant increasing the variety of food child/ren would try, encouraging them to eat healthier food and getting them to eat what they were first given.

Speed/easy/healthy & organisation: These ideas were commonly reported, and there appeared substantial overlap between the hope of cooking healthy food quickly and easily, and being more organised, indicating possible competing demands.

Family meals: Participants said they were hoping for the family to eat together, either by all family members eating the same meal, and/or all eating together at the same time.

Happy mealtimes: Some participants described hoping to make mealtimes happier or more enjoyable. They wanted to reduce stress, make mealtimes more relaxed and make meal preparation ‘more fun’.

HHFE Intervention: Feedback

Participants who completed the intervention (N=528) were also asked to provide feedback after the intervention, through an open-ended question. Two hundred and fifty three people provided an answer to this question. The majority of the feedback was positive, (perhaps not surprisingly as it was obtained from people who remained engaged with the nine emails over a 4-week period). Positive feedback most commonly centered on the provision of recipes and meal ideas, increased confidence around food choice and preparation, and help around organising and preparing meal plans. Many participants praised the email format of the

intervention, largely because it meant they didn't need to 'log on' and that they simply received the emails as part of their usual day, which required less perceived effort than alternative interventions. Several also commented on the fact that doing the intervention only involved 'small changes' that weren't unrealistic and on the tone, which was received as friendly and not patronising.

Negative feedback most commonly stated that the information in the emails was too basic and sometimes repetitive. Age appropriateness was also criticised (by parents of babies and toddlers who could not help with meal preparation and by parents of teenagers who perceived the activities as too childish). A small number also reported that they were disappointed not to have received more help with fussy eating.

Suggestions for improvements

Suggestions for improvements came from people who had had both positive and negative experiences of the intervention and included:

- 1) Information on budgeting and keeping healthy food costs low
- 2) More focus on fussy eating
- 3) More focus on younger children
- 4) More season-specific suggestions (e.g. picnics in the summer)
- 5) More example weekly meal plans.

None of these stood out as being consistent amongst participants.

Discussion.

Study 2 allowed for detailed analysis of participants' hopes for, and experiences of, the HHFE intervention. The data suggests that these largely coincided; new recipes, focussing the family on happily eating together and becoming more organised were commonly mentioned hopes and experiences, as well as broader aims such as inspiration and motivation.

The main limitation to this study is that the data is relatively old, and parents' expectations from an intervention of this type might have changed with developments in technology. As with Study 1, the analysis indicates that a more up-to-date and robust evaluation of the HHFE is warranted.

Study 3: Feasibility testing

Background.

Because of the time-lapse between the Pilot study and the intervention refinement of 2016/17, it was necessary to collect some more up-to-date feedback about the intervention ahead of making any changes, and to trial a number of possible outcome measures for the anticipated randomised controlled trial. In this section, procedures and feedback results are described (detailed information on the outcome measure testing is beyond the scope of the paper but a list of measures administered is available in the supplementary file). We aimed to recruit forty participants through the Netmums online forum to participate in the HHFE and to provide data through online questionnaires before and after the intervention. We then planned to invite a sub-sample to focus groups to discuss their experiences in more detail.

Methods.

An advert was placed in a Netmums chatroom by the Netmums administration team, inviting people to take the HHFE intervention and to provide feedback. People who were interested in taking part were invited to click on a link that directed them to participant information and consent, and then to a baseline questionnaire hosted by SurveyMonkey.com. Once they had completed the questionnaire, participants were directed to sign up to the HHFE intervention. Upon completion of the intervention (time 2), participants were emailed a second questionnaire. Participants who did not respond at time 2 were sent a reminder one week later, and were also contacted by email and invited to contribute informal feedback. We

additionally sought feedback over email because this method of data collection appeared to suit this particular target audience.

Results.

Participants.

Sixty five participants consented to take part and provided a full dataset at baseline (a further 24 started but did not complete the baseline questionnaire). This was higher than the original target (N=40) because it became evident as participants completed the intervention that attrition rates at time 2 were high and so recruitment was continued beyond 40 to ensure sufficient time 2 data. Of 65 participants, twelve provided data at time 2 (18.4%).

