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ACA Chefs adopt a school

An evaluation

9 June 2009

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Executive summary

Introduction

This document summarises an evaluation of a cooking in schools initiative called Chefs Adopt a School (CAAS) which is delivered by the Academy of Culinary Arts.[1] At present, sessions are provided all over England from Cumbria to Cornwall subject to demand and resources (with a few sessions being delivered in Scotland too). Annually, 21,000 children take part in the initiative. Delivered by professional chefs, the programme aim is to teach children about food, food provenance, health, nutrition and cookery. The evaluation was informed by a rapid systematic review of the existing literature on cooking in schools.

This research has been carried out at a time when cooking in schools is being put forward as a solution to improving diets and reducing obesity. It is currently the only evaluation of school cooking in the UK that measures outcomes that impact on health, such as: eating behaviour, cooking confidence and confidence asking for fruit, vegetables and ingredients at home. As such, it can inform future UK school cooking initiative interventions and evaluations. It also highlights the need to incorporate evaluation into school cooking initiatives, as findings provide valuable information necessary to fine tune an intervention.

In the core programme, chefs link with local schools, usually primary, where they deliver 2-3 sessions to one year group within a school. This process is then repeated each year. Key issues covered include hygiene, healthy eating, an appreciation of food through the senses (particularly taste) and practical cooking/food preparation. The first session covers healthy eating and the sensory appreciation of food while the second and third sessions are practical.

Methodology

The evaluation sample comprised two similar groups of children in years 4 and 5 at primary school in England (with an age range of 9-11 years). There were 4 schools in each group, one in each of the following areas: North West England, Midlands, West London and East London. For each school in the intervention group a similar school (matched for geographical region and Free School Meal Entitlement) was included in the control group. Schools in the control group were expecting a Chefs Adopt a School session in the following academic year, and were therefore delayed intervention.

The key outcome measured was cooking confidence score. A power calculation was undertaken to determine the minimum sample size needed in the intervention group to measure a real change in cooking confidence (for any changes to be measured with confidence this meant there needed to be a minimum of 63 in each group). The final sample comprised 86 pupils in the intervention group and 83 pupils in the delayed intervention group. As the sample size in each group exceeded this minimum

[1] ACADEMY OF CULINARY ARTS WEBSITE: www.academyofculinaryarts.org.uk

requirement, this indicates that any changes in cooking confidence were not likely to be due to chance.

A questionnaire was designed through consultation with chefs, teachers, children, research staff and an expert reference group. Pilot data collection with pupils provided an opportunity to consult with prospective participants and to test the reliability of the questionnaire. Amendments were made to the questionnaire following this consultation with pupils. The questionnaire was administered on two occasions in a two week period to assess reliability (i.e. consistency of a measure from one time to another) and was found to be sufficiently reliable.[2]

Questions were included to collect data on attitude to the CAAS session and cooking generally, cooking confidence, vegetable consumption, confidence asking for foods and ingredients at home and hand washing habits during food preparation. Data was collected in class groups before the chef delivered this session and 2-4 weeks following the session. Schools included in the intervention group received the standard 2 session delivery (including one practical session).

Key findings

Cooking attitude

To assess the children's attitude to the chef's sessions and cooking generally they were asked if they would like another visit from the chef, the aspects of the session they enjoyed and what other activities they would like to do:

- Overwhelmingly children reported enjoying the session: 89% stating that they would like another visit from the chef. Reasons given included: to make more dishes, cook more, to use the oven, to have the opportunity to taste new foods and flavours or because children enjoyed the first session and wanted to learn more about food.
- The key components children enjoyed were: tasting new foods (76%), making the dish (66%), learning about new foods (55%) learning new cutting skills (48%) and meeting the chef (48%).
- The session with the chef made most children want to cook a lot or a bit more (78%).
- While 9% either answered that they did not like cooking or the session did not make them want to cook more, all but 1 of these children would have liked another session with the chef.
- Children were asked what other things they would have liked to have done in the sessions; there were four key areas of focus. These were: more opportunity and time too cook and prepare food (33%), more opportunity to taste new foods (20%), more autonomy and involvement in practical activities and opportunity to learn new skills (10%). Finally, 22% stated that they were happy with the

[2]When using an instrument for evaluation with groups of children the instrument is considered sufficiently sensitive and reliable at the 0.6 level: Townsend ref Carmines EG, Zeller RA. Reliability and Validity Assessment. Newbury Park, CA: Sage Publications, 1979, in Townsend et al (2006)

sessions and would not have changed anything.

Cooking confidence

Children were asked how confident they were in four key cooking tasks: cutting fruit and vegetables, measuring ingredients, following recipe instructions and making a pasta salad.

- From the answers given a cooking confidence scale was devised from 1-4 where 1 was low confidence and 4 was high confidence. Following the session with the chef, the average reported cooking confidence score increased from 3.09 to 3.35 (by 0.26 points) in the intervention group - a statistically significant improvement. In the control group, confidence increased from 3.35 to 3.44 (0.09 points) this change was not statistically significant.
- The biggest reported confidence change in a specific skill was observed in the percentage of children who reported being able to make pasta salad by themselves (increasing from 26% to 54% post intervention).
- Children who attended schools in deprived areas (measured by the percentage free school meal entitlement) were likely to have a lower confidence gain compared to children attending schools in less deprived areas.
- Thirteen pupils from schools in deprived areas reported reduced cooking confidence after the session with the chef. While 2% pupils from schools in less deprived areas reported a fall in cooking confidence following the session with the chef.
- Across schools in all areas 25% pupils reported no change in cooking confidence.

Vegetable consumption

Children were asked how often they had eaten 5 vegetables in the previous week (cucumber, tomato, peas, celery and red pepper). These vegetables were included in the pasta salad made during the CAAS session and their responses were translated to a scale of 1-4 (where 1 indicated low consumption and 4 was high).

- Children's average reported vegetable consumption increased after the session with the chef, with the consumption score increasing from 2.24 to 2.46 points (0.22 points) again, a statistically significant increase.
- No significant changes were observed in the control group and, in fact average consumption of the 5 vegetables decreased slightly by 0.03 points from 2.58 to 2.55 points.
- While average reported consumption of all vegetables increased after the session with the chef in the intervention group, the only statistically significant increase was in individual vegetable consumption and related to cucumber consumption (from 37% to 52% post intervention).
- When controlling for variables that might have affected consumption (gender, geographical area, Free School Meal Entitlement), the intervention was found to have a significant impact on average reported vegetable consumption.

Asking confidence

Questions were asked to measure whether the intervention impacted on children's confidence to ask for vegetables and other foods and ingredients at home. Although the intervention was small, this data was collected to assess the *potential* to affect attitude, confidence and eating behaviour in the home environment:

- Compared to the control group, children in the intervention group reported a significant increased confidence in asking a parent to buy ingredients for a pasta salad from 50% to 73% post intervention. While in the same group there was a slight increase of 10% in confidence in asking for favourite sweets and this was not significant.
- Compared to the control group, children in the intervention group reported increased confidence in picking out the ingredients for a pasta salad whilst shopping (from 59% to 82% - approaching statistical significance). In the control group there was also an increase in confidence (from 66% to 74%). Despite there being no significant difference between the groups it is worth noting that the percentage of children who reported lack of confidence (either answering *"I am not sure about doing"* this or *"I can't do this"*) in the intervention group fell from 42% to 18% (24%) post intervention and in the control group from 34% to 27% (7%).
- Compared to the control group, children in the intervention group reported a significant increased confidence in asking for their favourite vegetable for dinner (from 60% to 74% post intervention).
- There was a slight increase in the percentage of children who claimed to feel able to ask for their favourite fruit for dinner (64% to 72% in the intervention group and 81% to 89% in the control group). The change in both groups indicates there was no difference between the two groups.

Discussion and conclusions

Pupils were enthusiastic and engaged by the Chefs session. They were eager to learn how to cook, practice food preparation skills and taste new foods. This attitude represents a great opportunity to teach children healthier eating habits through practical cooking. The positive attitude towards the sessions may well be in part due to the chef, an adult outside of their school environment. With so many chefs' presenting cookery programmes on television they have a certain status in society that children may respond well to.

The findings regarding asking confidence in the home indicate that eating behaviour and cooking confidence changes may be transferred to the home environment.

While changes in cooking confidence, vegetable consumption and asking confidence were small and distinct, that a small scale intervention has an impact is encouraging. The findings suggest that if more practical sessions were undertaken with pupils, a greater long-term impact may be achieved.

The trend for pupils from deprived areas achieving a lower cooking confidence was only observed in the intervention group and indicated a significant association between free school meal entitlement of school

and intervention. It may be that children's confidence was reduced when, during the practical session they realised the skill level needed to prepare and cook dishes and recognised they were yet to achieve this. Similarly the session may have caused them to draw comparisons with cooking at home, where it is possible that due to poor food access, low income and/or a lack of cooking skills, meals are not prepared from fresh ingredients. Without measuring free school meal entitlement on an individual basis and relating to the individual outcomes it is impossible to reach firm conclusions regarding this association.

To mediate specific outcomes, sessions need to be standardised without stifling individual chef's creativity. This would ensure chefs work to a common agenda and may result in greater, measureable impact, particularly if combined with a higher dose (more practical sessions).

Overall the classes encouraged young people to learn more about food, practice food preparation skills and increase vegetable consumption. Significant among these was the reported increase in cooking confidence.

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Introduction

This report outlines an evaluation of The Academy of Culinary Arts' Chefs Adopt a School Scheme carried out in the summer of 2008. Prior to this evaluation a rapid systematic review of the existing literature on cooking in schools was undertaken, which informed the evaluation design

In the core Chefs Adopt a School programme, chefs link with local schools, usually primary, where they deliver 1-3 sessions to one class each year, one of which is practical. Core elements included in all sessions are hygiene and health, an appreciation of food through the senses, particularly, taste and practical cooking/food preparation.

This is currently the only evaluation of school cooking in the UK that measures outcomes that may impact on health, such as: eating behaviours, cooking confidence and confidence asking for fruit, vegetable and ingredients at home. As such this work can inform future UK school cooking initiative evaluations and interventions. It also highlights the need to incorporate evaluation into school cooking initiatives as the findings can provide valuable information necessary to fine tune an intervention.

Detail of the CAAS session delivery can be found in Appendix 1 to this report.

Evaluation methodology

Sample size

The first step in the evaluation design was to ascertain an appropriate sample size. In other words, we needed enough children in the sample to have an effect considered to be of scientific significance and also statistically significant. Cooking confidence, as determined by a cooking confidence score, was taken as the primary outcome on which to base the calculation of sample size. As the literature review identified very few evaluations of cooking interventions in the formal literature, the standard deviation for a cooking confidence scale was taken from one study (the Cookshop Study) which met the highest quality standard set in the literature review (Liquori et al, 1998).

Here, standard deviation is a measure of the average distance of each individual score from the mean within the sample, or how "spread out" the scores are. A sample size of 63 children in each group was calculated to be to detect a difference of half (0.5) a standard deviation (SD) in self-efficacy score, with 80% power. A small standard deviation indicates that the data points tend to be clustered around the mean value. A large standard deviation indicates that the data is wide ranging so with greater deviation from the mean. In relation to this study it would indicate a wide range of cooking confidence scores. In the Liquori paper the average standard deviation for cooking confidence score = 0.28.

The evaluation design was quasi-experimental, made up of two groups that were similar – i.e. they were not randomly selected. It involved one intervention group comprising 4 schools and one delayed intervention comparison group consisting of 4 comparable schools. The primary outcome to be measured was: difference in pre-test and post- test scores on a cooking self-efficacy scale, between the two groups. A difference of half (0.5) standard deviation (SD), was assumed to be a significant level of change in cooking confidence.

Sample selection

Schools were contacted and recruited through ACA Chefs local schools. In the intervention group chef delivered 1-2 practical sessions, including one practical session. In the delayed intervention group (control), no session was delivered. A control group was included in the design to provide robustness and repeatability and to enable researchers to accurately measure specific variables between the two groups.

Children in years 4 and 5 (ages 9-11 years) were included in the evaluation. This decision was informed by the literature design findings where practical cooking sessions were found to have a greater impact on the cooking confidence of older primary school children.

Initially CAAS sessions were observed by researchers to inform the methodology. Session delivery style

varies between chefs and is often adapted to suit schools different needs, curriculum focus and/or facilities available. Some standardisation of session content was therefore necessary for the purpose of the evaluation. Chefs were consulted regarding a suitable recipe that included at least 3 vegetables and which could be made irrespective of cooking facilities. Without this standardisation, measurement of impact on consumption and cooking skills would not have been possible. The Chefs decided upon a vegetable pasta salad, where they agreed on the 5 vegetables to be included (tomatoes, cucumber, celery, peas and red pepper).

The core delivery is usually 2 sessions: Session 1 covers hand washing, healthy eating and experiencing food through the senses, with a focus on taste. Session 2 is usually a recap of the hygiene followed by a practical session. Sometimes a session 3 is undertaken which is usually a visit to the chef's workplace. In the North West, to maximise reach, sessions 1 and 2 have been combined into one session. Further, we have highlighted some adaptations of delivery in the case studies included in this report.

Ethical clearance was applied for and approved by the Ethical Committee at City University.

For the intervention group, schools were invited to take part in the evaluation if they had scheduled sessions with their local chef in the summer term. Schools in both groups were excluded in the evaluation if they were taking part in any other healthy eating or cooking intervention that could affect the evaluation outcomes. Schools included in the control group were selected from schools that were expecting a CAAS session in the forthcoming year, and were therefore delayed intervention. As a selection criteria control schools were chosen to be comparable to intervention schools both region and geographical setting and in free school meal entitlement. Full outline of sessions delivered can be found in Appendix 1 to this report.

In total therefore 11 schools were approached and 8 took part in the evaluation. One school in the North West was excluded from the intervention group because the CAAS session was being delivered as part of a healthy eating week. Another school in the intervention group was excluded because a different dish was made by the chef. Finally a school in the control group was not included because it had a low FSME compared to the intervention group that it was to be matched with. As a result of these exclusions, combined with the tight timescales, the sample size was reduced from 5 to 4 comparable schools in each group.

Schools were based in the North West (near Manchester and Liverpool), Midlands, West London and East London. These provided two comparable sub-samples which ultimately provided 86 participants (intervention) and 83 participants (control) that provided baseline and post intervention data. See Table 1 below:

Table 1: Sample demographics

	Control n=83	Intervention n=86
Gender (%)		
Girl	41.0%	49.4%
Boy	59.0%	50.6%
East London	31%	23%
West London	23%	22%
North West England	19%	28%
Midlands	27%	27%
FSME		
East London	70%	41%
West London	23%	20%
North West England	56%	51%
Midlands	7%	13%
Geographical setting		
East London	Inner city	Inner city
West London	Urban	Urban
North West England	Urban	Urban
Midlands	Urban	Urban

The comparable school in East London differed in FSME. In the control group 70% of pupils were entitled to FSM compared to 41% in the intervention school. However, alternative schools could not be identified in the time available.

Two visits were made to the 8 schools included in the evaluation to collect pre and post data. Baseline data was collected just before the scheduled session with the chef. Post intervention data was collected 2-4 weeks following the session with the chef. Any additional data in schools was collected at these times

Data collection methodology

A questionnaire was developed that would engage children. The study questionnaires identified in the rapid systematic literature review informed the questionnaire design. Examples of evaluation tools from the Center for advanced studies in Nutrition and Social Marketing in the US also informed the questionnaire design.[3] Once the questionnaire design was drafted, consultation with the Centre for Food Policy department at City University, ACA staff and the chefs delivering the sessions was undertaken. Finally, an international academic reference group (comprising 8 members) with expertise in practical cooking interventions was consulted.

The standard intervention 'dose' of the sessions is small: 1-2 sessions per school in total, including one practical session. Consumption data collection measured children's consumption in the week prior to

[3] Center for Advanced Studies in Nutrition and Social Marketing, Department of Public Health Sciences, University of California, Davis: http://socialmarketing-nutrition.ucdavis.edu/Tools/somarktools.php

post data collection of the 5 vegetables included in the pasta salad. These questions were deemed the best way to assess any changes in eating behaviour as the intervention was small dose. So measuring consumption of the vegetables used in the intervention would detect small changes in consumption.

Questions regarding where children had eaten the 5 vegetables (at home, school dinner or lunchbox) were asked. These were used to firstly eliminate those children who had claimed to eat certain vegetables in the previous week during school lunch when it was not available. So catering managers were also interviewed regarding lunch provision during these weeks. Secondly collection of this data provided an opportunity to measure whether there was a link between exposure to the vegetables during school lunch and consumption.

Questions regarding food preparation were used as a proxy to measure confidence in specific skills required for simple food preparation. Children were not directly asked whether they had prepared a pasta salad at home as this may have encouraged children to conform to perceived expectations. Therefore questions regarding confidence at asking for specific foods in the home environment and when shopping were included in the questionnaire to assess possible transference eating behaviour into the home environment. The questionnaire included a section on a mystery vegetable (fennel) to assess whether the tasting part of the session encouraged children to try new, unfamiliar foods. As the session also focuses on hygiene in the kitchen, questions were asked regarding children's hand washing habits during food preparation.

A sample of the final questionnaire can be found in Appendix 2 to this report.

