Food Dudes Evaluation 2016

REPORT

With the financial support of the European Union

Bord Bia Irish Food Board

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

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Executive Summary

In Ireland the EU School Fruit and Vegetables Scheme is implemented in national schools through the Food Dudes Healthy Eating Programme. This programme is an evidence-based incentivised behaviour changing programme which was developed by the Food and Activity Research Unit, Bangor University, Wales. It is managed by Bord Bía, the Irish Food Board, and was first rolled out in Ireland in 2005. It is funded by the Department of Agriculture Food and the Marine Ireland and receives an EU financial contribution under the EU Fruit and Vegetables Scheme.

The Food Dudes Healthy Eating Programme (FDHEP), aims to increase fruit and vegetable consumption amongst primary school children through the provision and repeated tasting of fruit and vegetables over a 16-day intervention period with the support of accompanying measures in the form of role models (Food Dudes Heroes) and small rewards, followed by a home phase where fruit and vegetables are supplied from home. The original Food Dudes Programme was completed in 2014 having reached 95% of all primary schools in Ireland.

The **Food Dudes Boost** Programme was introduced at the beginning of 2015. It aims to retain all the benefits of the original programme but has a stronger focus on the Junior Cycle (junior infants to second class) which involves a 16-day tasting intervention period while the Senior Cycle students (third to sixth class) participate in an 8-day tasting intervention period.

The short-term impact of the Food Dudes intervention has been evaluated in Ireland on several occasions; however the long-term impact of the intervention has not been reported.

In light of this, Bord Bía, on behalf of the department of Agriculture, Food and the Marine, commissioned University College Dublin (UCD) to carry out:

1. A long-term evaluation of the FDHEP intervention conducted in 2010-2011 (Study A)
2. An evaluation of the **Food Dudes Boost** Programme in senior classes conducted in February and March 2016 (Study B).

3. An evaluation of the **Food Dudes Boost** Programme in junior classes conducted in September & October 2016 (Study C).

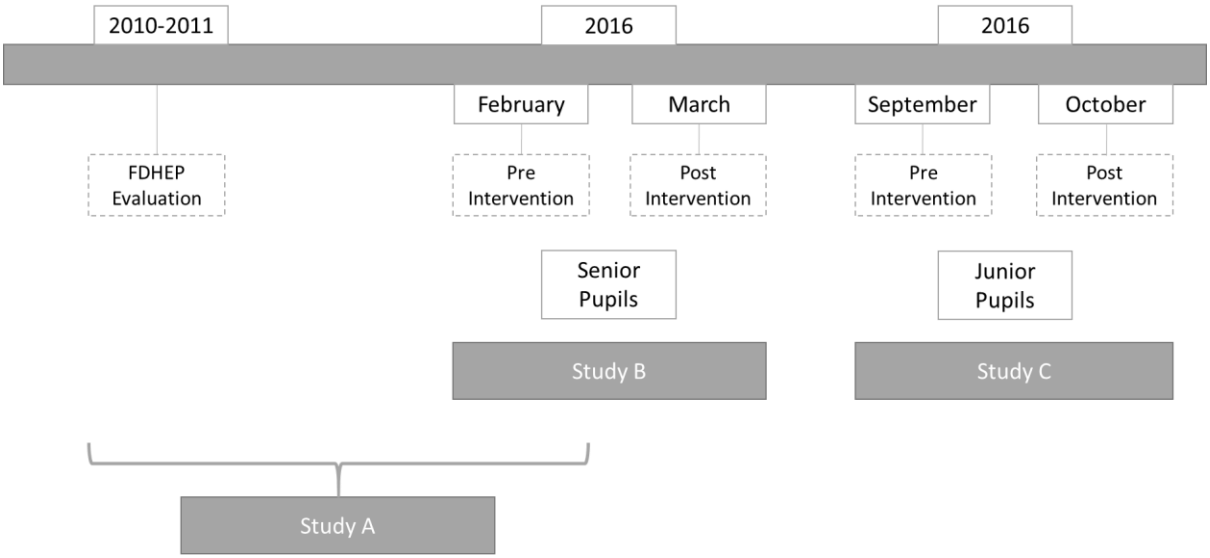

Figure 1. An overview of the three studies. Study A and B consisted of 13 schools and Study C consisted of 31 schools.

The methods used to record lunchbox contents are detailed below:

The **Food Dudes Quick Eating Diary (FDQED)** was developed specifically for the evaluation in 2010-2011 by Dr Mihela Erjavec and Professor Fergus Lowe of Bangor University, Wales (2). The Diary was used in the three studies A, B and C to ensure consistency and comparability with the data collected in 2010-2011. It was completed by class teachers to record class provision and consumption of fruit, vegetables and snacks both pre and post intervention. The FDQED records how many pupils in each class brought one or more portions of fruit, vegetables and snacks into school, and how many pupils consumed one or more portions that day.

Since the FDQED is used to report a summary measure of class intake, a detailed record method was also used to provide a more accurate report of the portions of fruit, vegetables and snacks for individual children's lunches. **Lunchbox record forms** were used by researchers in Study B and C to record the estimated portions and portion sizes of fruit, vegetables, and snacks provided in children's lunchboxes, as well as the portions leftover by children during the school lunch breaks. The results, which are described in the main report, show similar trends using both methods for Study B and C.

Key Findings

Study A: The long-term evaluation of the FDHEP intervention conducted in 2010-2011 vs. 2016

Figure 2 shows the percentage of pupils who brought one or more portions of fruit, vegetables and snacks to school before the intervention in 2010-11 (T1), after the intervention in 2010-11 (T2), at follow-up in 2016, 6 years after the original intervention (T3), and after the Food Dudes Boost intervention (consisting of eight tasting days), in 2016 (T4). The results were obtained from the FDQED.