Feedback

Participants were asked at time 2 to describe three positive and three negative aspects of the HHFE. The questions were not mandatory and not all participants provided three (or in some cases any) answers. Open-ended responses can be seen in tables 2 and 3.

Responses were examined to determine if they could be grouped. Common positive comments referred to new recipes, involving children more in food preparation, specific tips within the emails and the email format itself. Negative responses, on the other hand, were less consistent with few negative aspects of the intervention being named by more than one participant.

Ongoing User-Involvement

Due to the low response rates and the fact that participants were spread around the UK, the planned focus groups were not conducted. Instead, over the intervention refinement stage (described in Part 2), we maintained contact with participants and on occasion asked them to answer focused questions. This is in keeping with a 'person-centred' approach to user-engagement in digital behaviour change interventions (Yardley et al., 2016).

For example, we approached an opportunity sample of pilot participants and asked them to pick the most and least interesting two or three email titles from the intervention. This was done verbally and by email and some participants also provided feedback about the titles themselves. This approach ensured that user-feedback was obtained, but collected in a way that was efficient and didn't over-burden participants.

Discussion.

As discussed above, the retention rate for this study was low (13.4% of T1 starters completed at T2). Even those who did respond at both time points did not all provide full sets of data. On consultation with the Netmums team, two likely reasons for this were proposed: 1) in their experience, appetite for completing online surveys had diminished considerably over recent years and 2) some feedback from participants indicated that the intervention itself needed to be more engaging and inspiring. This information informed both the intervention refinement and design for the upcoming Randomised Controlled Trial (RCT).

Feedback for intervention refinement.

The positive feedback provided, though limited, was encouraging as much of it focussed on key aims of the intervention; involving children in meal preparation, delivering information in an easily-digestible format and sharing new food ideas, for example. Similarly, the negative feedback supported some of the ideas we already had about improving the HHFE. In both cases the sample size was too small to draw any conclusions but Study 3 data does appear consistent with Study 2 findings, which resulted from a much larger data-set. Interestingly, two topics were raised in Study 3 that did not appear in Study 2. First, some of the nutritional advice was not well-received because it was perceived to be inaccurate or inconsistent. Although the original intervention was designed in consultation with the UK Department of Health, nutritional guidelines have changed over the last five to ten years, in some cases substantially, for example the shift of focus on reducing saturated fats to reducing

sugars, this criticism seemed reasonable. In response to this feedback, we reviewed the nutritional advice offered in the intervention to ensure it reflected current thinking. An alternative interpretation of this feedback is that it perhaps reflects a declining acceptance of expert advice. The second topic that arose related to portion control advice. This advice was well received by a few members of the Study 3 cohort but rarely mentioned by those in the original Pilot study. This perhaps reflects that portion control is better understood as an important aspect of healthy eating, and has been communicated as such in public health campaigns (NHS, 2015). That these topics emerged again highlighted the need to refresh the content of the intervention and ensure it is current.

Conclusions

Collectively, the original Pilot Study and Follow-Up (Study 1), participants' feedback (Study 2) and the Feasibility Study (Study 3) presented a case to update and evaluate the Healthy Happy Family Eating intervention. The findings indicated that the intervention may demonstrate long-term effects, and be received positively by users, in particular its focus on making small sustainable changes.

The pilot work highlighted a number of opportunities to update the intervention whilst also emphasising the need for a review of the relevant evidence base. With this in mind, Part 2 describes the intervention refinement.

PART 2: Intervention refinement & formative theory

Refinement of the Healthy Happy Family Eating intervention was based on four elements:

- 1) Review of the HHFE evidence-base
- 2) User-feedback
- 3) Behaviour change theory
- 4) Stakeholder input