Questionnaire reliability

The final draft of the questionnaire was piloted twice over two weeks with Year 5 pupils from a school in West London. The pilot provided an opportunity to consult with prospective participants and an opportunity to test the reliability of the questionnaire. Amendments were made to the questionnaire as a result of this consultation with pupils. When using an instrument for evaluation with groups of children, the instrument is considered sufficiently sensitive and reliable at the 0.6 level.[4] The questionnaire was administered on two occasions in a two weeks period to assess reliability (i.e. consistency of a measure from one time to another)

The class pilot sample size was 22. The correlation coefficients were relatively high: for hand washing behaviour it was 0.88; cooking confidence was 0.71 and asking confidence as 0.85 respectively. The question regarding fennel had poor reliability (0.44). This means that the second time pupils filled in the questionnaire, their answers were similar (reasonably correlated) to the first, for all sections except for

[4] Carmines EG, Zeller RA. Reliability and Validity Assessment. Newbury Park, CA: Sage Publications, 1979, in Townsend et al (2006)

the fennel question. A correlation coefficient of 1.0 would indicate that all children gave the same answer to a question the second time.

Qualitative data

As well as the collection of this quantitative data, qualitative data was collected. The questionnaire included questions asking children about their favourite fruit and vegetables, food they prepared and cooked at home. It also asked participants to tell a story about a favourite meal or dish they would make at the weekend. The latter question includes sections on ingredients, who they ask to help, what they would need help with, where they would eat the meal, and who they would eat the meal with. These questions were designed to find out about children's food culture. Findings from qualitative data collection will be reported in a separate report.

Finally questions regarding the children's perception and attitude to the session with the chef were asked and these have been collated and are included in this report. This section of the report serves to provide ACA with direct feedback from participants as well as giving an insight into children's attitudes to the session with the chef, cooking and food preparation per se.

Data analysis methodology

Data was collected, input into excel. Quantitative data was exported in to SPSS v16 software for analysis. Findings are presented under the headings: Attitude to CAAS session; cooking confidence; vegetable consumption; openness to trying new foods and hand washing.

We asked pupils whether they had eaten the 5 vegetables included in the pasta salad during the last week. To cross check information given against school meal provision we asked them whether they had eaten the vegetables at home, in their lunch box and/or in their school lunch. We then asked the catering manager whether each of the 5 vegetables had been provided as part of the school lunch in the week prior to the questionnaire administration.

Case studies

Standardisation of recipes included in the formal evaluation resulted in homogenised sessions. To reflect some of the diversity of the ACA work we also visited the following initiatives and have included them as case studies in the report:

- Case Study 1: CAAS working with rural Eco-school
- Case Study 2: CAAS working with Playing for Success
- Case Study 3: CAAS as part of the North West Healthy Weight Framework

These case studies are briefly outlined in the following pages.

One other CAAS adaptation was visited: a parent and child afterschool cooking club. This was a series of 4 sessions where children bought their mother or father to the teaching kitchen to make a dish together. Dishes made included ratatouille, home made pasta and squash soup. Parents reported that cooking with their children encouraged them to cook from fresh ingredients more often at home. The session was lively and parents and children reported enjoying spending time together learning to cook. Unfortunately the recorded notes of this visit could not be retrieved from a computer hard drive following crashing.

Case Study 1: CAAS working with an Eco-school

This village school is set in a rural farming region, is small, with 60 pupils. The school budget is small (as money allocated to schools is based on pupil numbers). Despite this, staff are committed to and deliver a range of practical ecological and food based activities that includes working with CAAS.

Ecology

The school has been awarded the Green Flag (the highest accolade) 3 times running by Eco-School Standards. Ecology is incorporated into every level of school life, from the curriculum, to working with the children to reduce the schools carbon footprint, and in practical cooking activities, where food grown in the school vegetable patch is often used, while food waste is composted by the school too. Teaching staff aim to encourage the children to understand how what they do in their immediate environment can have positive or negative affects people in other parts of the World. The school teaches children that they need to be aware of this interdependence. Staff have forged links with Concern, a charity that in developing countries, as such the school promotes and teaches fair trade principles and has also visited Concern projects in Africa. So ingrained is ecology the children's way of thinking that when they eat lunch on school outings they have been known to ask where the composter is to dispose of their food waste.

The school has about 27 small vegetable growing plots. The garden is managed by a member of staff, two volunteers from the village and the children. They also have about 6 compost bins.

For the harvest lunch all classes made different dishes, some of the produce from the garden was used: Pumpkin soup, beetroot soup and tomato and basil soup, home made bread, local cheese and apple cakes. The soup was made from produce grown in the school garden.

Cooking sessions

The school delivers practical cooking lessons under the food technology curriculum, an after-school cooking club and CAAS sessions. The teaching kitchen is small and basic, and therefore only takes small groups of children.

The CAAS sessions are delivered to larger groups so are held in one of the class rooms. In the most recent Chef's sessions, children learned how to make tortilla wraps

The chef's approach is creative and passionate and his enthusiasm is infectious. The children really enjoy having a visitor deliver the sessions (rather than a staff member). As with many schools, teachers here are female so a male chef provides an important role model for the boys.

The children listen well to the chef and follow instructions and have an opportunity to learn and practice simple food preparation methods such as cut vegetables correctly, simple measuring and mixing foods.

As such the CAAS sessions are an important part of food on the curriculum.

Case Study 2: CAAS working with Playing for Success

As well as delivering sessions in local primary schools ACA chefs also deliver practical cooking sessions at local football clubs. This is arranged either directly as with the Aston Villa Vitality Scheme or within the Playing for Success initiative.

During the evaluation period, Aston Villa was refurbishing its teaching kitchen for local ACA chef to deliver practical cooking sessions.

At another football club in the North West, sessions are delivered within a national scheme called Playing for Success, which started in 2001. The programme aims to help improve literacy and numeracy skills of children who have been identified as likely to under-achieve. The impact of the overall scheme is evaluated at a local club level. At Everton the PSF Centre manager was once a teacher (this is the set up for the centres generally). Children do about 10 x 2 hour sessions usually. The group that was observed in the ACA session were working on a business enterprise project that included a written business plan, an advertising jingle, and a logo design. As well as focussing on literacy and numeracy skills the project also was an opportunity to familiarise the children with IT including desktop publishing. The chef's session was therefore different to the other sessions that, so was likely to be enjoyed by the children as it was a practical session.

The group observed was small: 8 children all from year 2. The chef's session was shorter than other sessions (1 ½ hours) and combined sensory, taste and practical cooking session.

The lesson included guidance on hand washing, experiencing food through the 5 senses, focussing on taste, using honey (sweet), dark chocolate (bitter), Hula Hoop (salty) and lemon (sour) and the 5 food groups. The children enjoyed this part of the session.

The chef then used the Balance of good health poster and asked the children to put different foods in the correct food group.

Children then helped to prepare a Singapore noodles.

Case Study 3: CAAS as part of the North West Healthy Weight Framework

CAAS in the North West is delivered as part of the North West Healthy Weight Framework. This strategy, co-ordinated by North West Regional Public Health Group, NHS Northwest and the Government Office North West, brings together local agencies delivering initiatives that promote healthy eating and physical activity to help prevent obesity. The aim is to achieve healthy weight for children and families.

CAAS falls within school setting delivery and is therefore a member of the North West Food in Schools cluster alongside National Healthy Schools Programme, Lets get cooking and the Food for Life Partnership. The CAAS programme is funded by the Regional Development Agency. Being a member of the cluster group enables CAAS to communicate with and work collaboratively with other health promotion agencies in schools.

The local chef delivering CAAS has a target of 240 taste/cookery sessions to be delivered in schools, developing healthy eating lesson plans and recruiting 25-30 academicians/chefs for the North West region to support embed and sustain the programme after the life of the project. Schools with 50% or more pupils entitled to free school meals are targeted in this area. To ensure that the delivery target is met the Chef consolidates the taste and sensory and practical cooking session into one session rather than two.

As part of the year of food and farming (2008) the School Food and Nutrition Cluster organised a visit to a local farm in Wirral in the morning followed by a session with the local CAAS chef in the afternoon. This was part of the Crop to Kitchen curriculum initiative.

The farm visited is well-known local family business, in the Wirral, and is the setting for the Annual Wirral Food and Drink Festival. It has an on site kitchen where sessions are run by a local chef, there may be possibility for CAAS to work with this chef and/or the farm and farm kitchen in the future (though the kitchen can only accommodate small groups).

Children were given the tour of the farm by the farmer starting with a delivery of asparagus, picked that morning ready for sorting, trimming, grading, bundling and packing into cardboard boxes and delivery later that day. The farm supplies local shops and restaurants as well as its own farm shop

On the tour teaching staff were each given a stick with a piece of string attached, pupils were encouraged to collect things on the tour that could be wound onto the stick with the string which could be taken back to school to use for story making.

The children were then taken on a tour of the strawberry poly tunnels and shown how to pick fruit without bruising. Included in the tour were blackcurrant bushes, gooseberry bushes, rhubarb, raspberry bushes and asparagus, potatoes and wheat fields. Lastly the children were shown wheat and encouraged to pick some to look at the ears. The farmer explained how wheat is grown and processed to make flour and bread. Children took the asparagus and strawberries with them to the chef's session in the afternoon where they were used to make soup and smoothies.

Results

Attitude to CAAS session

Participants who took part in the intervention were asked questions regarding the session, see Figure 1 below. This part of the questionnaire was designed to find out about the pupil's attitude to the CAAS session and satisfaction. The questions were also devised to indicate participant's attitude to cooking and food preparation.

Figure 1: Attitude to session with chef

Tell us what you like about the lessons you did with the chef...(tick as many as you agree with)

☐	Meeting a chef	☐	Learning about new foods
☐	Tasting new foods	☐	Making a dish
☐	Practising using a knife to cut fruit/veg	☐	None of the above

Is there any anything else you liked about the lessons with the chef?_____

If you were the chef is there anything you would have done differently in the lesson?

_____

*What other things would you liked to have done in the session?*_____

Did the lesson make you want to help with cooking more often?

☐	Yes, I want to cook a lot more	☐	Yes, I want to cook a bit more
☐	No, not really	☐	No, I don't like cooking

_____

Would you like to have another session with the chef? ☐ *Yes* ☐ *no* *(please tick)*

If you answered yes please tell us why you would like another session with the chef?

Is there anything else you would like to tell us about food and cooking?

Out of the 88 children who answered this part of the questionnaire, 89% wanted to have another session with the chef. Of these children:

- Twenty seven wanted another session with the chef so they could make more dishes and cook more, some wanted the opportunity to use an oven.
- Twenty four wanted another session with the chef to taste new foods and flavours.
- Twenty two wanted another session with the chef because enjoyed it.
- Fifteen wanted another session with the chef to learn more about food.
- Five children said they did not want another class with the chef, while 4 children did not answer the question at all.

Of the 88 children who answered the questions:

- Seventy six percent enjoyed tasting new foods;

- Sixty six percent enjoyed making a new dish;
- Fifty five percent enjoyed learning about new foods;
- Forty eight percent enjoyed learning new cutting skills with fruit and vegetables;
- Forty eight percent enjoyed meeting the chef;
- Only 2% said they didn't enjoy any of these things

When asked whether there was anything else they liked about the sessions, participant's answers focussed around 3 key areas: trying new foods and flavours (n=16), learning new cooking skills (n=15), food guessing games (n=9) and general enjoyment of the session and appreciation of the chef (n=9).

When participants were asked whether the session made them want to cook more:

- Fifty five percent answered yes I want to cook a lot more;
- Twenty six answered yes I want to cook a bit more;
- Six percent answered no not really;
- Three percent answered no I don't like cooking;
- And 3% did not answer the question.

Children were asked what other things they would have like to have done in the sessions. Answers fell into 5 different categories:

- The most popular answer was to make more food and to have more opportunity and time to cook and prepare food (n=22) from cheeseburgers to seaweed and noodles.
- Many children were happy with the sessions and would not have done anything else (n=18): "Tthe session was absolutely fantastic; there don't need to be any changes!"
- Sixteen would have liked to have tasted more food.
- Eight would have liked more autonomy and opportunity to learn new cooking skills within the session: "I would like to cook what I want", "have a go at cutting the pasta".

Children were asked if there was anything they would have done differently in the session, if they were the chef. Answers fell into 5 main areas:

- Twenty two said they would have liked to have done more cooking and food preparation had more variety of foods and had more time.
- The same number of children said they would not do anything differently and were happy with the session (n=22)
- Thirteen would have liked to taste more foods. Though on a negative health promotion note, 3 of these wanted more chocolate and 1 wanted more crisps. Three of these children wanted to try the dish that they had made in the session.
- Six of the children wanted to have the opportunity to cook independently and to have help planning a meal themselves: "Yes! I would let the children plan out how they would make the

dish", "I would let them make most of the food themselves".

- Five would have liked more explanation, including information about fruit and vegetables and find out about growing more fruit and vegetables.

Cooking confidence

Changes in confidence and consumption were measured between the intervention and delayed intervention groups. They were also measured within each group. Finally the influence of different variables: Genders, geographical area, FSME on outcomes were measured.[5]

Children were asked whether, when preparing food, they felt able to cut up fruit and vegetables, follow recipe instructions, measure ingredients and make a pasta salad. Their confidence was assessed using a scale, where 1='I can't do this at all', 2= 'I need a little help', 3='I need a lot of help', and 4='I can do this on my own'. See figure 2 below:

Figure 2: Cooking confidence questions

If you are preparing food, can you (please draw a circle around the face that tells us about you)....

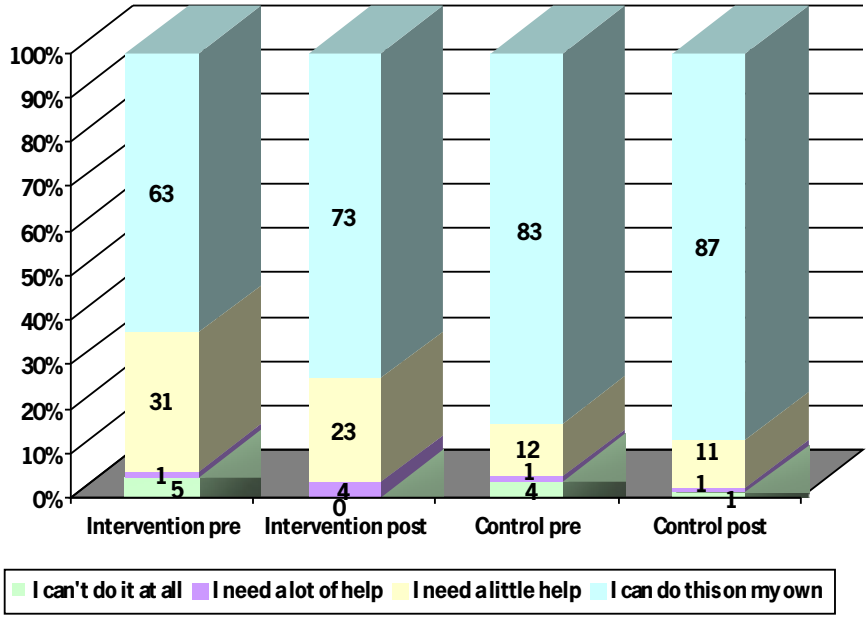
Cut up fruit or vegetables	**I can do this on my own**	**I need a little help**	**I need a lot of help**	**I can't do it at all**
Follow recipe instructions	**I can do this on my own**	**I need a little help**	**I need a lot of help**	**I can't do it at all**
Measure ingredients	**I can do this on my own**	**I need a little help**	**I need a lot of help**	**I can't do it at all**
Make a pasta salad	**I can do this on my own**	**I need a little help**	**I need a lot of help**	**I can't do it at all**

[5] Between-group differences were evaluated using Pearson's x^2 statistic for categorical variables and the Mann-Whitney U test for continuous variables. 95% confidence intervals were also calculated (e.g., difference score). Within-group changes in proportion from pre- to post-test were analysed using McNemar's test for two related samples. Factorial ANOVA was used to look at the effect of other factors such as gender and geographic region. All tests were two-tailed, and P<0.05 was considered statistically significant.

Cutting up fruit and vegetables

When asked before the chef sessions if they could 'cut up fruit or vegetables', 63% of children in the intervention group said they could do this 'on my own' compared with 83% of children in the control group (see figure 3). So the two groups were not the same at baseline. Post-test, the proportion of children who said they could cut fruit and vegetables on their own increased by 10% to 73% in the intervention group and by 3% in the control group. The number of children in the intervention group who could not cut up fruit and vegetables without help fell from 5% to 0% in the intervention group and 4% to 1% in the control group.