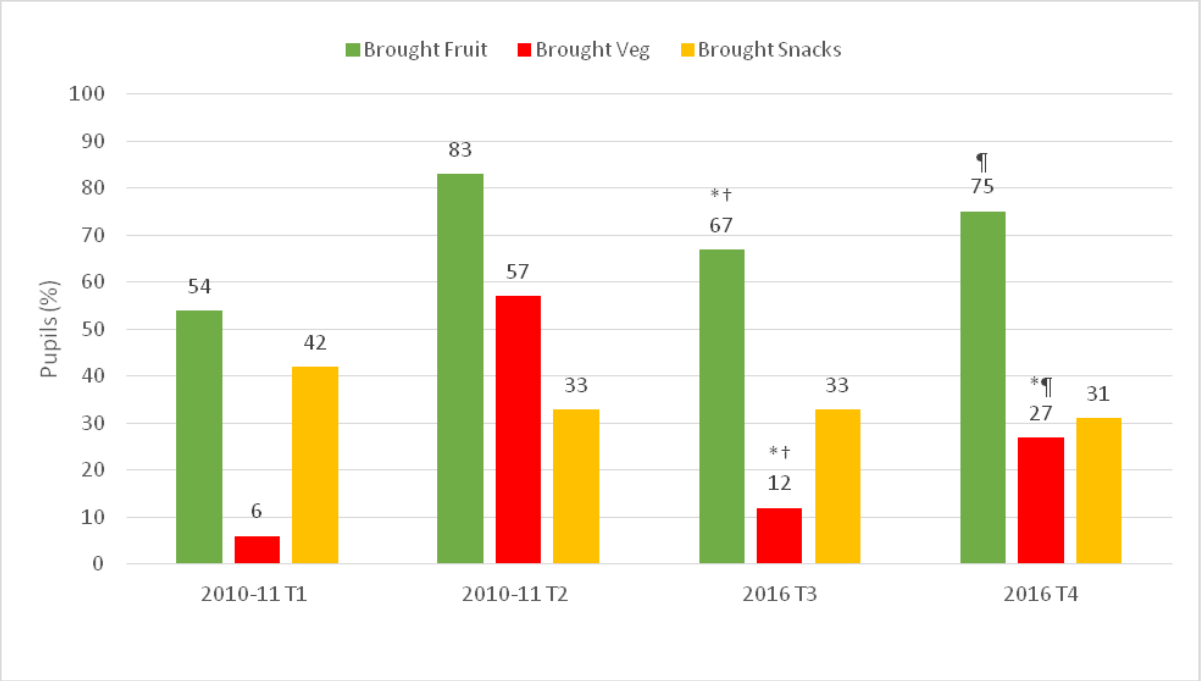

*Figure 2. Percentage (%) of pupils who brought one or more portions of fruit, vegetables and snacks to school. * denotes a significant difference from 2010-11 T2 value, † denotes a significant difference from 2010-11 T1 value, ¶ denotes a significant difference from 2016 T3 value - statistical significance was accepted at <0.05*

The key findings are as follows:

- Prior to any intervention in 2010-11 (T1), 54% of pupils brought one or more portions of fruit to school. Following the FDHEP intervention in 2010-11 (T2), the percentage increased to 83%. In 2016, 6 years after the original intervention (T3), the percentage had decreased to 67%, however remained higher than the original baseline in 2010-11 (T1). Following the Food Dudes Boost intervention (T4), the percentage increased further to 75%.

- For vegetables, a more significant result was observed. Prior to any intervention in 2010-11 (T1), only 6% of pupils brought one or more portions of vegetables to school. This increased to 57% following the FDHEP intervention in 2010-11 (T2). In 2016, 6 years after the original intervention (T3), the percentage had decreased to 12%, however remained higher than the original baseline in 2010-11 (T1). Following the Food Dudes Boost intervention (T4) the percentage increased to 27%.
- No significant difference was noted for snack provision over time.

Figure 3 shows the percentage of pupils who consumed one or more portions of fruit, vegetables and snacks in school before the intervention in 2010-11 (T1), after the intervention in 2010-11 (T2), at follow-up in 2016, 6 years after the original intervention (T3), and after the Food Dudes Boost intervention in 2016 (T4). The results were also obtained from the FDQED.

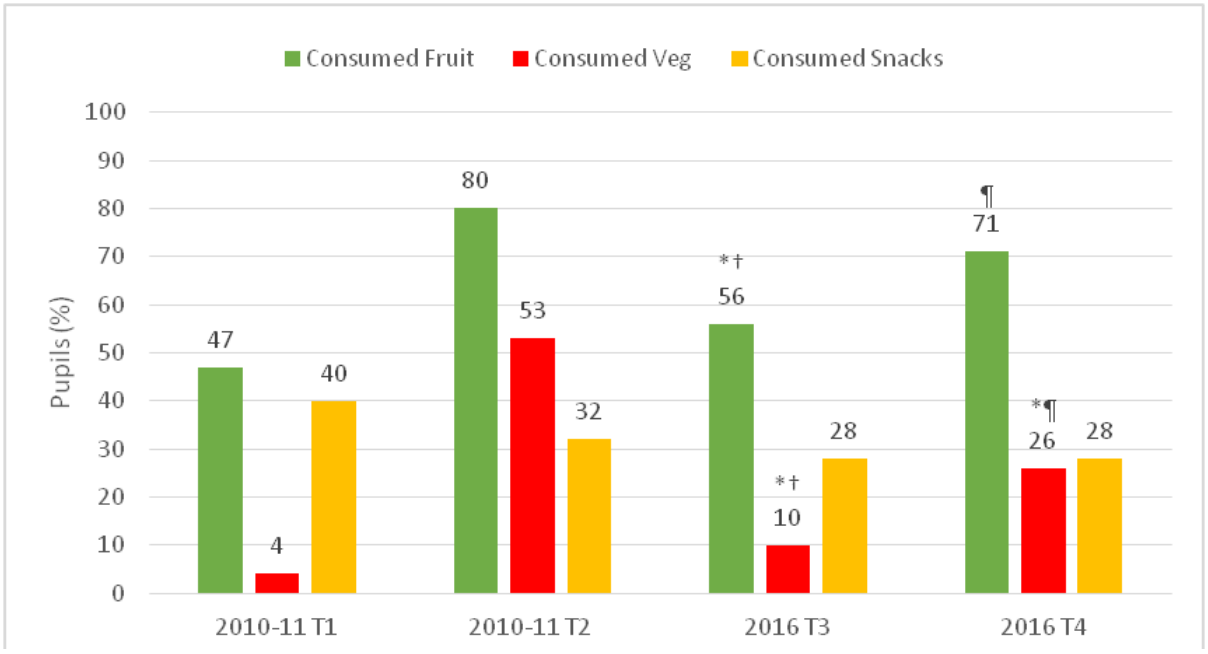

*Figure 3. Percentage (%) of pupils who consumed one or more portions of fruit, vegetables and snacks at school. * denotes a significant difference from 2010-11 T2 value, † denotes a significant difference from 2010-11 T1 value, ¶ denotes a significant difference from 2016 T3 value - statistical significance was accepted at <0.05.*

The key findings are as follows:

- Prior to any intervention in 2010-11 (T1), 47% of pupils consumed one or more portions of fruit in school. Following the FDHEP intervention in 2010-11 (T2), the

percentage increased to 80%. In 2016, 6 years after the original intervention (T3), the percentage had decreased to 56%, remaining higher than the original baseline in 2010-11 (T1). Following the Food Dudes Boost intervention (T4), the percentage increased to 71%.