Review of the evidence-base

A thorough review of the original HHFE content was conducted before any changes were made. This evidence fell broadly into one of two categories; psychological theory and nutritional information. The multi-component intervention was designed to draw on a number of theories and ideas in order to account for individual differences and preferences. It drew from approaches including, but not limited to self-monitoring (Burke et al., 2011, Michie et al., 2009), the Theory of Planned Behaviour (Ajzen, 1985), nudging (Arno & Thomas, 2016) and implementation intentions (Gollwitzer, 1993). It also drew on a number of more ‘food-specific’ psychological constructs such as feeding styles (Rodenburg, Kremers, Oenema, & van de Mheen, 2014) and practices (Musher-Eizenham & Holub, 2007), the Portion Size Effect (Hetherington & Blundell-Birtill, 2018) and shared family meals (Hammons & Fiese, 2011). Nutritional themes included “5 a day” (NHS, 2018), hydration, increasing variety, food swaps (Change4Life, 2018) and information around other UK government initiatives such as the Eatwell plate (NHS, 2018) and advice on checking food labels. The majority of information in the original HHFE emails was well-evidenced, although the intervention contained some themes for which there was no convincing empirical evidence. Recommended changes resulting from this review are outlined below:

1. Suggest inventive ways to encourage family members of different ages to spend time together at mealtimes
2. Communicate information to parents about exposure and modelling as techniques to encourage variety seeking
3. Change the 6 main ‘themes’ described at the beginning of each email to be more coherent and representative of the intervention
4. Clarify language (e.g. some confusion around messages about sugar in fruit juice)
5. Reduce emphasis on hydration
6. Reduce emphasis on saturated fat

User-feedback

The feedback obtained in Studies 2 and 3 suggests that parents were primarily attracted to the principal of healthy, happy family eating. On signing up to the intervention, they hoped for help organising and finding convenient ways to prepare healthy food, finding ways for the family to eat together and inspiration around new recipe ideas. The intervention developed appear to have met these goals and the email format was broadly acceptable.

Examples where the intervention did not align well with participants' hopes included participants' desires for more help with food fussiness and more information on eating healthily on a low budget. In the case of the more recent pilot work, there was also a concern that some of the information was not nutritionally sound. This was all taken into consideration and the updated intervention placed more emphasis on the missing aspects identified, while care was taken to ensure all nutritional information was consistent with up-to-date guidelines (also see Stakeholder Input below).

Opportunity samples from Study 3 (including completers and non-completers) were engaged throughout the process of refinement. Parents were consulted about the photographs contained in the emails, the updated HHFE logo and the email titles as well as written email content to ensure that it was engaging, accessible and easily understood.

Recommended changes resulting from user-feedback are listed below:

1. More emphasis that children can get involved with food preparation regardless of their age
2. More emphasis on speed and ease of meal preparation
3. Tablet and smartphone-friendly emails
4. Themed emails (e.g. link similar tips and topics together in one email)
5. Removal of 'printables' for parents (burdensome and unlikely to be used)
6. Removal of 'Foodie thought for the day' (perceived as outdated and patronising)

Behaviour change theory & the behaviour change wheel

The fundamentals of the current intervention had already been established in the original design. We therefore sought to use the Behaviour Change Wheel (BCW) (Michie, van Stralen, & West, 2011) and the corresponding APEASE criteria to help guide the refinements and maintain focus throughout the design process. Tables 2 and 3 demonstrate this.

Table 2: BCW intervention design guide process

1. Define problem	Children's restricted/unhealthy eating
2. Select target behaviours	Changing parents' feeding practices in the home
3. Specify	Parents making healthy foods available in the family home regularly; increase shared family meal frequency in the family home (e.g. parents sitting down with children to eat, parents cooking same food for whole family), increase family enjoyment of food (by involving children in decision-making, completing tasks designed to provide fun)
4. Identify what needs to change?	Parents' capability & motivation around providing healthy food, children's opportunity to eat healthy food
5. Identify intervention functions	Education, persuasion, training, environmental restructuring, enablement
6. Identify categories	Communication
7. Identify behaviour change techniques	Goals & planning, (self) monitoring, shaping knowledge, antecedents, restructuring the physical environment, restructuring the social environment, modelling the behaviour,
8. Identify mode of delivery	Distance → population → digital media → internet/mobile phone

Table 3: APEASE criteria

<u>A</u>ffordability	Email format is inexpensive and straightforward to roll out without further development costs
<u>P</u>rac^ticable	Intervention is deliverable to target audience; medium of parenting website means that interested parties are already using the delivery platform
<u>E</u>ffectiveness	RCT currently underway to establish effectiveness
<u>A</u>cceptability	Studies 1 – 3 have indicated & informed acceptability (e.g. greater understanding of questionnaire burden, intervention feedback & retention data). RCT will provide more detailed data on participation, feedback & engagement.
<u>S</u>ide effects	None known. Feedback is collected after participation in RCT.
<u>E</u>quity	Netmums more closely represents the population on socio-economic measures than other parenting websites