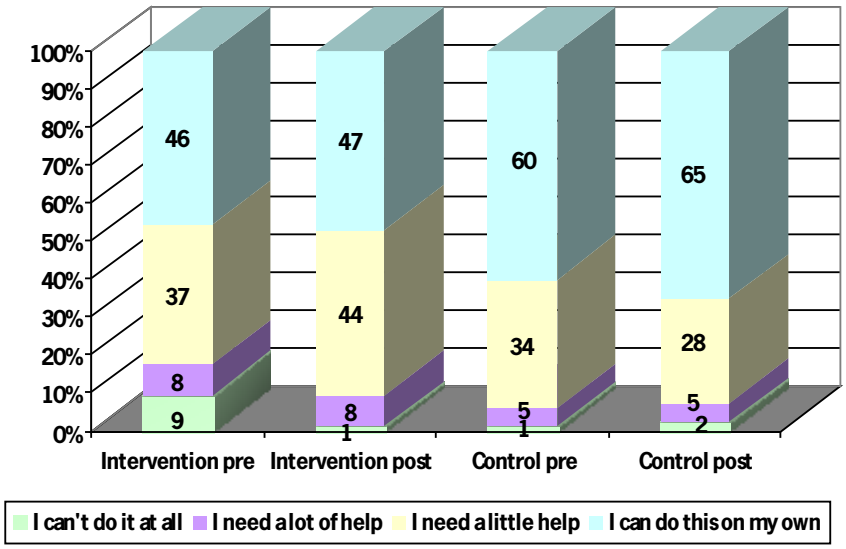
Figure 3: Cutting up fruit and vegetable confidence (*n*=169)



Following recipe instructions

At baseline, the two groups were significantly different in their reported confidence in following recipe instructions (as shown in Figure 4). In the control group, 60% of children said they were able to follow recipe instructions 'on my own', while 46% in the intervention group had the same confidence level. Within the intervention group, those who said they could not follow recipe instructions at all fell from 9% to 1% at post-test, while a small increase was observed in the control group, from 1% to 2%.

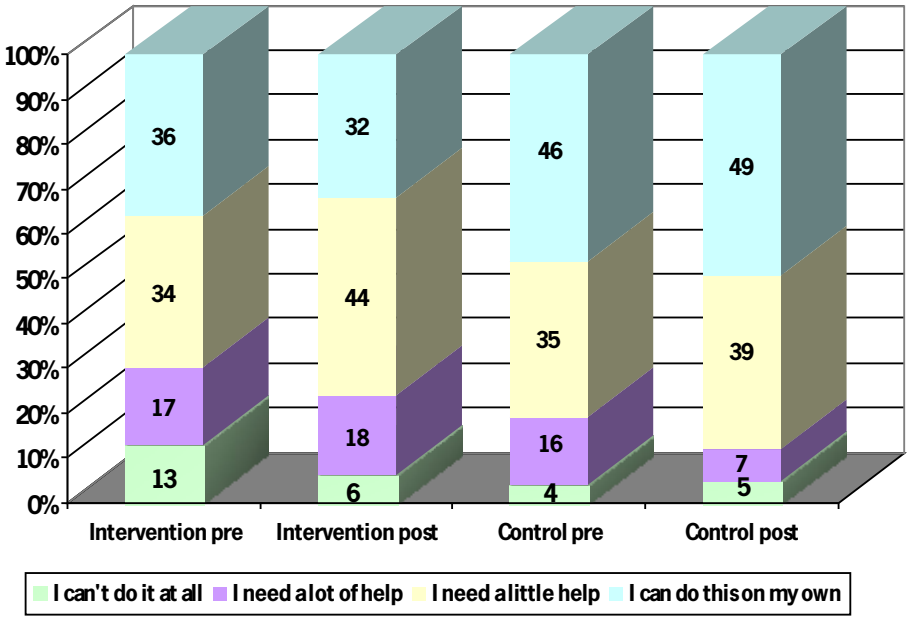
Figure 4: Confidence following recipe instructions (*n*=169)



Measuring ingredients

At baseline and post-test, the differences between groups in reported confidence measuring ingredients were not statistically significant. Within the intervention group, the largest change from pre- to post-test occurred in the proportion of children who said they 'need a little help', which increased from 34% to 44% at post-test (See figure 5). Also in the intervention group, those who said they could not measure ingredients at all fell from 13% to 6% at post-test, while this proportion increased slightly in the control group.

Figure 5: Confidence in measuring ingredients (*n*=169)



Making a pasta salad

At baseline, the differences between groups in reported confidence in making pasta salad were not statistically significant. Post intervention, the proportion of children who reported being able to make a pasta salad by themselves more than doubled in the intervention group, from 26% at baseline to 54% post-test (see Figure 6) In the control group, this proportion remained the same at 37%. While self reported confidence changed in both the intervention and control groups, post-test proportions did not differ significantly.

Figure 6: Confidence in making a pasta salad (*n*=169)

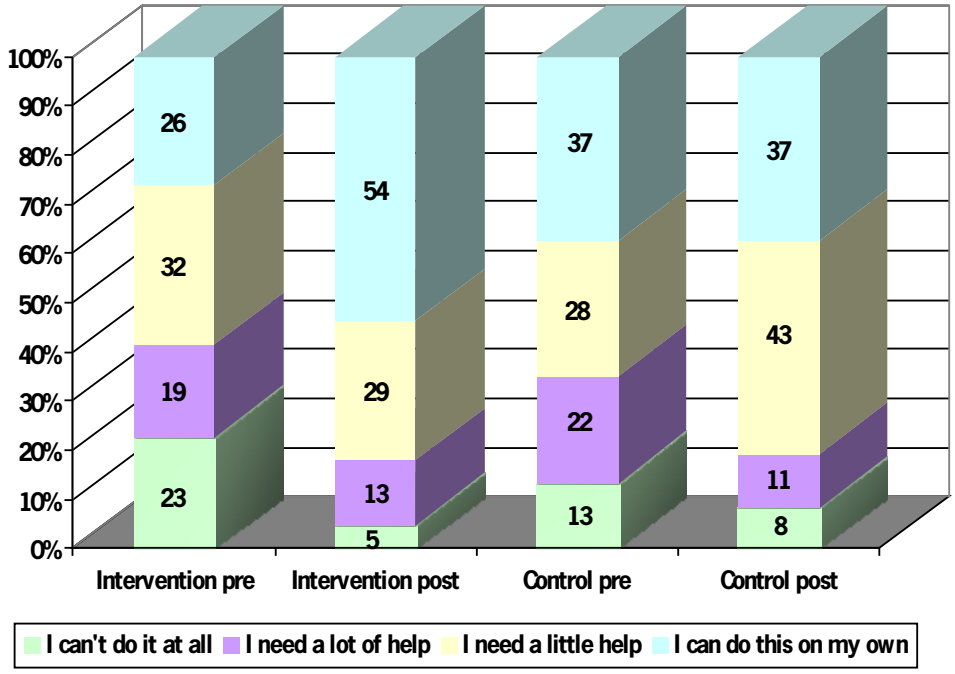


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Figure 7: Combined percentages of children who felt able to do an activity either alone

or with a little help (*n*=169)

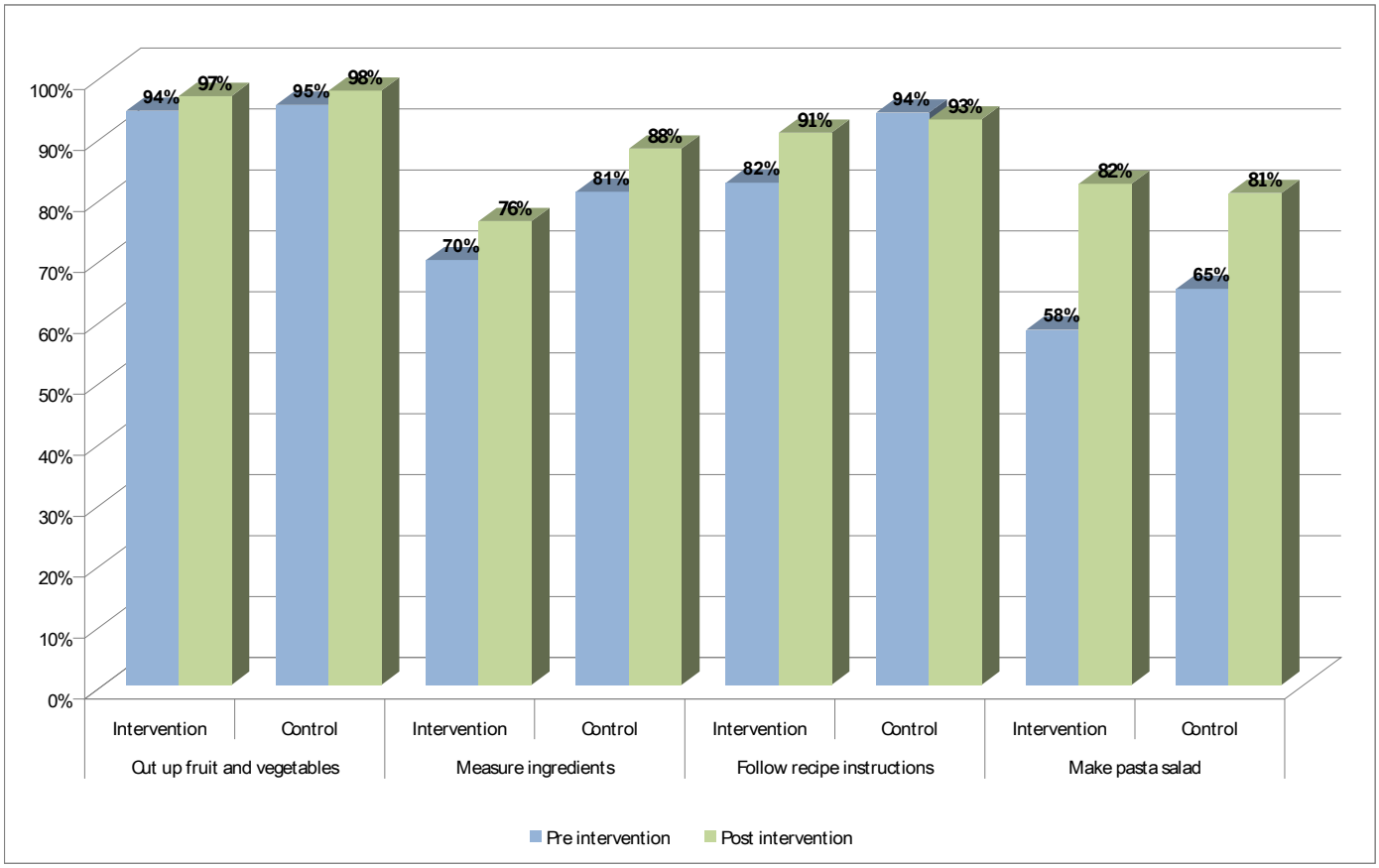


Figure 7 shows changes in both groups pre- and post- intervention, combining those who said they were able to do activities on their own with those who needed a little help, It is evident from the above that within groups, the largest pre- to post-test change occurred in children's confidence in making pasta salad, with gains in both the intervention and control groups, though a larger change was seen in the intervention group.

Cooking confidence score

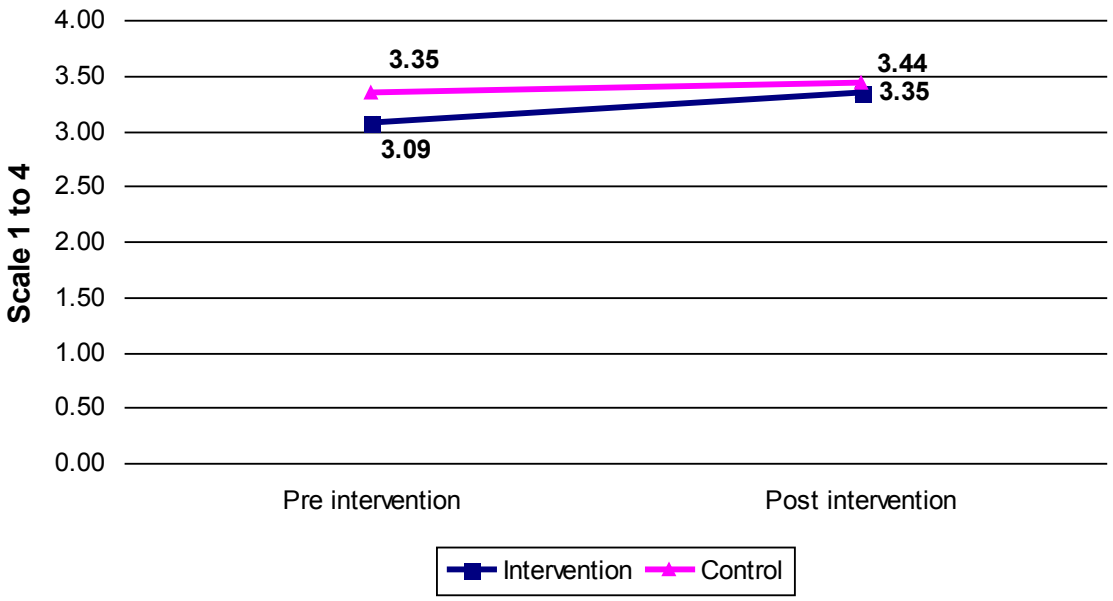
We measured cooking confidence using the questions outlined in Figure 2 where confidence was assessed using a scale, where 1='I can't do this at all', 2= 'I need a little help', 3='I need a lot of help', and 4='I can do this on my own'. An average was calculated combining the confidence scores in all skill areas for each child and dividing by the number of skill areas (=4). This average 'score' was used as an indicator of overall cooking confidence and was also useful in showing the direction of change.

A difference score was calculated by subtracting the pre-test score from the post-test score. The difference-score measures the average change in cooking confidence score between the two groups of children. While both groups demonstrated an increase in cooking confidence post intervention, the intervention group showed a significantly greater gain in confidence than the control group (p=0.038).

This means the intervention had an effect on children's cooking confidence.

At baseline, the average cooking confidence score in the intervention group was 3.09. Post-intervention, this increased by 0.26 (95%CI, 0.12, 0.38) to 3.35. . In the control group, confidence increased by 0.11 (95% CI, 0.02, 0.19) from 3.35 to 3.44. This finding suggests that overall, cooking confidence improved in both groups, though the greater gain was seen in the intervention group. See Figure 8 below

Figure 8: Cooking confidence score change pre to post intervention (*n*=169)



Effects of other factors

The influence of different variables (geographical regions, gender, FSME) on cooking confidence was measured.[6]

Of these variables, intervention was found to be associated with the change in cooking score (p=0.041) as was the interaction between group and geographic region (p=0.046). See Table 3 below. As schools in each geographical area had a different range of FSME, geographical region was highly correlated to FSME, i.e., intervention and control schools in each geographic area were selected on the basis of similar FSME. As such, we could not look at both variables at the same time; only one or the other. So geographical area was a proxy for FSME.

Table 3: Dependent variable difference in cooking confidence Vs other variables (*n*=169)

[6] USING A FACTORIAL ANOVA .

Source	Significance
Intervention	**0.041***
Gender	0.112
Geographical area	0.404
Intervention * gender	0.149
Intervention * geographical area	**0.046***
Gender and geographical area	0.557
Intervention gender and geographical area	0.113

In a separate analysis using FSME (stratified into ranges of % FSME), the interaction between FSME and group was again found to have a statistically significant (p=0.044) influence on cooking confidence. However, in this model neither group nor FSME independently were associated with cooking confidence (see Table 4 below).

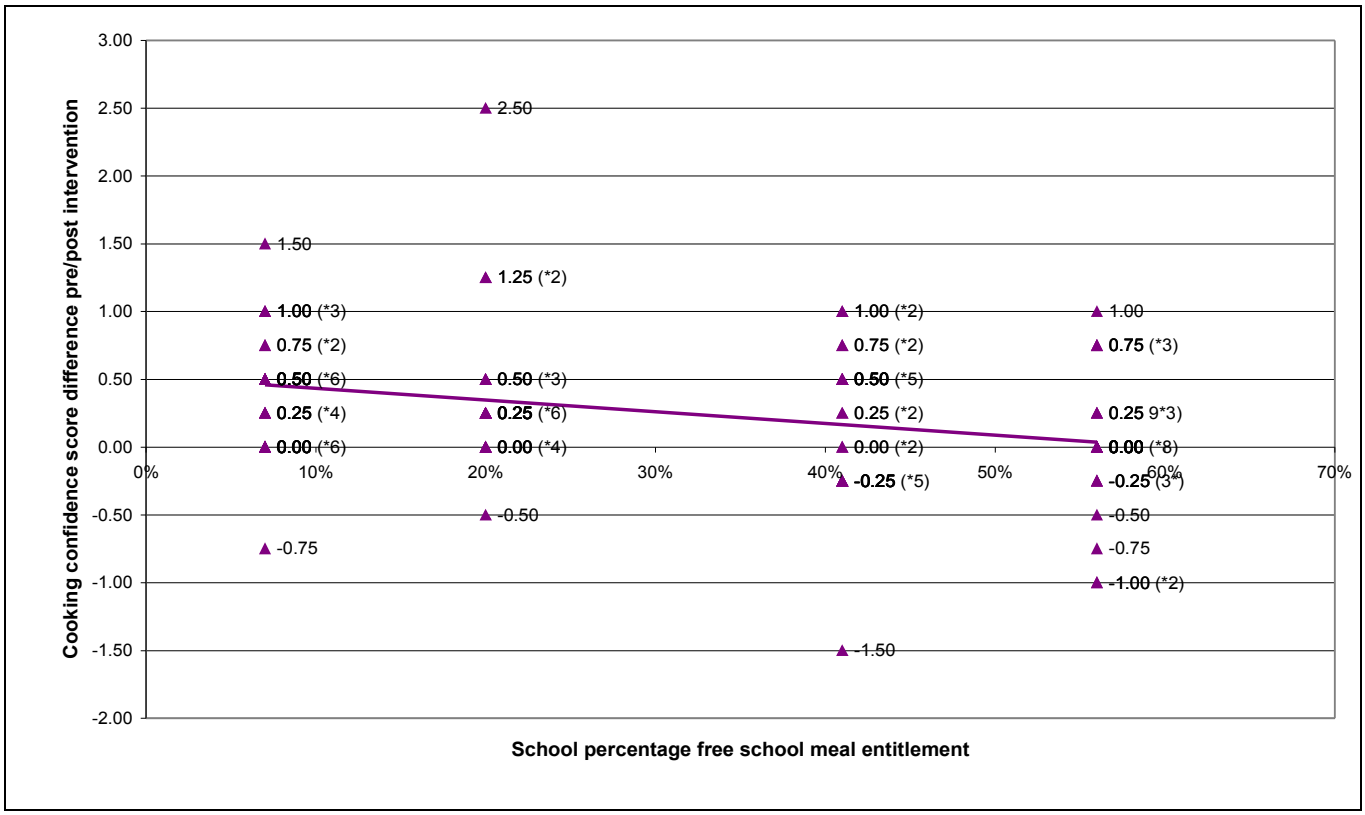
Table 4: Dependent variable difference in cooking confidence Vs other variables (*n*=169)

Source	Significance
FSME	0.182
Intervention * gender * FSME	0.602
Intervention*FSME	**0.044***

Reported changes in confidence for each pupil in the intervention group were plotted against the school's free school meal entitlement, see Figure 8 below. An inverse association was observed between a school's percentage free meal entitlement and change in cooking confidence score.