- For vegetables, a larger impact was observed. Prior to any intervention in 2010-11 (T1), only 4% of pupils consumed one or more portions of vegetables in school. This increased to 53% following the FDHEP intervention in 2010-11 (T2). In 2016, 6 years after the original intervention (T3), the percentage had decreased to 10%, remaining higher than the original baseline in 2010-11 (T1). Following the Food Dudes Boost intervention (T4) the percentage increased to 26%.
- No significant difference was noted for snack consumption over time.

Study B: The short-term evaluation of the FHDEP intervention in senior cycle pupils (2016)

Figure 4 shows the percentage of senior pupils (third to sixth class) who brought and consumed one or more portions of fruit, vegetables and snacks in school. Results were obtained from the FDQED.

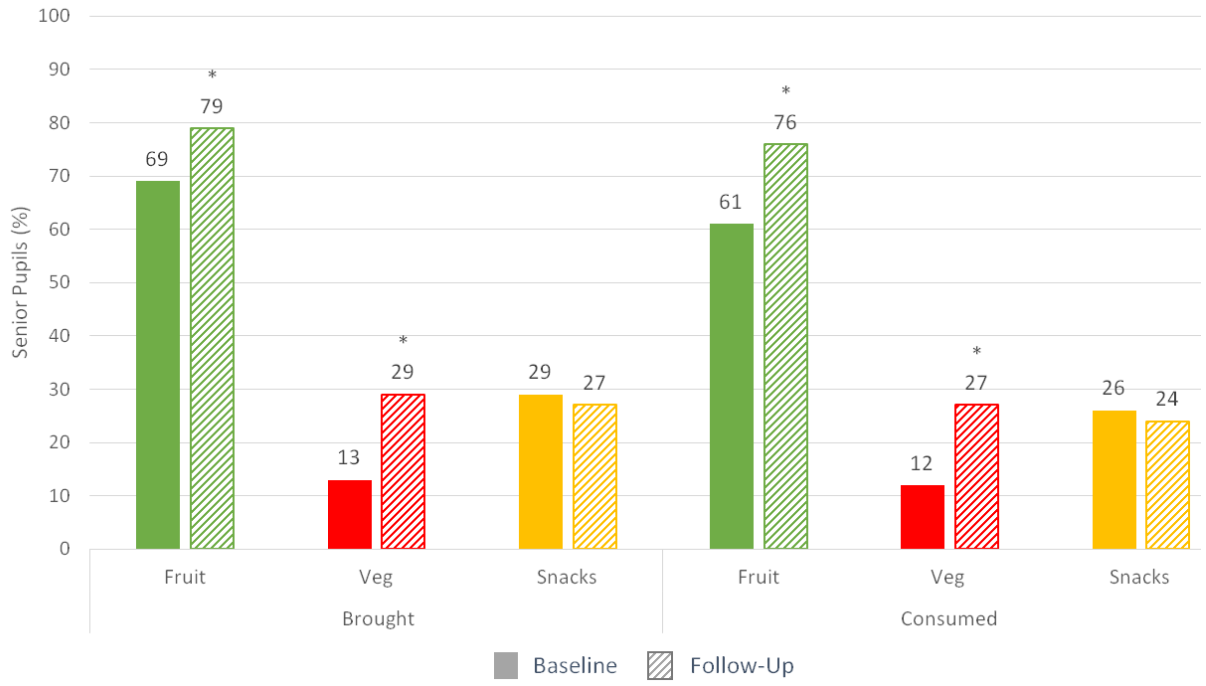

*Figure 4. Percentage of senior pupils (%) who brought and consumed one or more portions of fruit, vegetables and snacks at before and after the FHDEP boost intervention. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

The key findings are as follows:

- Prior to the intervention, 69% of senior pupils brought one or more portions of fruit to school, this increased to 79% following the FDHEP boost intervention. In terms of consumption, at baseline 61% of senior pupils consumed one or more portions of fruit at school, increasing to 76% following the intervention.
- For vegetables, prior to the intervention, only 13% of senior pupils brought one or more portions to school, with this increasing to 29% following the intervention. In terms of consumption, only 12% of senior pupils consumed one or more portions of vegetables at baseline, which increased to 27% following the intervention.
- No significant difference was noted for snack provision or consumption following the intervention.

Study C: The short-term evaluation of the FDHEP intervention in junior cycle pupils (2016)

Figure 5 shows the percentage of junior pupils (junior infants to second class) who brought and consumed one or more portions of fruit, vegetables and snacks in school. Results were obtained from the FDQED.