Stakeholder input

Once the email content had been revised by researchers to accurately convey the messages agreed on, the Netmums team applied their expertise communicating with parents to the email content. In the first instance, this involved making the language more informal and in keeping with the website's chatty journalistic style. Typically, this involved reducing

sentence length, using more encouraging language and personalising language (e.g. changing ‘the family’ to ‘your family’). The word ‘course’ was also felt to alienate people, and the intervention was consequently renamed the ‘Healthy Happy Family Eating Programme’. A new template was used for the emails which had previously been ‘a/b’ tested (Kohavi & Longbotham, 2016) by Netmums, and pictures and photographs were replaced to look more current and more diverse.

At this stage, a nutritional therapist was also consulted to read through the emails and confirm that the content was nutritionally sound. She felt that the main email content was balanced and informative. However, she expressed some concern that some of the recipes the emails linked to on the main website contained too much sugar and too few fruits and vegetables. Recipe links were therefore adjusted to ensure they involved a wider variety of foods and reduced sugar content.

New intervention: The Healthy Happy Family Eating Programme

Figure 2 describes the final online healthy eating intervention designed for parents, which aims to change eating behaviours across the whole family. Content is organised to ensure that each email has a clear theme with relevant ‘bright ideas’ and ‘top tips’.

Using user-feedback, we have ensured that the emails are of manageable length, attractive and easy to read on a variety of electronic devices. Only advice considered aligned with current evidence is included. All content is considered to be accessible for the typical adult population, as established by an electronic readability tester.

Thus, the content is robustly evidenced and theory-based, and carefully tailored to suit its audience. The new HHFE has the potential to reach a large number of parents in an inexpensive and easily accessible way. A randomised controlled trial to assess its efficacy is underway (Snuggs, Houston-Price, Harvey, in preparation).

		Content	Evidence base & theory
Day 1	Healthy happy family eating	Introduction: Togetherness, balance, variety, planning, simplicity Bright Ideas: Take notes, cooking with kids Top Tips: Getting the family eating together	Theory of planned behaviour Shared family meals Balance & variety
Day 2	Heathy happy breakfasts	Bright Ideas: Planning family breakfast, adding fruit to breakfast, try porridge with choice of topping Top Tips: Low sugar, check labels, wholemeal, calcium, grilled vs fried	Theory of planned behaviour Shared family meals Nutritional information
Day 5	5 a day: Having fun with fruit & veg	Bright ideas: FV activities for various ages Top tips: keep pre-chopped veg, keep trying same fruit & vegetables (FV), don't negotiate with dessert Top tips for fussy eaters: involvement in food choices, parents eat the FV, don't pressure	Exposure to FV Availability/accessibility Encouragement of 'positive' feeding practices Discouragement of 'negative' feeding practices
Day 8	Portion control: how much is too much?	Bright Ideas: Eatwell plate, consider regular meals Top Tips: Portion size guidance, avoid plate clearing language, avoid 'tv-eating'	Portion Size Effect Nutritional information
Day 11	Sugar: swapping the sweet stuff	Bright ideas: sugar swaps, family members plan sandwich Top Tips: Cook from scratch, remove temptation, check labels, stealth sugar	Theory of planned behaviour Shared family meals Nutritional information Nudging
Day 14	Happy mealtimes	Bright Ideas: 'Me-time', family meals (ground rules) Top tips: Slow down eating, no screens	Mindful eating Shared family meals Screentime reduction
Day 17	Salt	Bright ideas: clear out, family taste test Top tips: Salt guidance, labels	Family involvement Nutritional information
Day 20	Planning and budgeting	Bright ideas: Meal planner, kids involvement in preparation Top tips: batch cooking, frozen veg, leftover ideas	Theory of planned behaviour Family involvement
Day 21	Healthy happy family eating	Recap: Useful links Bright ideas: Plan special family meal	Theory of planned behaviour Family involvement

Figure 2: HHFE email structure

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