Figure 8: Intervention group cooking confidence difference change by school FSME(*n*=86

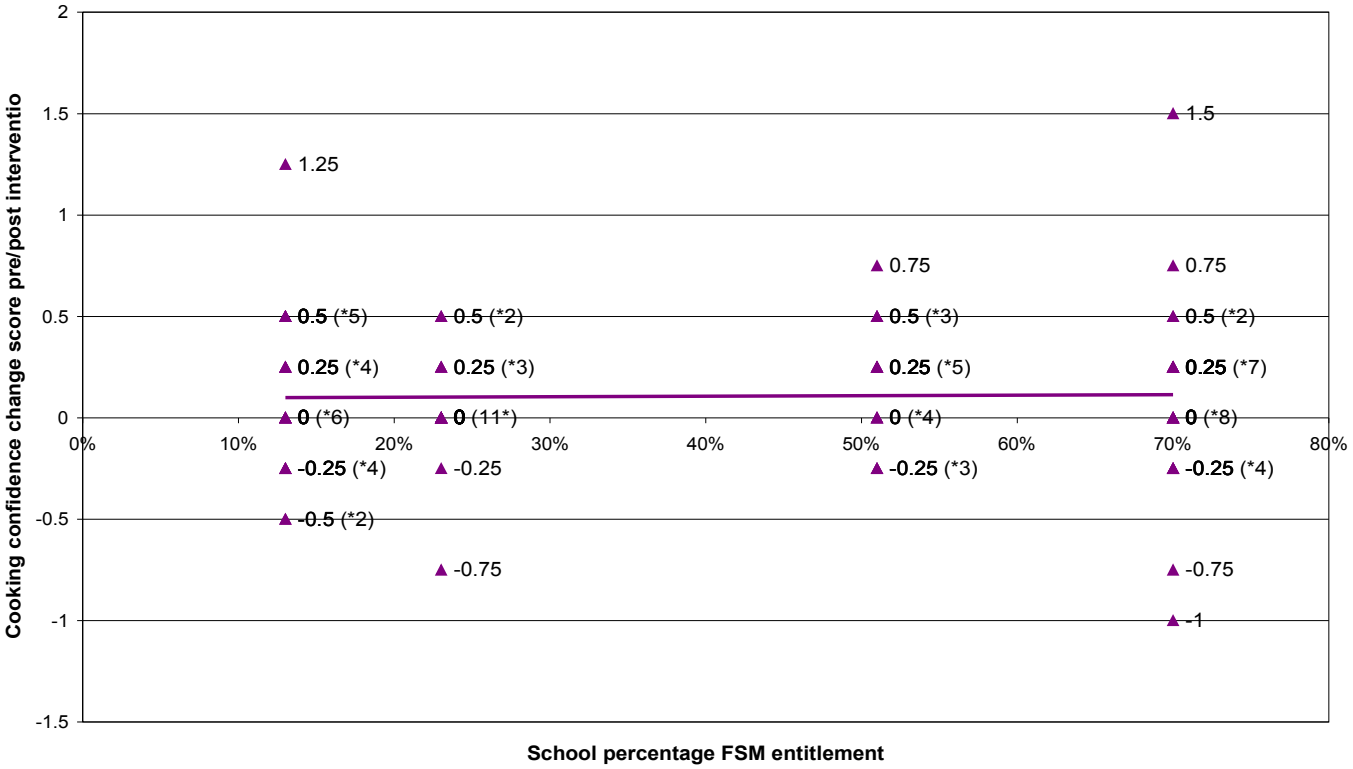
(*n) denotes number of pupils if more than 1



The same trend was not observed in the control group (see Figure 9 below). So in the intervention group, pupils from schools in more deprived areas, indicated by a higher percentage FSME tended to have a smaller gain in confidence in their cooking skills following the session with the chef, compared to their counterparts in schools with lower FSME. Of the 15 pupils who reported lower confidence in their cooking skills following the session with the chef, 13 were from schools with high FSME (41% and 56%), while only two were from schools with low FSME (7% and 20%) Across all schools in total 20 pupils (just under a quarter) reported no change in cooking confidence following the session with the chef.

Sixteen out of 25 (64%) of the pupils from the school with the lowest FSME reported an increased cooking confidence following the session with the chef compared to 7 out of 22 (32%) of the pupils from the class with the highest FSME (56%).

Figure 9: Control group cooking confidence score change Vs school FSME (*n*=83)



****n* denotes number of pupils**

Vegetable consumption

To measure vegetable consumption pupils were asked to circle the relevant face on the questionnaire section detailed in figure 10, below. Consumption questions related to the 5 vegetables included in the pasta salad the children made in the chef's session.

Figure 10: Vegetable consumption questions

In the last week have you eaten any (please draw a circle around the face that tells us about you)...

Cucumber	**Yes I ate this more than once this week**	**Yes I ate this once this week**	**No but I wanted to eat it**	**No, and I didn't want to eat it either**
Tomato	**Yes I ate this more than once this week**	**Yes I ate this once this week**	**No but I wanted to eat it**	**No, and I didn't want to eat it either**
Peas	**Yes I ate this more than once this week**	**Yes I ate this once this week**	**No but I wanted to eat it**	**No, and I didn't want to eat it either**
Celery	**Yes I ate this more than once this week**	**Yes I ate this once this week**	**No but I wanted to eat it**	**No, and I didn't want to eat it either**
Red pepper	**Yes I ate this more than once this week**	**Yes I ate this once this week**	**No but I wanted to eat it**	**No, and I didn't want to eat it either**

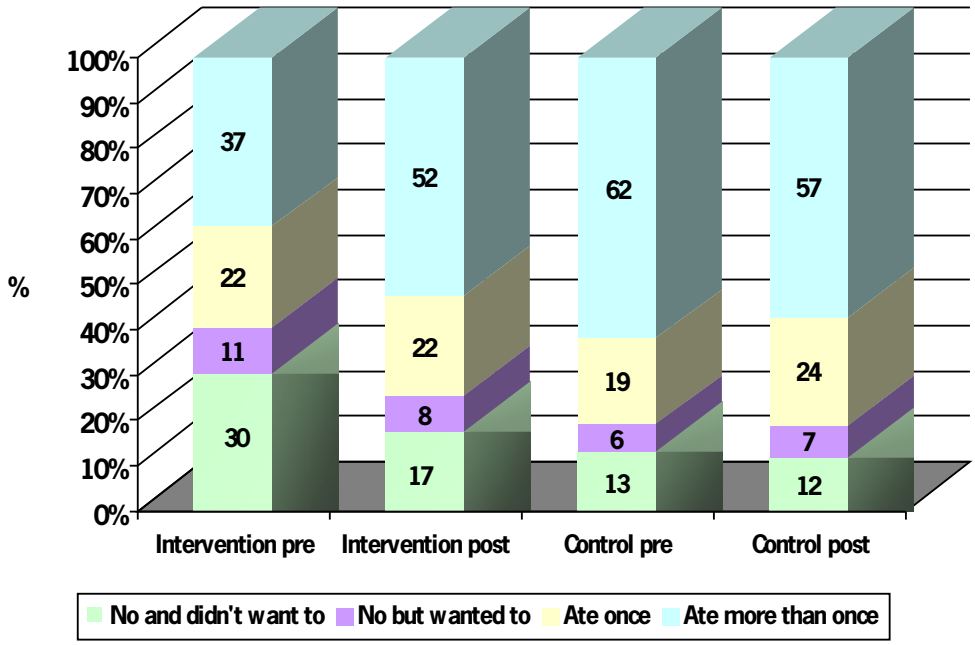
Cucumber consumption (*n*=169)

At baseline, significantly more children in the control group reported eating cucumber at least once a week than in the intervention group (81% Vs 59%, respectively).

As shown in Figure 11, within groups, this percentage rose by 15% in the intervention children after the session with the chef, from 59% to 74%, which was a statistically significant increase. The percentage of children in the control group who ate cucumber at least once in the previous week did not change significantly post-test.[7]

The change in consumption observed in the intervention group was statistically significant post-test (p=0.007).

Figure 11: Percentage cucumber consumption (*n*=169)



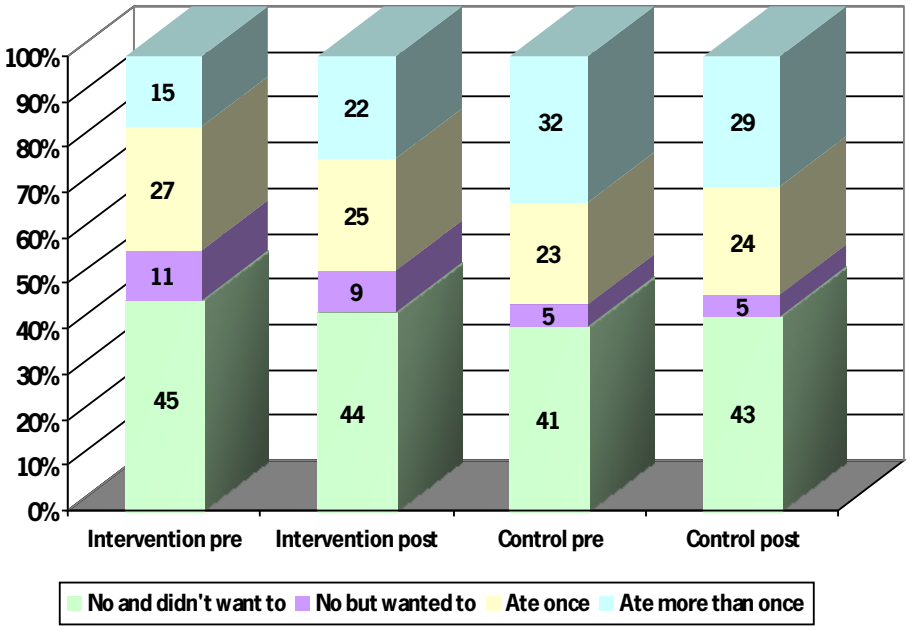
[7] McNemar's Test, group 1: those who ate the vegetable at least once, group 2: those who did not eat the vegetable

Tomato consumption

At baseline, significantly more children in the control group reported eating tomato at least once in the previous week than in the intervention group (54% Vs 42%, respectively).

Changes in tomato consumption were not statistically significant in either group post-test. The percentage of children who answered *'no, but I wanted to eat'* tomato did not change significantly from pre to post test in either group.

Figure 12: Percentage tomato consumption (*n*=169)

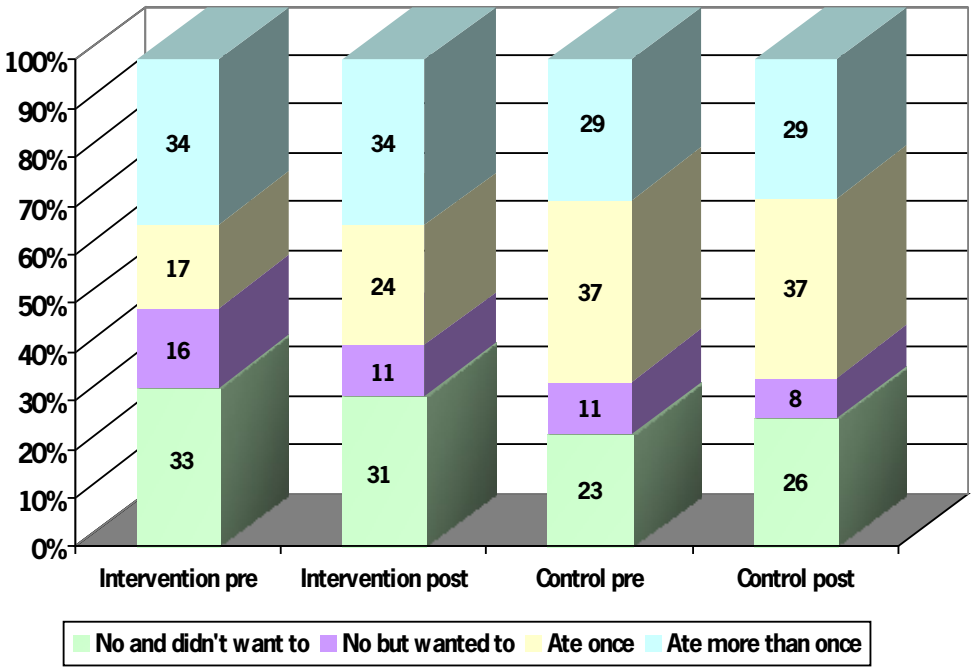


Pea consumption

As shown in figure 13, at baseline significantly more children in the control group reported that they had consumed peas at least once in the previous week compared to the intervention group (66% Vs 51%, respectively).

Overall, the changes observed in reported pea consumption were not statistically significant in either group post-test. So while increases in consumption were observed in the intervention group, these were not statistically significant.

Figure 13: Percentage pea consumption (*n*=169)

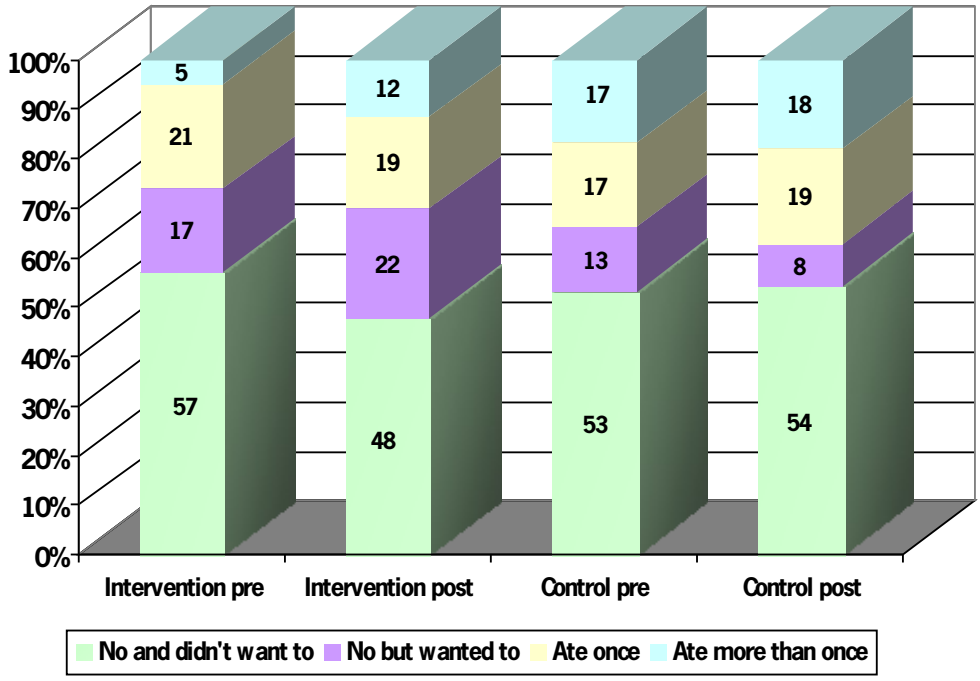


Celery Consumption

At baseline more children in the control group reported eating celery at least once in the previous week than in the intervention group (34% Vs 26%, respectively), see Figure 14 below.

The changes observed for celery consumption were not statistically significant in either group post-test. It is interesting to note however that there was a slight increase in the intervention group (5%) in children who would have liked to have eaten celery if it was available, which suggests a slight change in attitude (compared to a decrease of 5% in the control group).