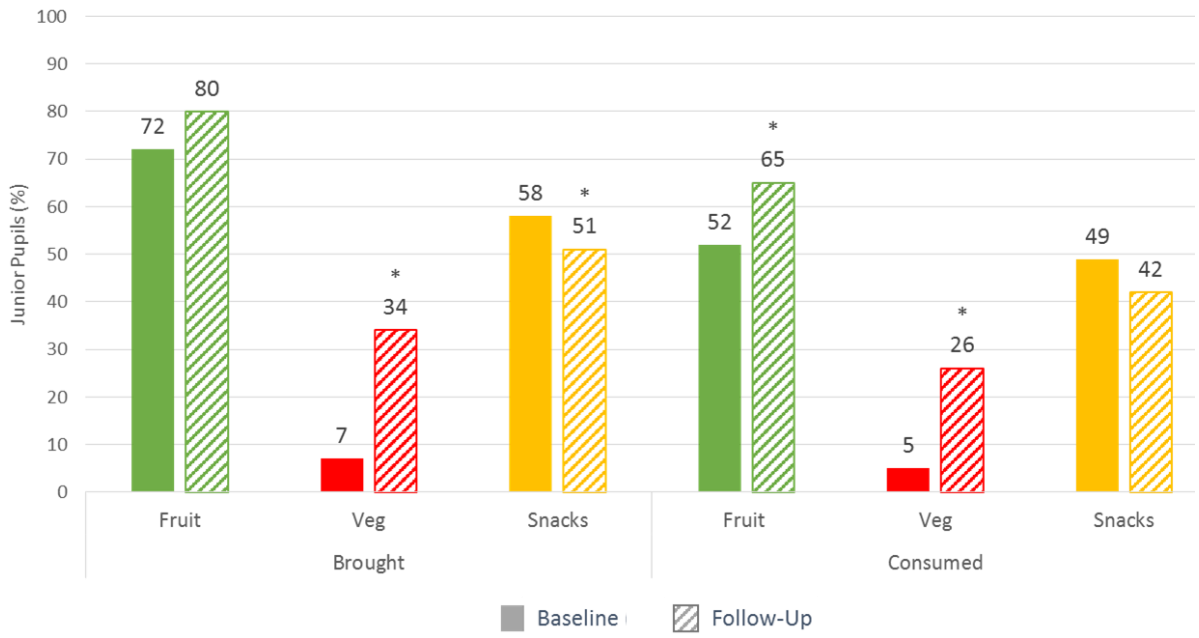

*Figure 5. Percentage of junior pupils (%) who brought and consumed one or more portions of fruit, vegetables and snacks at before and after the FHDEP boost intervention. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

The key findings are as follows:

- Prior to the intervention, 72% of junior pupils brought one or more portions of fruit to school, this increased to 80% following the FDHEP boost intervention. In terms of consumption, at baseline 52% of junior pupils consumed one or more portions of fruit at school, increasing to 65% following the intervention.
- For vegetables, prior to the intervention, only 7% of junior pupils brought one or more portions to school, with this increasing to 34% following the intervention. In terms of consumption, only 5% of junior pupils consumed one or more portions of vegetables at baseline, which increased to 26% following the intervention.
- At baseline 58% of junior pupils brought one or more portions of snacks to school, decreasing to 51% following the intervention. No significant difference was noted for snack consumption following the intervention.

Conclusion

The Food Dudes intervention has a positive short- and long-term impact on the behaviours of primary school aged children. In the short-term, following the programme increases in the proportions of pupils bringing and consuming fruit and vegetables at school are seen, which is in line with previous studies (1, 2). As is evident from the results, the intervention appears to be particularly effective in younger children, with enhanced improvements seen, most notably for the proportion of junior pupils bringing and consuming vegetables at school increasing by more than four-fold following the intervention.

The present study also indicates that the intervention improves long-term behavioural outcomes in terms of fruit and vegetable provision and consumption in school when compared to the absence of an intervention. Although, the immediate post-intervention (T2) impact of the initial Food Dudes intervention was not sustained to the same degree over a six year period, the proportion of senior pupils bringing and consuming fruit and vegetables six years after the initial Food Dudes intervention (T3), remained significantly higher than in 2010-11, prior to having ever received the intervention (T1).

1. Introduction

1.1 Background

The EU School Fruit and Vegetables Scheme is implemented in Ireland through the Food Dudes Healthy Eating Programme (FDHEP). This programme is an evidence-based incentivised behaviour changing programme which was developed by the Food and Activity Research Unit, Bangor University, Wales. It is managed by Bord Bía, the Irish Food Board, and was first rolled out in Ireland in 2005. It is funded by the Department of Agriculture Food and the Marine Ireland (DAFM) and an EU financial contribution has been received under the EU School Fruit and Vegetables Scheme since 2009 (Commission EU Regulation 288 of 2009). The Food Dudes Programme aims to increase sustained fruit and vegetable consumption amongst primary school children through the provision and repeated tasting of fruit and vegetables over a 16 day intervention period with the support of accompanying measures in the form of role models (Food Dudes Heroes) and small rewards (followed by a home phase where fruit and vegetables are supplied from home). The original Food Dudes Programme was completed in 2014 having reached 477,423 school children and 3127 schools (95% of all primary schools in Ireland).

The Food Dudes Boost Programme was introduced at the beginning of 2015. It aims to retain all the benefits of the original programme but has a stronger focus on the Junior Cycle (junior infants to second class) which involves a 16-day tasting intervention period while the Senior Cycle students (third to sixth class) participate in an-8 day tasting intervention period. The boost programme is only implemented in schools that have already participated in the programme.

The Food Dudes intervention has been evaluated in Ireland on several occasions. The initial pilot study was conducted by Horne et al. (2009) to establish whether the intervention was effective. They reported that, in the intervention schools the parental provision and children's consumption of fruit and vegetables increased following the 16 day intervention period, and at the 12 month follow-up, compared to the control school (1).

A more recent evaluation was conducted between 2010 and 2011 by O'Connor and McKenzie (2). The evaluation was based on a self-report instrument, the Food Dudes Quick Eating Diary (FDQED), which was administered at baseline before the intervention period and at follow up once the intervention programme was completed. Data collected using the FDQED comprised of lunchbox recordings pre and post lunch. The teachers provided both quantitative and qualitative data at a class level which described the general changes to children's lunch boxes (provision and consumption of fruit and vegetables) following the intervention.

Each evaluation has demonstrated that the intervention is effective in increasing the frequency of fruit and vegetables being brought to school in the short to medium term. However, the impact of the intervention on longer term behaviour has not been reported to date. Furthermore, while anecdotally teachers have reported that parents in general responded positively to the intervention, parents have not been asked to report on their experience of the Food Dudes Programme. In addition, recent studies have used mobile technology to audit the content of lunchboxes (3-5) which allows for improved detailed recording on the provision and consumption of foods during school hours, with greater precision.

In light of this, Bord Bía, on behalf of the department of Agriculture, Food and the Marine, commissioned University College Dublin (UCD) to carry out the following:

1. A long-term outcome evaluation of the FDHEP intervention conducted in 2010-2011 (Study A)
2. An impact evaluation of the FDHEP intervention in senior classes in Irish primary schools conducted in February & March 2016 (Study B).
3. An impact evaluation of the FDHEP intervention in junior classes in Irish primary schools conducted in September & October 2016 (Study C).

This report will establish whether the FDHEP can impact the consumption of Fruit, Vegetables and Snacks (F, V & S) in the short and long term.

1.2 Aims and Objectives

1.2.1 Study A: A long-term follow up study of schools evaluated in 2010-11

The aim of this study was to assess the outcome of the FDHEP intervention six years after the intervention was introduced to children in the junior cycle.

The objectives were to:

- Identify and obtain the original data collected in 2010-2011.
- Report on child recall of the FDHEP intervention carried out in 2010-2011.
- Identify whether recall of the FDHEP intervention from 2010-2011 was associated with Fruit & Vegetable provision and consumption when children were in senior classes in 2016.

1.2.2 Study B: Short-term impact on Senior Pupils

The aim of this study was to establish whether the FDHEP intervention was effective in changing provision and consumption of fruit and vegetables by **senior pupils** during school lunchtime.

The objectives were to:

- Estimate the amount of Fruit, Vegetables & Snacks (F, V &S) provided in school lunch boxes pre and post FDHEP intervention.
- Estimate the amount of F, V & S consumed during school lunchtime pre and post FDHEP intervention.
- Validate the FDQED used by class teachers.
- Report on Teachers' experience of the FDHEP
- Report on Parents' experience of the FDHEP

1.2.3 Study C: Short-term impact on Junior Pupils

The aim of this study is to establish whether the FDHEP intervention was effective in changing provision and consumption of fruit and vegetables by **junior pupils** during school lunchtime.

The objectives were to:

- Estimate the amount of F, V & S provided in school lunch boxes pre and post FDHEP intervention.
- Estimate the amount of F, V & S consumed during school lunchtime pre and post FDHEP intervention.
- Validate the FDQED used by class teachers.
- Report on Teachers' experience of the FDHEP
- Report on Parents' experience of the FDHEP

2. Study Approach

The overall aim of the three studies was to conduct an evaluation of the Food Dudes Healthy Eating Programme intervention. The intervention itself was delivered by Real Nation under the direction of Bord Bía. Therefore, for the purpose of this report, the components of the intervention itself will not be described in detail, as a more comprehensive description of the intervention can be found elsewhere (1). In summary, the programme consisted of a 16-day intervention for junior pupils and an 8-day intervention for senior pupils, during which schools had fresh fruit and vegetables delivered to school daily by an independent company. Each day of the intervention pupils had the opportunity of eating a portion of fruit and a portion of vegetables. To encourage tasting, pupils were rewarded with small prizes and certificates as well as being shown DVD episodes of the Food Dudes Heroes enjoying fruit and vegetables. Below describes the design of the studies used to evaluate the FDHEP.

2.1 Evaluation Study Design

This report covers three studies that were used to evaluate the FDHEP. An overview of the three studies can be seen in Figure 6.

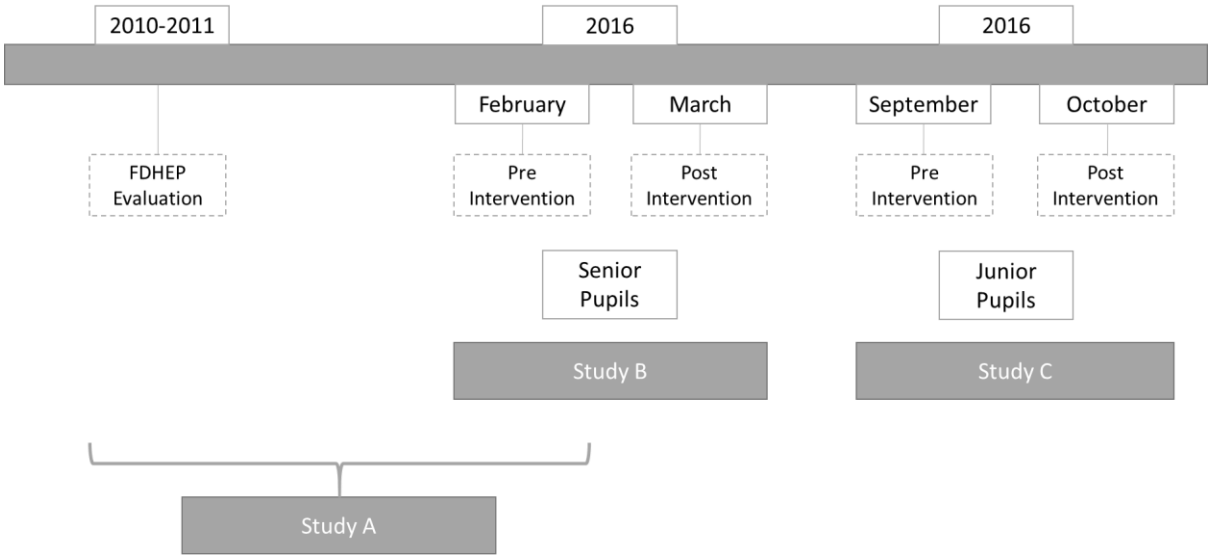

Figure 6. An overview of the three study designs used to evaluate the FDHEP intervention as detailed in this report.

2.1.1 Study A

This was a follow-up study to evaluate the long term outcome of the FDHEP intervention which took place in schools between 2010 and 2011. Children exposed to the intervention at that time were in the junior classes (junior and senior infants) of primary school and at the time of the follow-up evaluation conducted between February and March 2016, had progressed to the senior cycle classes (fifth and sixth class).

2.1.2 Study B

Study B evaluated the impact of the FDHEP intervention on F, V & S provision and consumption of senior pupils (third – sixth class). Baseline data was collected in February 2016 prior to the FDHEP intervention taking place in the school, and post intervention follow-up data was collected in March once the FDHEP intervention was

completed. Of the consenting schools, only senior classes were invited to take part in the evaluation. Schools selected for Study B, had previously taken part in the FDHEP in 2010-11.

Consent

Parent information letters and parental consent forms were sent out to participating schools in advance of the baseline visit, for teachers to distribute to pupils in the senior classes. The information letters provided parents with the details of Studies A & B and what would be required of the children.