Figure 14: Percentage celery consumption (*n*=169)

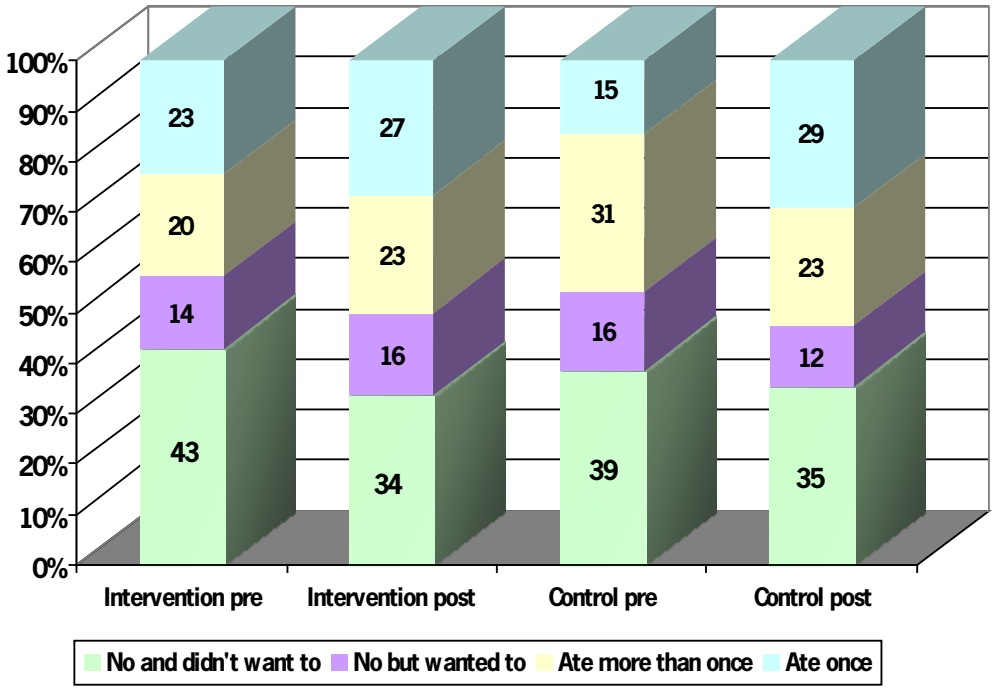


Red pepper consumption

At baseline, children in the intervention and control groups were similar in their red pepper consumption: 43% and 46%, respectively, reporting that they ate red pepper at least once in the previous week (see Figure 15 below). After the intervention, while both groups showed an increase in consumption, they remained similar (i.e., differences between the two groups were not statistically significant).

The changes observed in red pepper consumption were not statistically significant in either group post-test.

Figure 15: Percentage red pepper consumption (*n*=169)



Overall vegetable consumption data

Figure 16 below combines the percentage of children who reported eating the vegetables once and more than once in the past week pre and post intervention for both groups. A trend for increased consumption for all 5 vegetables can be seen for the intervention group, while for the control group, consumption of cucumber and peas stayed the same, tomato consumption decreased slightly and slight increases in celery and red pepper consumption were observed. So while the reported increases in consumption in all vegetables in the intervention group were not significant, compared to the control group (where the same pattern of reported consumption was not observed) this is of note.

Figure 16: All vegetable consumption (*n*=169)

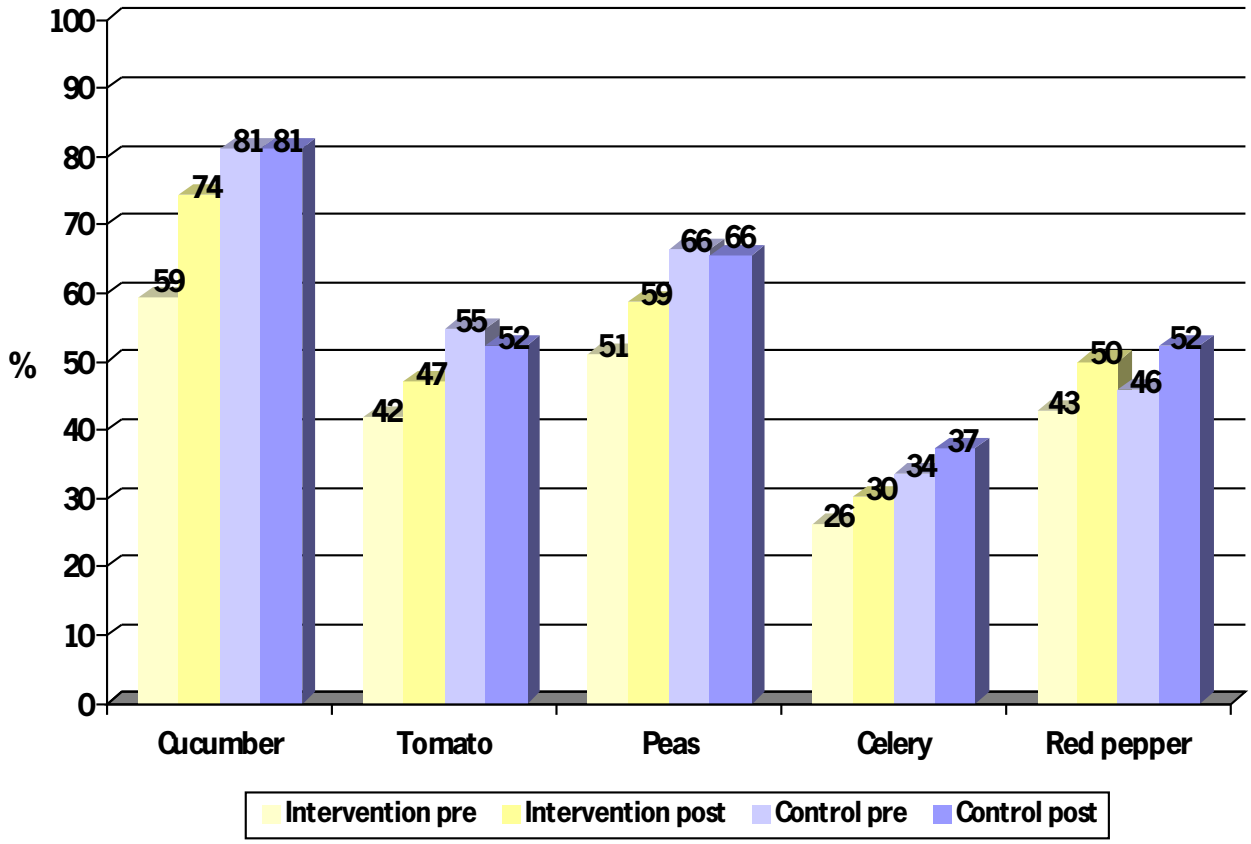


Table 5: Within intervention group only change in the proportion of Children reported eating each vegetable at least once in the last week (*n*=86)

Vegetable	Pre-post difference	p-value
Cucumber	15.1%	**0.007***
Tomato	4.2%	0.678
Peas	7.6%	0.263
Celery	4.0%	0.523
Red pepper	7.1%	0.263

Table 5 above and Table 6 below summarise the changes in reported consumption pre to post test, within the intervention group and control groups, respectively. The increase in cucumber consumption in children receiving the chef sessions was the only statistically significant change observed. Though,

consumption of all vegetables did increase in the intervention group. No significant change in consumption was observed in the control group, reported consumption of tomatoes and peas fell slightly.

Table 6: Within control group only: change in the proportion of children who reported eating each vegetable at least once in the last week (*n*=83)

Vegetable	Pre-post difference	p-value
Cucumber	0.0%	1.000
Tomato	-2.4%	0.815
Peas	-0.8%	1.000
Celery	3.6%	0.581
Red pepper	6.6%	0.210

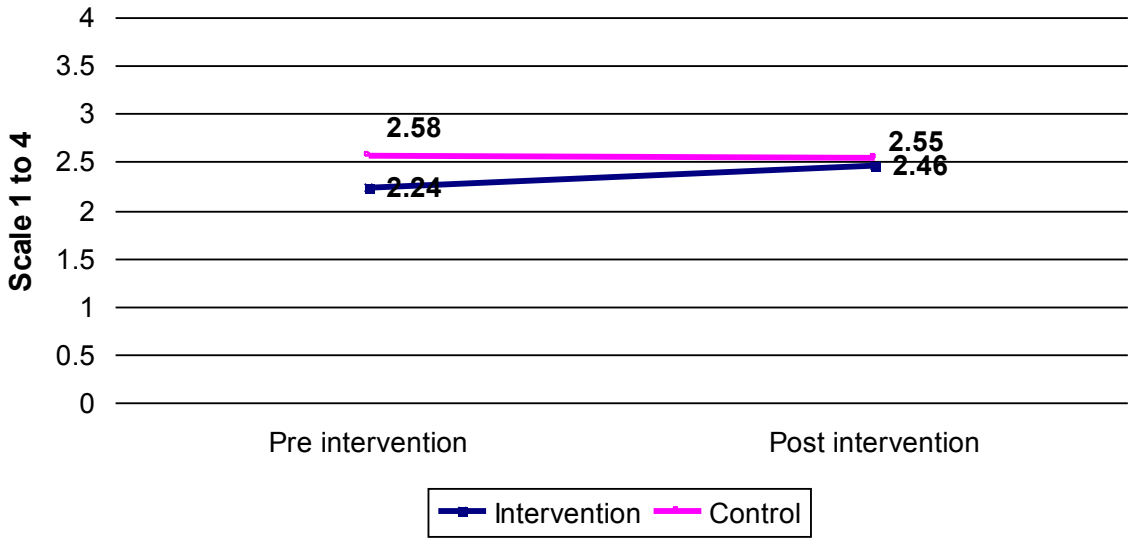
Vegetable consumption change score

A summary measure for vegetable consumption was devised by assigning a number value to the consumption responses where 1= 'No and didn't want to eat it' and 4= 'Yes, I ate this more than once this week'. Similar to the cooking confidence score, an average was calculated by combining the scores for all five vegetables for each child. The average 'score' was used as an indicator of overall vegetable consumption and was also useful in showing direction of change.

A difference score was calculated subtracting the pre-test score from the post-test score. The difference-score measures the average change between the two groups of children. The vegetable consumption difference score was found to differ significantly between the two groups (p=0.024). This means the intervention had an effect on children's vegetable consumption.

At baseline, the average vegetable consumption score in the intervention group was 2.24. Post-intervention, this increased by 0.22 (95% CI, 0.08, 0.34) to 2.46. In the control group, the average consumption score decreased by 0.03 (95% CI, -0.14, 0.10) from 2.58 to 2.55. This finding indicate that overall vegetable consumption improved in the intervention group only,

Figure 17: Vegetable consumption change scale pre and post intervention (*n*=169)



Effects of other factors

Statistical tests[8] were carried out to determine the effect of different variables on vegetable consumption difference score. These included group (intervention or control), gender, FSME and geographic area. When other factors were accounted for, group was found to have an effect on vegetable consumption difference score (p=0.007), see Table 7 below.

Table 7: Effect of different factors on vegetable consumption difference score (*n*=169)

Source	Significance
Intervention	**0.007***
Gender	0.094
Geographical area	0.809
Intervention * gender	0.103
Intervention * geographical area	0.068
Gender and geographical area	0.173
Intervention *gender and geographical area	0.857
Intervention * gender * FSM	0.391
FSM	0.855
Intervention*FSM	0.507

[8] FACTORIAL ANOVA

Exposure and provision

Children were asked the questions outlined in Figure 18 to ascertain where participants reported eating vegetables.

Figure 18: Section of questionnaire regarding exposure and provision
If you ate any of the above vegetables where did you eat them (draw a cross through the pictures that tell us about you)? :

Cucumber	**In your school lunch**	**In your lunchbox**	**At home**
Tomato	**In your school lunch**	**In your lunchbox**	**At home**
Peas	**In your school lunch**	**In you lunchbox**	**At home**
Celery	**In your school lunch**	**In your lunchbox**	**At home**
Red pepper	**In your school lunch**	**In your lunchbox**	**At home**

Catering managers were asked whether they had provided the 5 vegetables included in pasta salad in the week prior to data collection at baseline and post intervention. The results are outlined in Table 7 below.

Table 8: Provision of 5 vegetables in school lunches

	Vegetables in school lunch provision week prior to pre/post data collection									
Schools: pre/post	**Cucumber**		**Tomato**		**Peas**		**Celery**		**Red Pepper**	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
NW UK intervention	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
NW UK control pre	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E London control pre	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
E London intervention	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W London intervention	✓	✓	✓	✓	✓	✓	✘	✘	✓	✘
W London control pre	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Birmingham intervention	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Birmingham control pre	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘

As can be seen from Table 8, of the 5 vegetables, celery and red pepper were not always included in lunch provision. The intervention school in the North West, the East London control school and the Birmingham intervention school did not provide these vegetables at baseline and post intervention. While the West London intervention school did not serve celery pre intervention and the Birmingham control school did not provide red pepper both pre and post intervention.

This data was firstly used to assess whether school children mistakenly stated they had eaten vegetables at school which had not been included in school lunch provision.

Table 9: Children reporting eating celery or red pepper at school lunch Despite the vegetables not being included in lunch provision

Schools: pre/post intervention	**Celery**	**Red Pepper**
NW UK intervention pre	1	
NW UK Intervention pre	1	2
E London control pre		1
E London control post	3	
W London intervention pre	1	
W London intervention post	1	2
Birmingham intervention post	2	
Birmingham control pre		1

Secondly this data was used to assess whether exposure (provision of these vegetables) at school lunch increased consumption. However as the group numbers were small, no significant association was found.

Asking confidence

In this section, children were asked whether they felt able to ask a parent or carer to buy the ingredients for a pasta salad, favourite sweets, the ingredients for a pasta salad, pick out a favourite fruit or vegetable when shopping and ask for a favourite fruit or vegetable dish at supper. Pupils could select the following responses: *'I can do this'*, *'I am not sure about doing this'* or *'I can't do it at all'*. In order to make within group comparisons, those who answered *'I can do this'* were coded as *'yes'* and those who answered *'I am not sure about doing this'* or *'I can't do this'* were coded as *'no'*. Figure 19 below details the asking confidence section of the questionnaire.

Figure 19: Asking confidence section of questionnaire

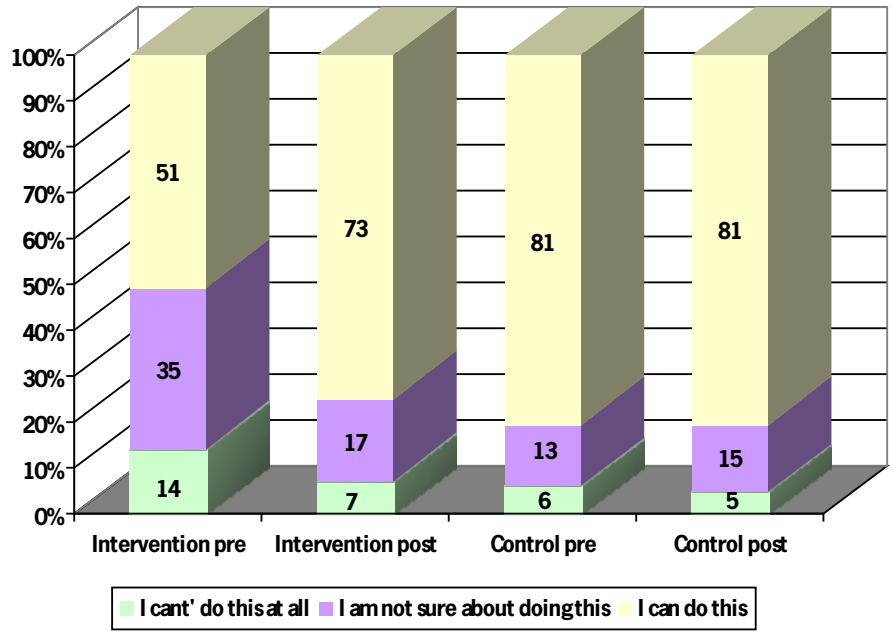
At home can you (please draw a circle around the face that tells us about you)....

Ask a family member/carer or friend to buy ingredients for a pasta salad…	I can do this	I am not sure about doing this	I can't do it at all
Ask a family member/carer or friend to buy my favourite sweets…	I can do this	I am not sure about doing this	I can't do it at all
Go shopping with my family/carer or friend and pick out the ingredients for a pasta salad…	I can do this	I am not sure about doing this	I can't do it at all
Go shopping with my family/carer or friend and picking out my favourite fruit or vegetables…	I can do this	I am not sure about doing this	I can't do it at all
Ask a family member/carer or friend to make your favourite vegetable for supper…	I can do this	I am not sure about doing this	I can't do it at all
Ask someone in your family/carer or friend to serve your favourite fruit at dinner…	I can do this	I am not sure about doing this	I can't do it at all

Confidence to ask parents to buy pasta salad ingredients

As shown in figure 20, at baseline more children in the control group who reported that they could ask their parent or carer to buy ingredients for a pasta salad than in the intervention group (81% Vs 51%, respectively). The percentage of children in the who reported that they could ask a parent or carer at home to buy the ingredients for a pasta salad increased by from 51% to 73% post intervention. The changes observed in asking confidence were statistically significant in the intervention group ($p<0.001$). Conversely the number of children who felt either unsure or unable to do this halved – from 49% to 24% post intervention.