Baseline Visit

A researcher from UCD met with class teachers of senior classes prior to class starting to discuss the activities for the day. Teachers were provided with Pupil Information sheets (Appendix 1), red and green stickers, Child Nutrition Surveys (Appendix 2) and an FDQED (Appendix 3) before class started. Pupil Information sheets and Child Nutrition Surveys were handed out by the teacher to all pupils in the class, allowing them to read through the materials and understand what would be involved in taking part in the evaluation study, and voluntarily complete the anonymous survey. Once the information sheets were read, pupils had the option to put a red or green sticker on their lunchbox, indicating whether or not they wished to take part (green indicating they wished to take part, and red indicating that they did not want to take part). Pupils were advised to fold up their parental consent letters and put them into their lunchboxes. Whilst distributing the stickers, the teacher took note of pupils' lunchbox contents and completed the FDQED. Following this, the teacher used a box provided by the researcher to collect all the lunchboxes of assenting pupils, and place them outside the classroom for the researcher to collect.

The researcher took the lunchboxes to a separate room/area where there were no children as agreed with the Principal, to collect the parental consent forms and record the amount of F, V & S brought to school in the children's lunchboxes. If both parental consent and pupil assent were provided the lunchbox contents were recorded on the Lunchbox Record Sheet (see Appendix 6), and a photograph of the lunchbox was taken on a mobile phone (Huawei Ascend Y330, China). Once all lunchboxes had been recorded and photographed, they were put back into the box and left outside the classroom before the class' first break.

After the lunchbreak, the class teacher checked the contents of all lunchboxes and filled out the second part of the FDQED. The teacher then re-collected the assenting pupils' lunchboxes and put them into the box outside the classroom for the researcher to collect. The researcher followed the same protocol as detailed before to record the amount of F, V & S left over in the lunchboxes and took a photograph using the mobile phone. The lunchboxes were returned to the class teacher and the completed FDQED and Child Nutrition Surveys were collected by the researcher. Prior to leaving, the researcher confirmed the date for the follow-up visit after the FDHEP intervention to ensure it was suitable.

Follow Up Visit

Following completion of the FDHEP intervention, the researcher returned to collect follow-up data. On the morning of the visit, the researcher provided the class teacher with a list of names from whom parental consent had been obtained, thereby identifying the pupils the teacher required to provide either a green or red sticker to for assent. The FDQED as well as a Teacher Questionnaire (Appendix 4) were also given to the teacher. As per the protocol for the baseline visit, the teacher completed the FDQED prior to

placing the lunchboxes of the assenting pupils into the box outside the classroom. The researcher followed the same protocol for recording the lunchboxes as described above for the baseline visit, ensuring lunchboxes were returned to the class room in time for the class' first break and recording them again following their lunchbreak. Once all lunchboxes were returned to the teacher, the researcher collected the completed FDQED and Teacher Questionnaire, thanked the teacher and Principal for their participation and left.

2.1.3 Study C

This study adopted the same protocols as used in Study B in order to evaluate the FDHEP intervention in junior pupils. Baseline data was collected in September 2016, prior to the FDHEP intervention taking place, with follow up data collection taking place once the FDHEP intervention was completed, in October 2016.

Consent

Study C had a greater lead in time and therefore, rather than delivering consent forms directly to each school, the forms were distributed to the Food Dudes Coordinators of each school by a UCD researcher whilst attending a Food Dudes Training in-service organised by Real Nation. All but two schools taking part were able to attend, and for those schools parent information letters and consent were successfully posted from UCD to the school via registered post.

Baseline Visit

Study C followed the same protocol for the baseline visit used in Study B, except for the Child Nutrition Survey. As this study focused on junior pupils it was their first time

experiencing the FDHEP and therefore the Child Nutrition Survey was not included in the methodology.

Follow Up Visit

The protocol used for the follow up visit in Study C was the same used in Study B.

2.2 Sampling

The delivery of the FDHEP is managed by Real Nation on behalf of Bord Bía. The roll out of the intervention is managed by dividing schools into a series of Blocks based on their resources and logistical capacity in different regions. The UCD Research Team obtained two lists of schools from Real Nation, namely Block 9 (n=35) and Block 12 (n=100) of the FDHEP roll-out. Block 9 consisted of 35 schools, which had participated in the FDHEP in 2010-11. Due to logistical reasons, only 19 of these schools were chosen to be contacted by Real Nation on behalf of UCD, and asked if they wished to participate in Study A/B FDHEP evaluation. Of the 19 schools chosen, 13 schools were fully available to participate in the evaluation (Appendix 7). Based on school size and geographic location, out of 100 schools in Block 12, only 45 were chosen to be contacted by Real Nation on behalf of UCD and invited to participate in the FDHEP evaluation for Study C. Of the 45 schools chosen for evaluation, 31 were fully available to participate. Figure 8 provides an overview of how schools were selected for participation in both studies.

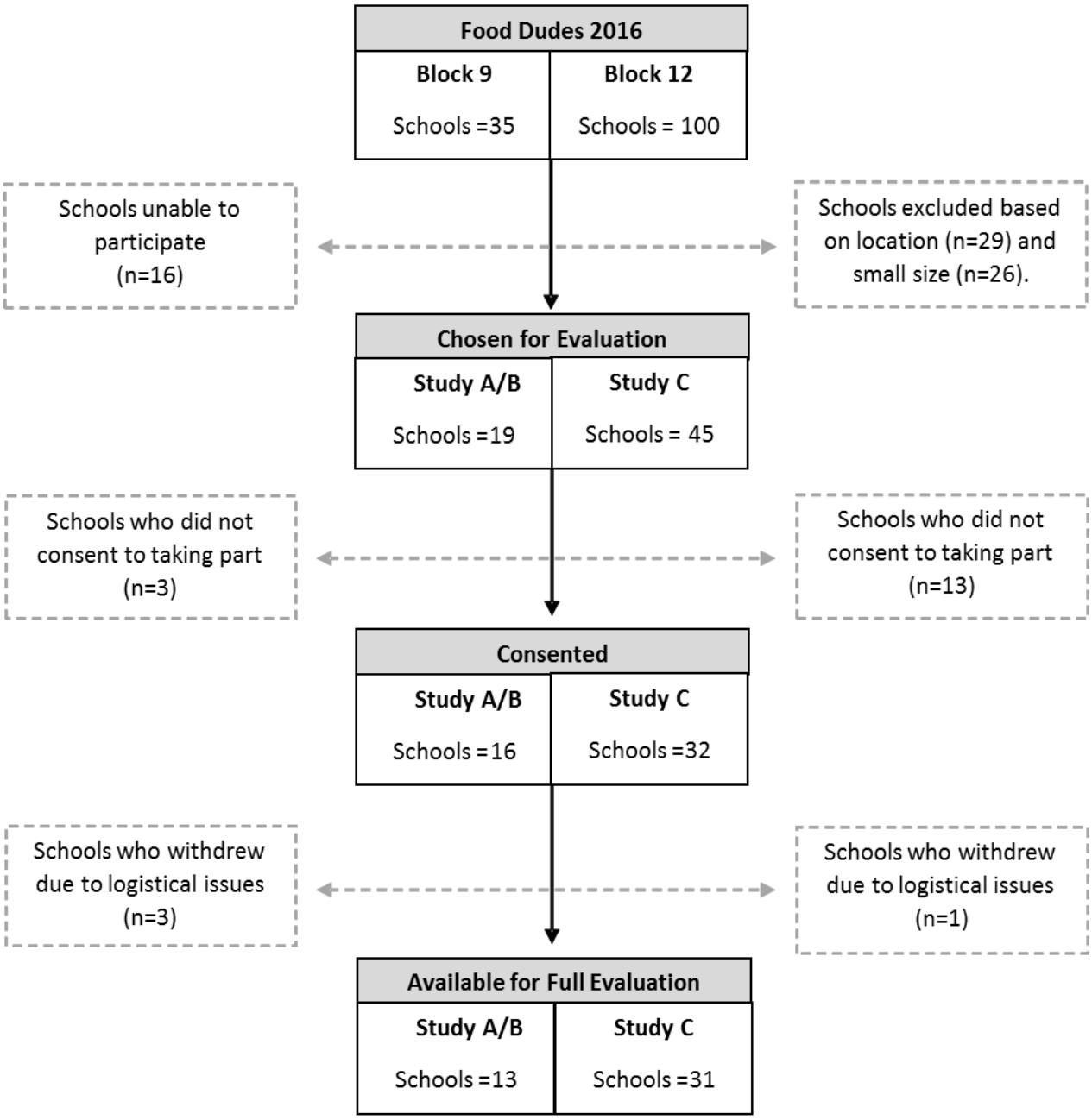

Figure 7. Overview of schools selected from Block 9 and Block 12 of FDHEP to take part in Study B and Study C evaluation of the FDHEP.

2.3 School Type

Of the 64 schools from Block 9 and Block 12 invited to participate in the evaluation studies, 57 were classified as ordinary mainstream primary schools and 7 were classified as DEIS schools. For the schools that fully took part in the evaluation studies, 39 were classified as ordinary main stream primary schools and 5 were classified as DEIS schools. Table 1 provides an overview of the breakdown of school types in Study A/B and Study C.

Table 1. Type of schools from Block 9 and Block 12 invited to participate in Study A/B and Study C of the Food Dudes Healthy Eating Programme Evaluation Studies.

	Block 9 for Study A/B		**Block 12 for Study C**	
	Total n=35		Total n=100	
	Selected Schools (n=19)	**Evaluated (n=13)**	**Selected schools (n=45)**	**Evaluated (n=31)**
Ordinary Main Stream	18	12	39	27
DEIS	1	1	6	4

2.4 School Size

The size of the schools in Study A/B and Study C varied between small (≤50 pupils enrolled), medium (51-200 pupils enrolled) and large (≥ 201 pupils enrolled), with the majority (n=12) falling into the medium category (Table 2). The distribution of school size between Study B and Study C of evaluated schools is outlined in Table 2.

Table 2. Size of Study B and Study C schools that took part in evaluation of the Food Dudes Healthy Eating Programme.

	Small Schools (≤50 pupils enrolled)	**Medium Schools (51-200 pupils enrolled)**	**Large Schools (≥201 pupils enrolled)**
Study A/B School Size (n=13)	1	8	4
Study C School Size (n=31)	0	26	5

2.5 School Region

Study A/B schools were distributed across the following three regions – Mayo/Sligo, Westmeath and Wicklow (Table 3). Study C schools were distributed across the following four regions – Cavan, Galway, Louth and Tipperary (Table 4).

Table 3. Region of Study B schools invited to participate in the Food Dudes Healthy Eating Programme Evaluation.

Region	**No. of Schools per Region**	
	Study A/B Schools	Evaluated Schools
Mayo/Sligo	6	6
Westmeath	6	3
Wicklow	7	4
Total	**19**	**13**

Table 4. Region of Study C schools invited to participate in the Food Dudes Healthy Eating Programme Evaluation.

Region	**No. of Schools per Region**	
	Study C Schools	Evaluated Schools
Cavan	7	5
Galway	10	6
Louth	11	9
Tipperary	17	11
Total	**45**	**31**

3. Methods

3.1 Ethical Considerations

Before commencing this evaluation, ethical approval was obtained on 22/02/2016 from the Human Research Ethics Committee in UCD (ref: LS-16-11-Murrin).

Informed consent was obtained on three separate levels: at school, parent and child level. Prior to data collection, verbal consent was obtained over the phone from the school Principal. Following this, a consent form and letter was sent home to parents explaining the objectives of the evaluation and an invitation to participate in a parent feedback questionnaire. On the day of the evaluation, pupils were given a child information sheet and assent was obtained as pupils were provided with stickers to place on their lunchboxes to signify whether they wished to participate in the evaluation. Only lunchboxes with consent from parents and assent from pupils were measured by the researchers.

3.2 Training

In total, 15 qualified nutritionists were recruited as researchers to carry out the fieldwork; 5 for Study A/B and 10 for Study C. All researchers were trained in advance of the data collection. Training involved a review of the background and aims of the evaluation, explanation of the protocol, a walk-through of an evaluation day, standardised measurement of foods and photographic guidelines.

3.3 Lunchbox Measurements

The methods used to record lunchbox contents are detailed below:

1. **Food Dudes Quick Eating Diary (FDQED) (Study A, B & C)** which was developed specifically for the evaluation of the FDHEP in 2010-11 by Dr Mihela Erjavec and Professor Fergus Lowe of Bangor University, Wales (2), was used in Study A, B and C to ensure consistency and comparability with data originally collected in 2010-11. It was completed by class teachers to record class provision and consumption of F, V & S both pre and post the FDHEP intervention. The FDQED records how many pupils in each class brought one or more portions of F, V & S into school, and how many pupils consumed one or more portions of F, V & S that day. It is important to note that the FDQED cannot distinguish between the number of portions of F, V & S individual children bring and consume in school (i.e. one child who brings in three pieces of fruit, is counted as one on the FDQED as it is one pupil, similarly one child who brings in one piece of fruit is counted as one on the FDQED). Teachers were given verbal instructions on how to fill it out by the researcher on the day of an evaluation visit, likewise instructions were also on the FDQED form handed to teachers (Appendix 3).