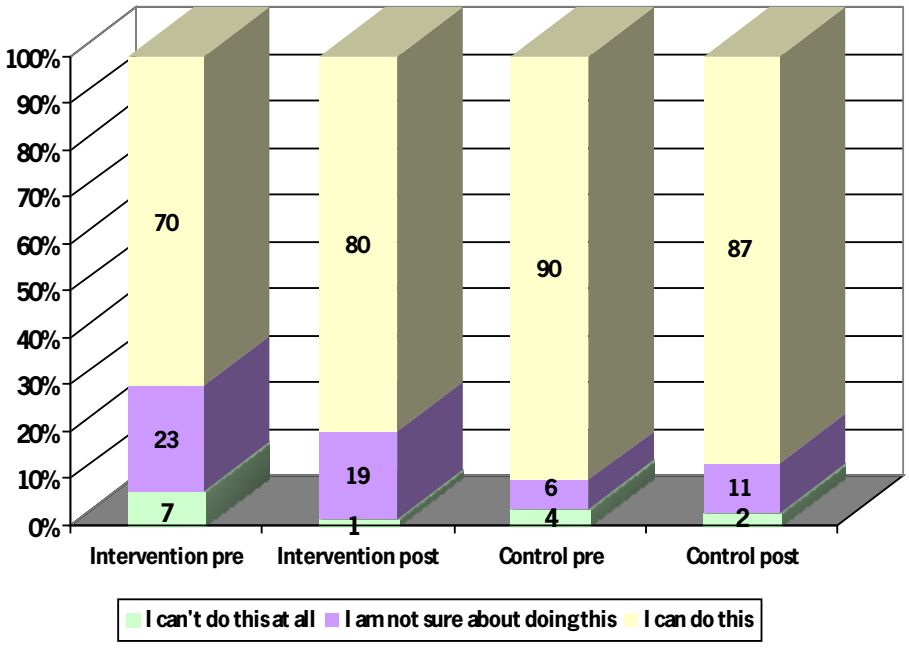
Figure 20: Asking confidence for pasta salad ingredients at home (*n*=169)



Ask to buy your favourite sweets

At baseline, a greater proportion of children in the control group reported that they felt able to ask their parent or carer to buy sweets compared to the intervention group (90% Vs 70%, respectively). See Figure 21. The changes observed in asking confidence were not statistically significant following the session with the chef.

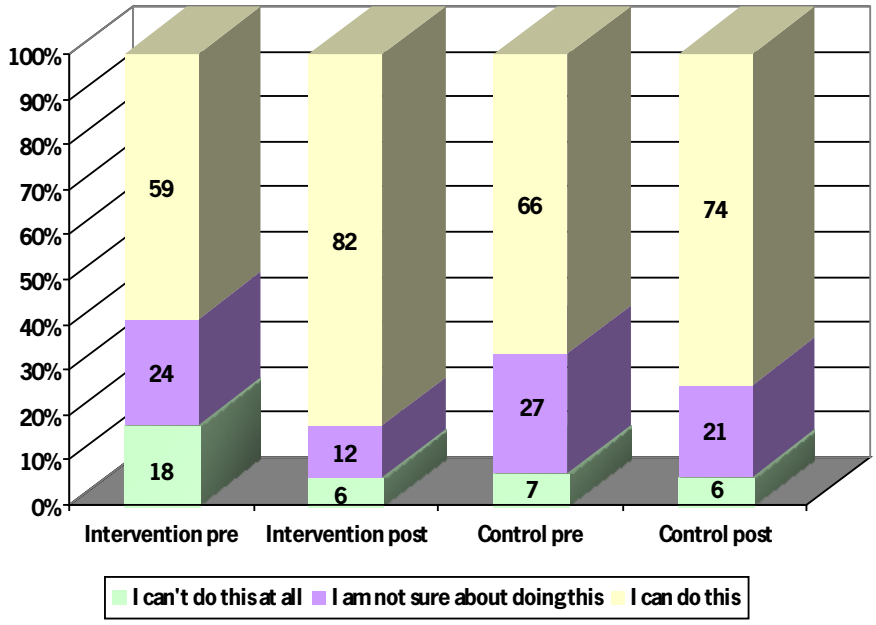
Figure 21: Asking confidence for favourite sweets at home (*n*=169)



Pick out ingredients for a pasta salad

At baseline and post-test, the differences between groups in reported confidence picking out ingredients for pasta salad when shopping were not statistically significant. The increase in the percentage of children who felt they could pick out ingredients approached statistical significance in the intervention group, increasing by 23% to 82% post-test (p=0.072). See Figure 22 below.

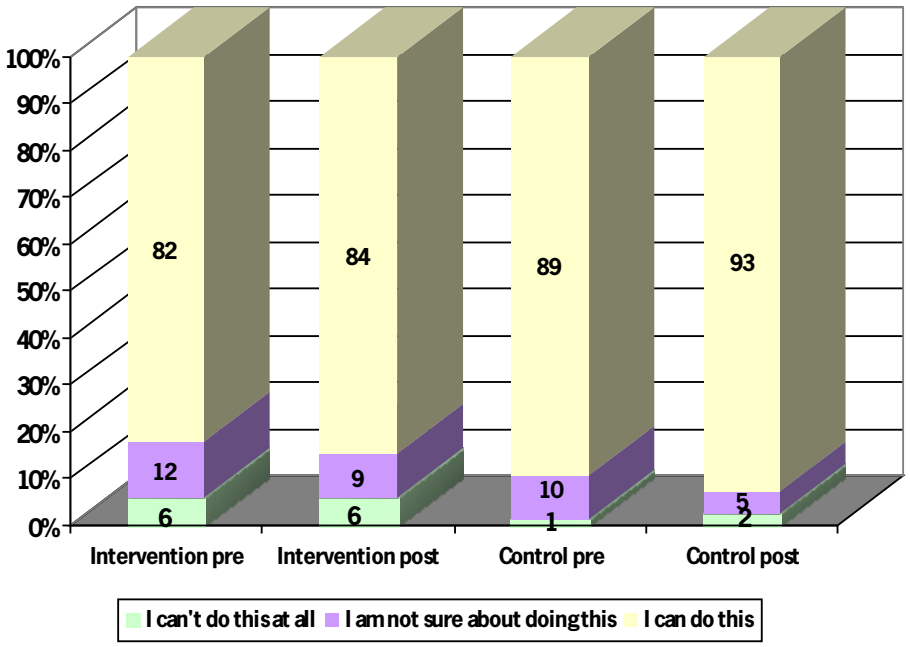
Figure 22: confidence to pick out ingredients for pasta salad (*n*=169)



Pick out fruit or vegetables when shopping

At baseline and post-test, the differences between groups in reported confidence in picking out their favourite fruit or vegetable while shopping were not statistically significant. The changes observed in confidence were small and were not statistically significant following the session with the chef, see Figure 23 below.

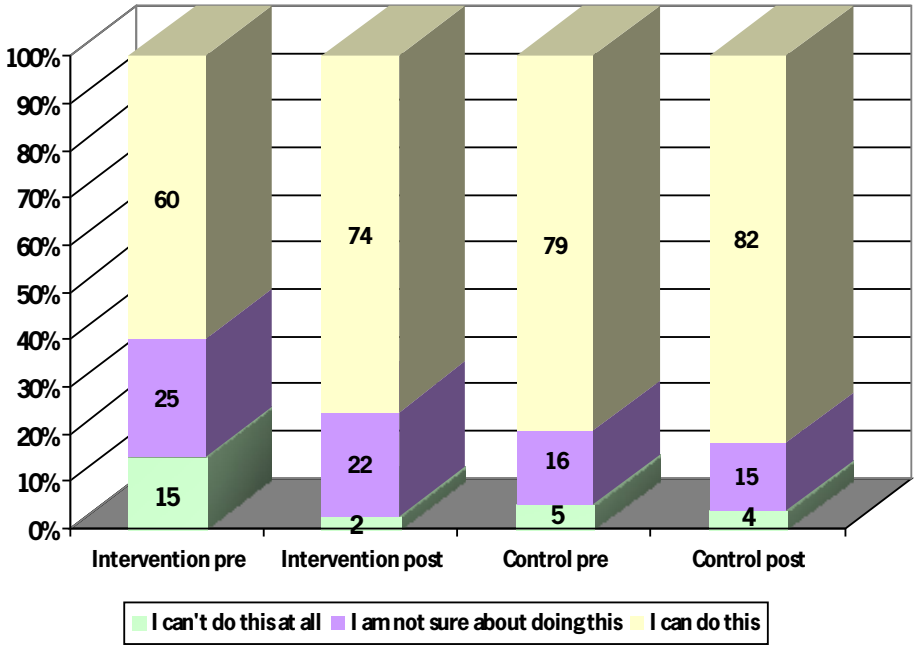
Figure 23: Confidence to pick out fruit or vegetables when shopping (*n*=169)



Ask for your favourite vegetable for supper

At baseline, a greater proportion of children in the control group reported that they were able to ask for their favourite vegetable for supper than in the intervention group (79% Vs 60%, respectively). See Figure 23 below. The increase in proportion of children who felt able to ask for a vegetable for supper was statistically significant in the intervention group (p=0.011).

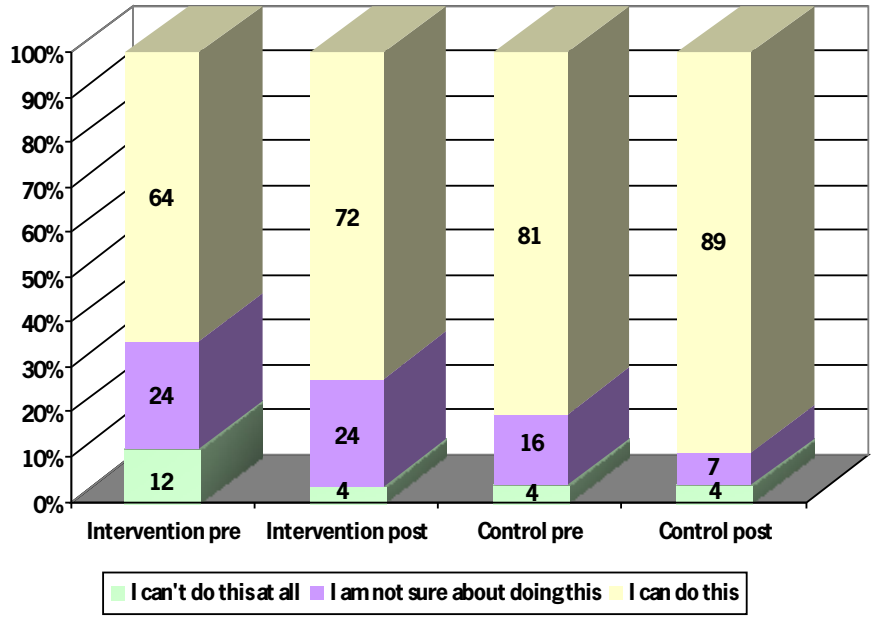
Figure 23: Confidence to ask for favourite vegetable for supper (*n*=169)



Asking confidence for favourite fruit for dinner

At baseline, a greater proportion of children in the control group who reported feeling able to ask for their favourite fruit for dinner than in the intervention group (81% Vs 64%, respectively). The changes observed in asking confidence were not statistically significant in either group post-test. While changes in confidence were not statistically significant it is interesting to note that the percentage who felt able to ask for their favourite fruit for supper increased from 64% to 72% in the intervention group. At the same time the percentage of children who did not feel able to do this decreased from 12% to 4%. See Figure 24 below.

Figure 24: Asking confidence for favourite fruit for dinner (*n*=169)



Openness to trying new vegetables

Children were shown a mystery vegetable (fennel) and asked if they had eaten the vegetable, knew the name of it, and whether they would be willing to try it in a salad. Children were asked if they had eaten and knew the name of a mystery vegetable, where a photo of the vegetable (a fennel bulb) was provided and the vegetable was passed around the class. See Figure 25 below.

Figure 25: Openness to trying new vegetable
Have you tried this vegetable before? ☐ ***Yes*** ☐ ***no*** ***(please tick)***

If you have tried it before please tell us what it is: _____

If you were given this vegetable in a salad would you try it? (Please draw a circle around the face that tell us about you)...

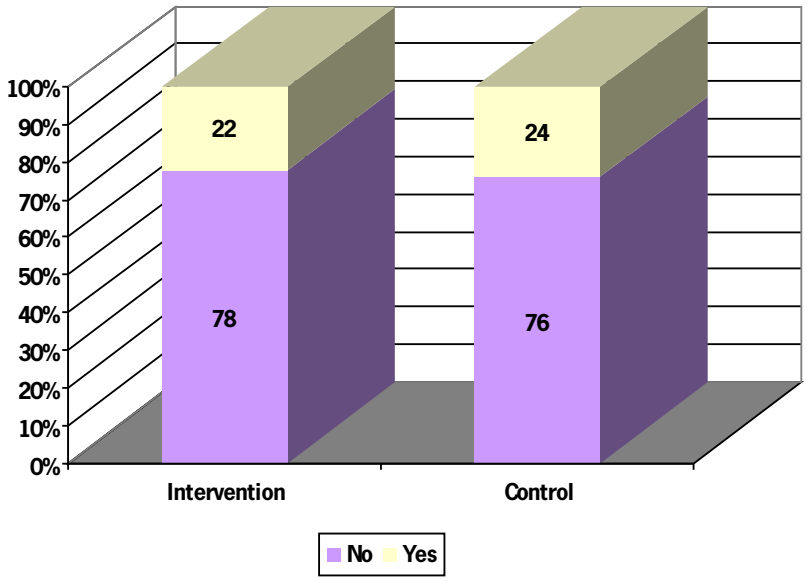
Yes I would try it

Yes I would try it but wouldn't eat it if I didn't like it

No I wouldn't try it

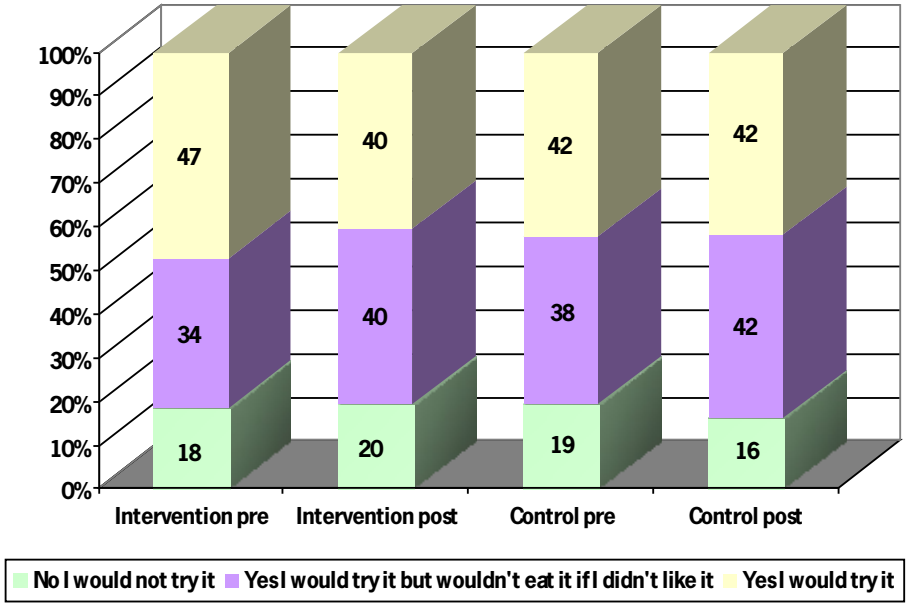
As can be see from Figure 26, slightly more of the control group had not eaten fennel before 78% compared to 76% in the intervention group. The difference was not large enough to be statistically significant (p=0.384).In total 92% of the children did not know that the vegetable was fennel. Only 11 children knew that it was fennel, 10 of these were from the school in West London.

Figure 26: Pre intervention "have you eaten this vegetable before?" (*n*=169)



Of the 19 children in the intervention group who claimed to have eaten fennel before, only 7 of them could name it. While only 3 of the 23 in the control group who claimed to have eaten fennel before could name it. Children thought it was onion, spring onion, turnip, cucumber, celery.

Figure 27: Openness to trying fennel in a salad (*n*=169)



At baseline and post-test, the differences between groups in willingness to try the mystery vegetable were not statistically significant. The percentage of children pre intervention who said they would try this vegetable fell post intervention to 40% from 47% in the intervention group. See Figure 27. In the control group the percentage stayed about the same at nearly 42%.

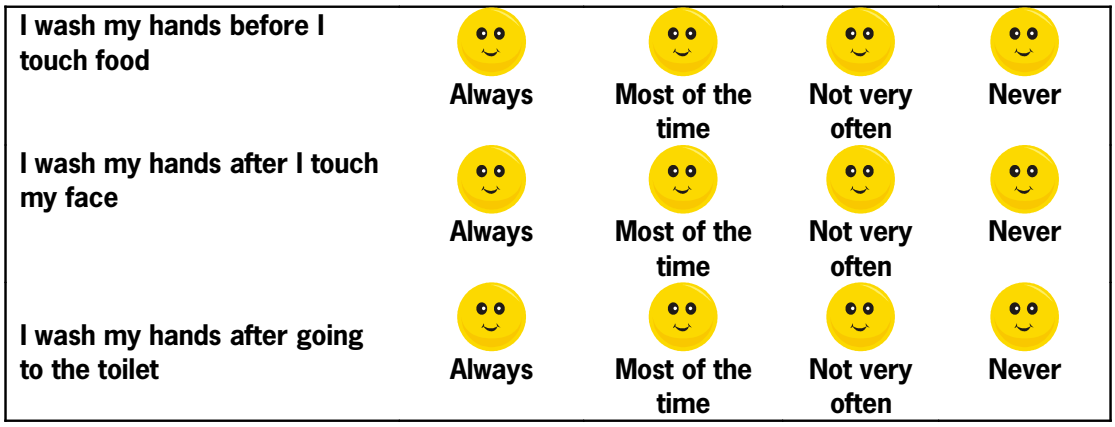
Neither percentages in the intervention group (p=1.0) nor the control group (p=0.774) changed significantly.

Hand-washing and food preparation

Participants were asked questions regarding their hygiene practices during food preparation. They were asked if they washed their hands before touching food, after touching their face and/or after visiting the toilet. For each of these questions pupils could select the following responses: *'always'*, *'most of the time'*, *'not very often'* or *'never'*. The questionnaire section is detailed in Figure 28 below.

Figure 28: Hand-washing and food preparation

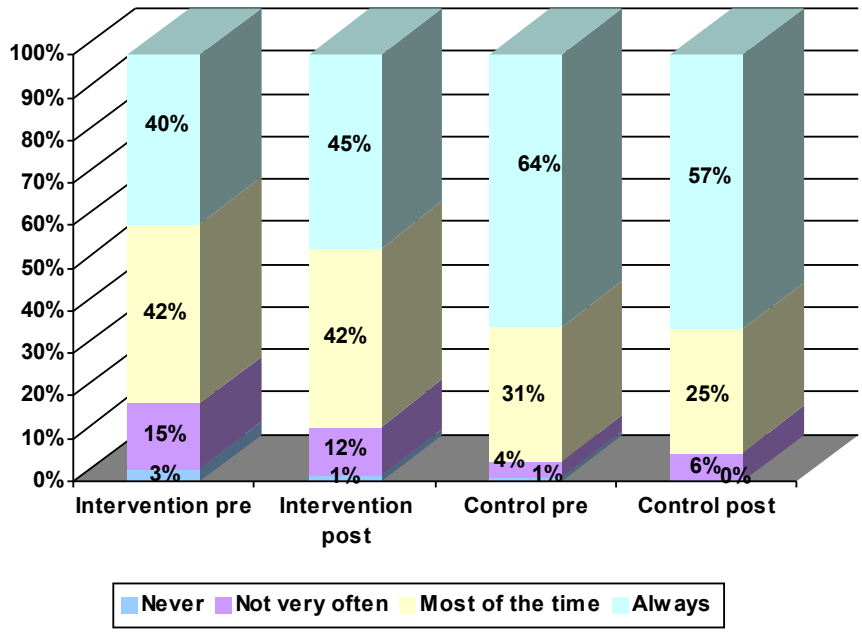
When I'm preparing food or cooking (please draw a circle round the face that tells us about you)…



Hand-washing before touching food

At baseline, the intervention and control groups were not the same as significantly more children in the control group reported washing their hands *'always'* before touching food than in the intervention group (64% Vs 40%), see figure 29 below. Post intervention, the proportion who claimed to wash their hands *'always'* in the control group remained higher than in the intervention. When pre to post changes were investigated within each group, neither the intervention or control groups changed significantly.

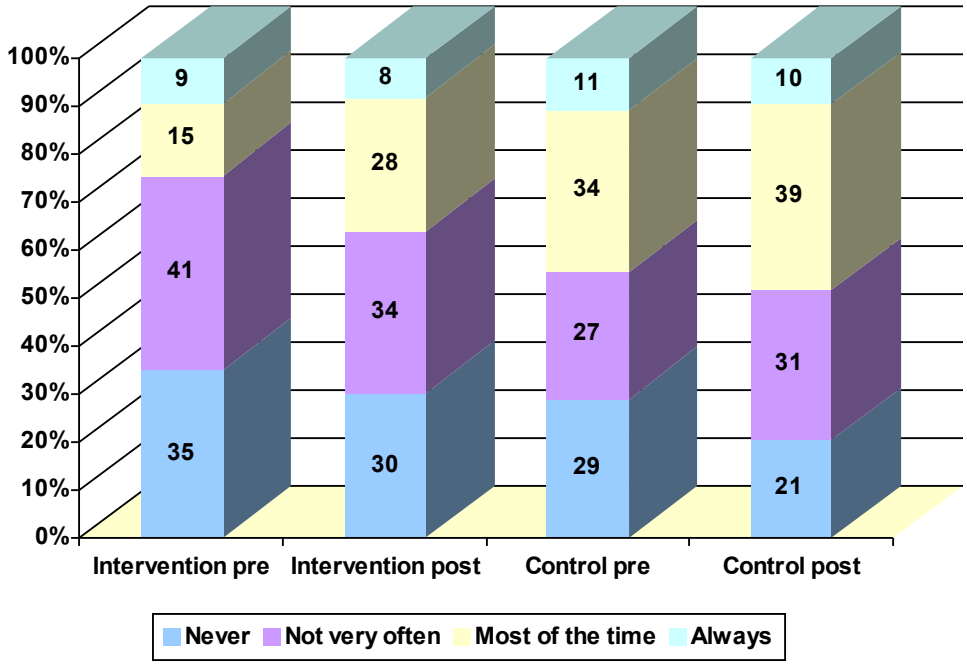
Figure 29: Do you wash your hands before touching food (*n*=169)



Hand washing after touching face

At baseline, intervention and control groups were not the same, with significantly more children in the control group hand washing "always" or "most of the time" after touching their face than in the intervention group (45% vs 24%, respectively), see figure 30 below. Post intervention, both groups showed an increase in those who reported washing their hands *'always'* or *'most of the time'*. However, when pre to post changes were investigated within each group and grouping the responses *'always'* and *'most of the time'* together, neither of these increases were statistically significant.

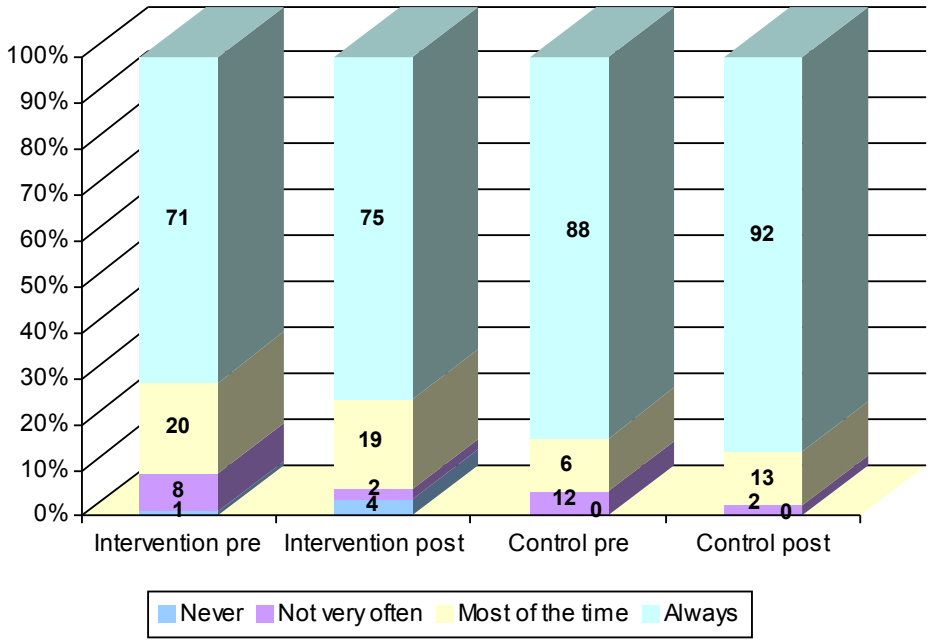
Figure 30: Do you wash hands after touching your face (*n*=169)



Hand washing after visiting the toilet

As shown in figure 31, at baseline more children in the control group reported washing their hands "always" after visiting the toilet than in the intervention group (88% Vs 71%, respectively). Post-intervention, grouping together the responses *'always'* and *'most of the time'* and looking at changes within groups, neither observed changes in the intervention or control group were statistically significant.

Figure 31: Do you wash your hands after visiting the toilet (*n*=169)



Overall, the intervention did not appear to have a significant impact on hand-washing behaviour.

Discussion

Attitude to CAAS session

The data collected revealed that the key aspects children enjoyed about the session were tasting new foods and flavours, making a new dish, learning about new foods, learning and practicing new food preparation skills and meeting the chef.

Overall the session with the chef motivated 71% of the children to report wanting cook a lot or a bit more. Eleven percent of the children reported that they were not engaged by the session. It should be noted that all but one of these children wanted to have another session with the chef. So any dissatisfaction expressed may be due to frustration at not being able to carry out more practical food preparation. This may have been because of the large size of the group and the limited time in the session. Through this questionnaire, there were a constant number of children who stated that they more autonomy and involvement in the practical activities. These children may also be expressing a frustration that they could not participate more in the practical activities.

In particular the children seemed to enjoyed having a chef (rather than a teacher) delivering the session. This may add to their overall positive attitude to the intervention. With 89% of children wanting another visit from the chef, 22% stating they would not have changed the way the session was delivered and 48% stating that one of the aspects they enjoyed about the session was meeting the chef (the same answers may not have been given if a teacher was leading the session).

Most of the children who said the session did not really make them want to cook or that they did not want to cook, or even that they did not like cooking still, would have liked another session with the chef (18 out of 23). Reasons included: because they wanted to cook, taste more foods and learn more cooking skills.

While a positive attitude is essential to mediate changes in behaviour, it is worth noting that previous research has found that attitude itself does not necessarily translate into behaviour changes and the latter is harder to achieve than the former. This is illustrated by the lower yet consistent changes in reported consumption seen in this research.

Sample selection

Both the intervention and delayed intervention (control) groups were from schools that were interested in cooking as the control group was selected from schools waiting to receive a chef's session in the following year. Identifying and engaging control schools that are truly representative would have been difficult. This is because in a culture where academic establishments are rated on their achievements, they are likely to prefer not to be identified to not be delivering cooking activities. Despite this, there were

differences observed between the two groups. This suggests that the intervention had some effect. However, we found that at baseline, i.e. before the session with the chef, the control group had slightly higher rates of consumption, cooking confidence and hygiene practice. Because the control schools were selected to be similar to the intervention schools this anomalies in selection indicates an unidentifiable error in the selection process.

Self reported efficacy

During data collection researchers stressed that there were no wrong or right answers in the questionnaire, that the questionnaire was anonymous, and that they specifically wanted to hear about the pupils experiences. However children may have given answers that they believed was expected of them, i.e., they conformed to perceived expected behaviour. They may have seen the questionnaire as a test with wrong and right answers. Also it is likely that they gave answers that they saw other pupils giving because data was collected in the classroom setting. It is therefore possible that the answers they gave may not have reflected true consumption and cooking confidence. Only one of the studies in the review used observation methods to collect data. Ideally interviews regarding consumption, using the 24 hour recall method would reduce error. However, this was not possible within the evaluation budget and timescales.

Regarding reliability, it is worth noting that this was quite high, i.e. pupils gave consistent answers when the questionnaire was piloted.

Cooking confidence

The cooking confidence score was used to measure impact within groups in the evaluation. This is based on the method used in the Cookshop paper (Liquori et al, 1998), which was identified as the best quality evidence available in the literature review that informed the evaluation.

The overall average cooking confidence score in the intervention group increased significantly by 0.26 points. An increase of 0.09 was observed in the control group; which was also statistically significant. However the gain observed in the intervention group was somewhat larger. Considering the small scale and short duration of the intervention, this increase in cooking confidence post intervention is encouraging.

These measurements are of confidence changes within groups and while this is an important indicator of the difference in scores between groups is a stronger measurement of change.

The change in cooking confidence score indicated a true average increase in confidence for both groups, and whilst the change in confidence was larger for the intervention group, we cannot explain the

increase in confidence in the control group. It is possible that answering the questions at baseline familiarised the children with the terms, so that the second time they filled in the questionnaire they recognised the questions and dishes and therefore felt more confident about making them or even answering the question itself.

The devised cooking confidence scores represent an average score as an aggregation of measurements of four different skill sets. For two of these skill sets (cutting up vegetables and making pasta salad), average changes in confidence were significant. However for measuring ingredients and following recipe instructions, the confidence changes were not significant.

Children in the intervention did follow instructions from the chef; however, they did not follow recipe instructions individually from start to finish. So it is not surprising that there was no significant change in confidence following recipe instructions. It is worth noting, however, that the percentage of children who felt they could not follow recipe instructions at all fell from 9% to just 1% after the session with the chef. So the session mediated an average increase in confidence.

With regard to measuring ingredients, there was an increase of 10% in the children who needed a little help with this, and those who felt they could not do this at all decreased by 7%. Measurements in the sessions were general, using spoons, number of vegetables etc. It is therefore not unexpected that confidence in measuring ingredients did not increase significantly. The slight increase in some level of confidence is likely due to the simple measuring of ingredients during the session. The process of seeing the ingredients measured, and mixed together may have mediated an average increase in confidence and if measuring scales and jugs were used in the session confidence may well have increased further

Practical sessions are usually delivered by the chef to a class of between 15-25 pupils. Chefs cannot always rely on help from teachers or teacher's assistants, despite requesting this, so there are issues co-ordinating and teaching such a large group. This necessitates the simplicity of delivery.

From observation and discussion with chefs it is understood that children were not given a hard copy of the recipe to take home. This omission may negatively impact on children's confidence in their cooking as they may have felt more able to following recipe instructions and/or measuring ingredients if they had a copy of the recipe to try out at home. It also could reduce transference into the home environment, which is key to embedding eating behaviour and cooking efficacy.

A significant increase in confidence in making pasta salad was demonstrated. However, this may be a result of how the question was asked. As, if questions had been asked about the individual components of making a pasta salad, an increase in confidence may not have been observed. The reported increase in confidence almost doubled in the intervention group this may be just because participants feel they should know how to make a pasta salad after making it with the chef in the session. So may have been providing answers that they would have felt were expected of them by researchers.

It is interesting to that the percentage of children who felt they could make pasta salad by themselves or with a little help was combined; an increase in both the intervention and control group post intervention was observed (58% to 82% in the intervention group compared to 65 to 81% in the control group). Based on children being able to make pasta salad on their own, however, the difference in confidence between the groups post intervention was significant, which suggests that the session with the chef had an impact on children's cooking confidence.

Similar increases were also observed when percentages were combined for following recipe instructions (70% to 81% in the intervention group compared to 76% to 88% in the control group). The two groups were found to not be statistically different pre and post intervention, so the session with the chef is unlikely to have had an impact on confidence in this skill.

The intervention group demonstrated a bigger change in confidence compared to the control group in terms of measuring ingredients, though this was not significant and was mainly in children who needed a little help. This perhaps is indicative of the level of automation the children experienced in measuring ingredients during the session.

Cooking confidence did increase for both groups, however for the intervention group only this change was significant which suggests the session with the chef had an impact.

Free School Meal Entitlement (FSME) Vs intervention

The association between the FSME of a school combined with intervention and cooking confidence is of note. This trend for pupils from deprived areas achieving a lower cooking confidence was only observed in the intervention group and indicated a significant association between FSME of school and the intervention. However, without measuring FSME on an individual basis it is impossible to reach conclusions regarding this association.

It may be that for some children, confidence was higher before the practical session than afterwards because they had no experience of the food preparation tasks beforehand and thus rated their confidence based on what they thought they could do without ever having performed the task. After the session, it is possible that some then realised the complexity of the task and were able to rate their confidence more accurately.

When all the variables were considered, free school meal entitlement alone was not associated with cooking confidence and neither was group (intervention Vs control). Rather, FSME appeared to mediate the lower change in cooking confidence in pupils who received the intervention. This interplay needs further research to understand the underlying causes.

Also, the intervention had 86 pupils and divided among the FSME groupings, the sample size is small so caution is needed not to overemphasise this association. A further limitation is that the link is between a variable at school level (FSME) to one which is at the individual level (cooking confidence). As such, further research and/or evaluations would need to focus on FSME at an individual level to understand the interaction between FSME, intervention and the impact on confidence.

It is concerning however that more pupils in deprived areas are reporting a decrease in confidence (n=13) compared to those from more well off areas (n=2). Whilst bearing in mind that the numbers are small, this unexpected finding requires further investigation.

Also of interest from the analysis is that across the board, 20 pupils out of 86 reported no change and 15 reported a negative change in cooking confidence after having the session with the chef. This may well be due to the small dose. If pupils have little experience of practical cooking skills, one session may increase average confidence; however more sessions are likely to be needed to have a positive impact on confidence for more children from all areas. One practical cooking session may impact negatively on children's cooking confidence if they are inexperienced (which is likely for some 9-11 year olds).

For children who reported a loss in cooking skills, the session may have served to remind them of their inexperience and lack of skills. It may be that more sessions would be needed addressing different skills and food preparation techniques to increase these children's confidence.

Conversely it may be that children who had some experience of practical food preparation or cooking had their confidence reinforced and increased by the CAAS session.

Vegetable consumption

The change score demonstrated a statistically significant increase in reported overall vegetable consumption in the intervention group (+0.22) which was not observed in the control group (-0.30). Therefore the session with the chef did have a positive impact on eating behaviour in the short term.

Out of the 5 vegetables evaluated only consumption of cucumber increased significantly post intervention. While changes in consumption of the other 4 vegetables did not reach statistical significance post intervention, it may be indicative of a positive trend. The same increase was not observed for the 5 vegetables in the control group.

Consumption data was specifically for the 5 vegetables included in the pasta salad. It is possible that they were eaten following the session as part of a pasta salad. Children were not specifically asked this question as researchers felt they would give to perceived expected answer, ie that yes they did eat pasta salad. Also it is possible that children ate these vegetable as ingredients and were not aware of it.

Post intervention data was collected 2-4 weeks after the session with the chef so while not long term the data does seem to indicate an impact on eating behaviour. The increased consumption observed in the intervention could be due to the intervention taking place during summer term when salad vegetables (tomato, cucumber, celery and red pepper) are in season and widely available. There were no significant increases in consumption of any vegetables in the control group though which would be expected if this was the case.

It is also worth noting that for cucumber, celery and pepper in the intervention group there was a decrease in the percentage of children who said they did not and would not want to eat vegetables (cucumber: -13%, celery: -9% and red pepper: -9%).

Long-term follow up would be needed to ascertain whether this change in consumption is sustained.

Exposure

The small number of children (1-3 per school) who reported eating a vegetable at school lunch, when it was not served indicates likely recall error or they may have confused school lunch option on the questionnaire with the lunch box option.

If the measure of consumption was more sensitive (e.g. by using food frequency questionnaires or 24 hour recalls) and less subject to recall error, it is possible that the influence of school lunch exposure on consumption could have been measured. However, as the intervention is small scale and specific these tools would not have been suitable. A larger sample size would also be necessary to assess the exposure in schools. Future evaluations of school based initiatives should take this factor into account as previous research (Sa and De Lock) has found an association between exposure and consumption. This is part of the whole school approach that other school food initiatives adopt. Two high quality papers identified in the literature review adopted the whole school approach (Liquori et al 1998 and Perez Rodrigo et al 1997).

Asking confidence

This section of the questionnaire was designed to measure transference of confidence and attitude into the home environment. Pupils were not asked directly whether they had made pasta salad at home as they were likely to conform to what they perceived to be expected of them.

Instead by asking pupils whether they felt able to ask parents/carers to buy certain foods, it was hoped that some understanding could be gleaned regarding transference.

With a larger dose intervention, it would be advisable to ask more in-depth questions, and perhaps to enlist the involvement of parents in reporting.

The significant increase in pupils who felt able to ask for pasta salad ingredients at home (+22%) and to pick them out when shopping (+23%) compared to increased confidence in asking for favourite vegetable (+14%) and picking out favourite fruit or vegetables when shopping (+2%) may indicate that increases in consumption were specific to the vegetables used in the CAAS session. More research is needed to explore this further.

Similarly asking confidence transferred into the home environment was specific to the dish made. When children were asked if about their confidence asking for ingredients for a pasta salad at home or pick out the ingredients themselves while shopping, increases in confidence were high at +22% and +23% post intervention respectively. While the latter was not significant, it is of note. The increases were similar though and in fact more children were happy to pick out ingredients for a pasta salad in the supermarket (82% post intervention) compared to those who felt they could ask a parent to buy the ingredients for the pasta salad (73%).

There was an increase in the percentage of children who could ask for their favourite sweets (10%) but this was not statistically significant. This question was asked to test whether the asking confidence was related to pasta salad ingredients specifically rather than general confidence. The evidence suggests that it does. However, pupils may be conforming to perceived acceptable behaviour because they are being observed by researchers. Yet, the intervention group is confident in asking for favourite sweets and it does increase post intervention, but it is not significant.

There was no statistically significant change in confidence picking out fruit and vegetables in the supermarket, though confidence was generally high. In hindsight children could have been asked separately about picking out fruit and vegetables in the supermarket to pinpoint whether confidence related to vegetables alone. Or perhaps, whether the lower confidence percentage was related to the shopping environment.

In the intervention group, there was a significant increase in children who felt able to ask for their favourite vegetable at supper (60% to 74%). This would seem to indicate that the intervention had an impact on asking confidence. Not least as the percentage of children who felt they could not ask for their favourite vegetable fell from 15% to 2% post intervention. There was an issue in how this question was asked. “Supper” being an old fashioned middle class term. It is possible that the answers given were not a true reflection of confidence. It may be that the children were conforming to perceived expected behaviour. For instance, some children may call their evening meal tea, dinner or chai time (for Asian families). Rather, for future evaluations of this type, researchers need ensure questions asked are more open, perhaps asking “can you ask for your favourite fruit or vegetable at home”.

That there was no significant increase in children’s confidence to ask for favourite fruit at supper time further suggests that this increased confidence related to vegetables only (as the intervention used vegetables as ingredients and not fruit).

However the phrasing of the question may have assumed that children ate fruit at supper time for pudding while they may actually usually have it as a snack so the question may not have been relevant to their eating habits at home. Again, more open questions could have been asked.

In the control group there were slight increases in confidence to pick out ingredients for a pasta salad and favourite fruit and vegetables when shopping, asking for favourite fruit or vegetable at supper time. There was a slight decrease in the percentage who felt they could ask for favourite sweets. This may have been the children conforming to perceived expected behaviour patterns because they were being observed by researchers. The percentage of children who felt able to ask for pasta salad ingredients did not change, though levels were high at 81%.

Overall the findings from this section suggest that there was an increase in asking confidence related to vegetables and in particular pasta salad ingredients and this was associated with the session with the chef. The significant association between intervention and confidence relating to vegetables alone or as an ingredient may indicate that despite the dose being small, its focus on vegetables resulted in specific outcome: increased asking confidence in the home environment. This may signify transference of attitude that could translate into eating behaviour to the home environment.

Openness to trying new vegetables

The questions regarding fennel consumption were designed to measure children's openness to trying new foods following the intervention with the chef. Fennel was chosen because it is unlikely to be eaten by children regularly. Of the 11 who knew and had eaten it, 10 were from West London. The researcher thought that these children may have been from the Greek community who use fennel in cooking. Fennel was an arbitrary choice and other vegetables could have been included in this section.

It is worth noting though from the qualitative data, children reported wanting to have the opportunity to try more foods and also to try the dish they had made in class. Often at the end of the session, because of time restraints children will be given a portion to take home to try. As with younger children, research shows that children are more likely to try new foods if eaten with peers who are trying the food, allowing them to test or eat their food at the end of the session may increase openness to trying new food.

Also where children reported back on the tasting part of the session, they were given crisps and chocolate, in order to talk about salty and sweet foods. Feedback from the children showed that they were open to trying new foods and flavours. Crisps could be replaced with olives and chocolate with pineapple or some other fruit to introduce them to foods that may not usually be part of their diet.

Hand washing

Hygiene is a key part of CAAS. It was therefore unexpected to find that the sessions had no significant impact on hygiene habits. Pre intervention the control group had higher levels of hand washing behaviour.

Children who claimed to wash their hands after touching their face was low for both groups, and if anything indicates that they are telling the truth rather than giving the answer they think they should be giving.

When children were asked if they washed their hands after touching their face there was little change post intervention in the intervention group in those children who said they did this all the time, but the percentage of children who claimed to do this most of the time almost doubled from 15% to 28%. This question perhaps should have been asked differently, e.g. “do you avoid touching your face when preparing food”. Finally while there was a slight increase to 75% of children who claimed to wash their hands after visiting the toilet. There was also a slight increase in children claiming to never wash their hands after visiting the toilet (1% to 4%).

None of the changes relating to hand washing behaviour were statistically significant. In the sessions observed by our researcher, chefs talked about hand washing at the beginning of the session when children were directed to wash their hands. The importance of hygiene was also touched upon. The findings from the evaluation, suggest that perhaps more emphasis on hygiene is needed to change behaviour.

CAAS design

While the statistics outlined in this report indicate that a short term change in cooking confidence and consumption was achieved, whether this change will be sustained is unclear. Compared to the robust intervention studies included in the literature review this intervention is small scale and not part of a wider change in culture. The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) recommends (based on their systematic review findings) that any promotion of fruit and vegetables in schools needs to be based on a whole school approach. See Appendix 3 to this report. The whole school approach includes food provided at lunchtime and break times, parental involvement, cooking and taste testing as well as exposure and learning. The evaluated delivery of CAAS is a discrete programme not least because it includes one practical session. Some of the EPPI-Centre recommendations are incorporated within the CAAS sessions and schools often have the sessions delivered as part of a curriculum project. However, delivering CAAS as part of a comprehensive healthy eating promotion may result in longer term improvement in eating behaviour and cooking confidence.

At present, because there is little guidance for chefs on how to deliver health promotion messages, there is disparity in delivery. The emphasis on practical cooking and food preparation engages children. As

such health promotion messages could be incorporated into the practical aspects of the CAAS sessions, rather than being stand alone. EPPI-Centre research has found that current health messages are not relevant to children. As such CAAS can incorporate healthy eating messages within delivery by ensuring that all foods and dishes meet the school nutrition standards.

Conclusions

The practical cooking intervention dose of CAAS is small, so significant changes in cooking confidence, vegetable consumption and asking confidence indicates that even small scale interventions may have a short-term impact. Follow up would be necessary to assess whether such changes are sustained however. As based on findings from the literature review where cooking initiatives included between 6-10 practical cooking sessions and had little sustained impact, this would be unlikely.

It is obvious from the feedback from participants that they were engaged and eager to learn new cooking skills and taste new foods. Eleven percent of pupils who stated that the sessions did not make them want to cook more or that they did not like cooking. This is despite most of these pupils wanting more opportunities to practice new skills, taste new foods and have a visit from the chef again. This suggests that the large size of the group, combined with the small dose left the children somewhat frustrated. This may also be because one session is not enough for them to gain new skills, so there was little opportunity for them to work independently. On a positive note children responded positively to having the session delivered by a chef.

The interaction between a schools Free School Meal entitlement and the lower gain in cooking confidence requires further research.

It is impressive that the CAAS programme had significant impact on children's cooking confidence, eating behaviour and confidence to ask for foods at home. This evaluation is the first in the UK measuring these outcomes and can be built on for future cooking initiatives.

References

1. Liquori T, Koch PD, Contento IR, Castle J. The cookshop program: Outcome evaluation of a nutrition education program linking lunchroom food experiences with classroom cooking experiences. Journal of Nutrition Education 1998; 30 (2): 302-313.
2. de Sa J and Lock K (2007) School-based fruit and vegetable schemes: A review of the evidence;. LSHTM;
3. Perez Rodrigo C, Aranceta J. Nutrition education for schoolchildren living in low-income urban area in Spain. Journal of Nutrition Education 1997; 29 (5): 267-273

Appendix 1: Chefs Adopt a School

What Is It?

Chefs Adopt a School is the Academy of Culinary Arts' charitable long-term project which, through a 'hands-on' approach, focuses on developing an essential understanding of 'taste' and teaches children about the pleasures of eating, the provenance of ingredients and the processes by which raw materials are transformed into food. As well as providing a solid basis for learning life skills, it is hoped that this will encourage them to experiment for themselves.

Main Aims of Chefs Adopt a School

- To introduce children to 'real' food: how to taste and appreciate the joys of eating
- To advance the education of children and young persons in food, nutrition, hygiene, health and related subjects
- To develop their knowledge of food and food provenance, and understanding of the diversity of foods eaten by different people for cultural and medical reasons.

Chefs Adopt a School endorses the government's policy on healthy eating, by educating children and young persons in food, nutrition, hygiene, and health. Food and cooking should be included in the national curriculum for children from five years and upwards.

How it Works

Our special ingredient

The unique Chefs Adopt a School ingredient is the presence of a real chef who 'adopts the school' and delivers the sessions.

The Chefs are members of the Academy of Culinary Arts who are leading professionals in this country and the idea for this project came from them! They give their time voluntarily to teach because they want to pass on the passion that first brought them to the profession they love.

The Chefs Adopt a School programme does not rely on a kitchen - it's great if you have one, but an ordinary classroom is quite sufficient - you may well find that your chef is just as happy to run a session

in his or her own kitchen.

WE'LL MAKE THE INTRODUCTIONS AND WORK OUT THE STRUCTURE OF THE SESSIONS FOR YOU. THE CHILDREN WILL LOVE IT AND IT'S CERTAIN TO HELP THEM!

The chefs deliver a series of 2-3 annual sessions, devised by the Chefs Adopt a School committee, in the form of structured one hour workshops which integrate well with Key stages 1-4 of the National Schools Curriculum.

A preliminary meeting is recommended between teachers and academicians to establish:

- The outline of the programme, which can be adapted according to the children's age and their current school work.
- Where the sessions will be held.
- What preparation is necessary prior to the session.
- How much the children will participate or be involved.
- How parents can be involved.

Children are encouraged to write about their experience and send their notes and pictures (where possible) to the Academy.

The ideal age group is 5-11, in numbers of no more than 20 – larger groups require extra supervisory help. We are, however, open to all age groups.

Typical Sessions

1st Session

The first session will cover the following:

- Who we are.
- The role of the chef and his responsibilities.
- The importance of hygiene and safety.
- Why we need food.
- Where food comes from.
- An introduction to the five senses and the four principal tastes.
- A diagram of the tongue indicating bitter, sour, salt and sweet taste buds.
- Ideas for identifying these taste areas using different coloured jellies.

2nd Session

The second session will involve the children identifying fresh ingredients and using them to make a simple healthy dish in class. This session generally covers:

- A reminder of what was taught in the first session to refresh their memories on the five senses, the four tastes and the anatomy of taste, e.g. where you taste what on the tongue.
- A discussion of the ingredients the chef has brought, e.g. origins, shapes, smells and tastes as well as the kind of dishes it would be possible to make with the ingredients.
- Cooking and tasting of the dish.
- Examples of these dishes could be:
    - Fresh tomato and basil soup Vs. tinned tomato soup.
    - Pizza with 6 fresh herbs previously identified by the children.
    - Open apple tarts made with different varieties of British apples previously identified by the class.

3rd Session

A return visit to the chef's establishment is suggested. It is recommended that the practical content of this session is decided upon between the chef and the teacher prior to the day.

The typical visit to a chef's establishment could include:

- A tour of the kitchens.
- A further introduction to fresh, seasonal ingredients with a display of fresh meat, fish, vegetables and herbs.
- Practical uses of these ingredients within a simple cookery lesson. If it is possible the children may also be able to prepare something to eat as part of their lunch or to take home to their parents.

Appendix 2: Chefs Adopt a School evaluation questionnaire

Appendix 3: Evidence for Policy and Practice information and co-ordinating centre (EPPI-Centre) Health promotion in schools guidance

The following guidance is based on recommendations for promoting fruit and vegetables put forward by the EPPI-Centre in their report on children and healthy eating. The report was a comprehensive review on barriers and facilitators of healthy eating promotions to children. The guidance is based on their research findings and can be applied to any health promotion in the school environment, including food preparation and cooking:

For school based health promotion of fruit and vegetables to translate into increases in consumption they need to include: active learning about fruit and vegetables using, cooking and taste testing; access to fruits and vegetables at lunchtime and break times and parental involvement in the promotion of fruit and vegetables. This approach creates an environment that promotes the consumption of fruit and vegetables.

Health promotions that focus on fruit and vegetables as the central message work best. Reviewers found that where the key message about fruit and vegetable consumption were diluted, the intervention had less an impact.

Including children's views and experience as the basis for an intervention can have a result in a bigger effect. Consulting with children on their needs and their perceptions of the subject matter is imperative. For instance with fruit and vegetable promotions, children were actively put off by any mention of the word "healthy".

The EPPI research found that be current health messages are not relevant to children because they have no basis in their experience. Future health promotion initiatives in schools should therefore work with children to develop health messages that are appropriate for children, and which engage them to effect behaviour and attitude.

Consultation with children and parents should be part of any health promotion in schools. As well as being ethical, this ensures the intervention is effective in understanding and meeting their needs, as well as being more effective generally through engagement of participants.

Furthermore future evaluations need to include parents and children as stakeholders in the planning evaluation of interventions. This will be beneficial to determining relevant data collection methods, tools

and subjects and in determining the outcomes that need to be measured.

Interventions that promote fruit and vegetables separately or in different ways work better because children have different attitudes to fruit and vegetables.

Intensive interventions aimed at parents who are motivated to change their behaviour can also increase children's consumption of fruit and vegetables considerably.

With teachers time already stretched, interventions that demand little time commitment from them work best. Teachers are happy to accept additional classroom support particularly when teaching unfamiliar subjects and also to spread the workload of delivering health promotion sessions.

To reduce inequalities, school health promotion interventions need to be specifically targeted at children from lower socio-economic backgrounds.

Appendix 4: Examples of good practice from Rapid Systematic Literature Review

Figure 34: Good practice for school-based cooking interventions

1. Education on the value of whole foods and where food comes from, in addition to nutrition, food preparation and food safety
2. Include new foods introduced in the cooking sessions in the school lunches
3. Ensure that recipes are suitable and children have access to the ingredients and equipment needed to prepare the recipes at home
4. Involve parents – newsletters, meetings, as potential cooking instructors or facilitators
5. Smaller groups for cooking sessions to enable all children to actively participate
6. Using school kitchens and lunchrooms for cooking sessions and involving cooking personnel
7. Opportunity for children to sit down together (with staff) and eat the meal they prepared