2. **Lunchbox Record Forms (Study B & Study C)** were used by researchers to record estimated portion sizes of F, V & S provided in children's lunchboxes to eat at school, as well as the estimated portion sizes of F, V & S leftover by children.

Originally it was intended to use measurements recorded from the lunchbox record forms by the researcher to validate measurements recorded by the teacher using the FDQED for the same pupils. However, this was not possible as the teacher measured the full class as part of the intervention while the researcher was restricted to measuring only those consented to the evaluation, and given that the lunchboxes were not

identifiable, it was not possible to separate the non-consented lunchboxes from the teachers' measurement record.

3. **Digital Photographs (Study B & Study C)** were taken of each lunchbox by the researcher once the contents of the lunchbox was recorded on the lunchbox record form. This was necessary to allow for matching pre and post lunchbox data for analysis. All photographs were taken on UCD issued mobile phones (Huawei Ascend Y330, China). In Study B following all data collection, photographs were uploaded on to a secure password protected network on a UCD computer, and then transferred over to a secure electronic folder for which access is limited to individuals involved in the evaluation study. In Study C, photographs were uploaded directly by the researcher from the study phone to a secure online folder following each school visit.

3.4 Questionnaires

Questionnaires were administered to children, parents and teachers to provide a separate measure of F, V & S provision and consumption and to evaluate the experience of all those involved in the intervention.

3.4.1 Study A

During data collection in February 2016, Child Nutrition Survey Questionnaires were administered to fifth and sixth class pupils, to assess their recollection of participating in the FDHEP in the 2010-11 school year. The child questionnaire aimed to capture the pupils' experiences of the programme 6 years previous, as well as their current consumption of F & V at school and at home. Furthermore, this questionnaire aimed to identify whether F & V consumption was greater in children who had a positive recall of the FDHEP intervention.

3.4.2 Study B

The following questionnaires were used in Study B:

- **Teacher Questionnaire** – which was completed by senior class teachers on the follow-up evaluation day visit in March 2016, following completion of the FDHEP intervention (Appendix 4). This questionnaire aimed to capture the teacher's experience of the FDHEP, their perceptions of how successful it was in their classroom and if there was an impact on F & V provision and consumption in their classroom as a result of the programme.
- **Parent Questionnaire** – which was administered to parents via online survey (April 2016) or over the phone by a member of UCD research staff (July 2016) (Appendix 5). Parents consented to taking part in the questionnaire on the child consent form which was collected on the baseline visit of each school in February 2016. This questionnaire collected information on the parent's experience of the programme and whether parents felt that the programme had impacted their child's consumption of F & V. This questionnaire also aimed to identify whether the programme had initiated any other types of behaviour change in the children, such as physical activity levels, or requests while food shopping.

3.4.3 Study C

The same questionnaires used in Study B were used again in Study C:

- **Teacher Questionnaire** – which was administered and completed by junior class teachers on the follow-up visit in October 2016 following completion of the FDHEP intervention.

- **Parent Questionnaire** – Which was administered to consenting parents via online survey (November 2016) or over the phone by a member of the UCD research staff (November – December 2016).

3.5 Data Analysis

3.5.1 Study A

In June 2016 four SPSS files containing datasets from 2010-11 were obtained from a researcher involved in the 2010-11 evaluation study. These were downloaded from a shared server and transferred onto a password protected UCD computer for analysis. FDQED follow-up results from 2010-11 junior and senior infant classes were compared to FDQED baseline results from 2016 fifth and sixth classes using a paired-samples t-test on SPSS (Statistical software package v.20).

Child Nutrition Survey data was returned to UCD in March 2016, codes were assigned and all data was entered into a password protected Excel workbook on a UCD computer. Data dictionaries describing how codes were assigned and how variables were coded for entry into the Excel workbook were created. Data from the Child Nutrition Survey was analysed using mean scores and frequencies, and Chi-squared test were used to identify whether F & V consumption was higher in pupils who had a positive recollection of their first experience of the FDHEP in the 2010-11 school year.

3.5.2 Study B & C

Following successful data collection, all data from both Study B and Study C was returned to UCD by October 2016, where codes were assigned and all data entered into password protected Excel workbooks. Data dictionaries were created describing how codes were to be assigned and data dictionaries were created for each individual

evaluation tool used describing the variable codes to facilitate data entry– all of which will be made available. Following data entry of all FDQED's, Lunchbox Record Forms, and all questionnaires, ~10% double entry of the data was carried out on each data set and inter coder reliability was checked using the online software "Recal2" (2011, available at: http://dfreelon.org/utils/recalfront/recal2/). Any issues were identified and all data was cleaned prior to analysis. All files were then transferred into SPSS files to be analysed using SPSS (Statistical Software Package v.20).

FDQED data was analysed using paired-samples t-tests to identify any differences between the number of pupils who brought and consumed F, V & S in school at baseline and follow-up, significance was accepted at $p<0.05$.

Using Study B lunchbox photograph data, out of the 407 lunchboxes recorded, 40% (n= 161) of the lunchboxes were successfully matched from baseline in February 2016 to follow up in March 2016. The matched lunchbox record forms (n=161) were analysed using paired-samples t-tests to identify changes in F, V & S provision and consumption.

Study C lunchbox photograph data was used to match up 1228 lunchboxes from baseline (September 2016) to follow-up (October 2016) out of the 1623 lunchboxes recorded in total from the 31 schools at baseline and follow-up. Therefore, 614 matched lunchbox record forms were analysed using a paired-samples t-test on SPSS.

Data from the teacher and parent questionnaires were analysed using mean scores and frequencies, and qualitative data from the open ended comment questions were grouped according to relevant themes that emerged.

4. Results

The following section outlines results from evaluation Study A, B and C.

4.1 Study A

As part of the long-term evaluation of the FDHEP, junior and senior infant classes of schools evaluated in 2010-11 have been directly compared with pupils now in fifth and sixth class of the same schools to assess whether provision and consumption of F, V & S has changed over the 6 year period. Figure 8 displays the number of schools and classes that participated in the long-term evaluation of the FDHEP.

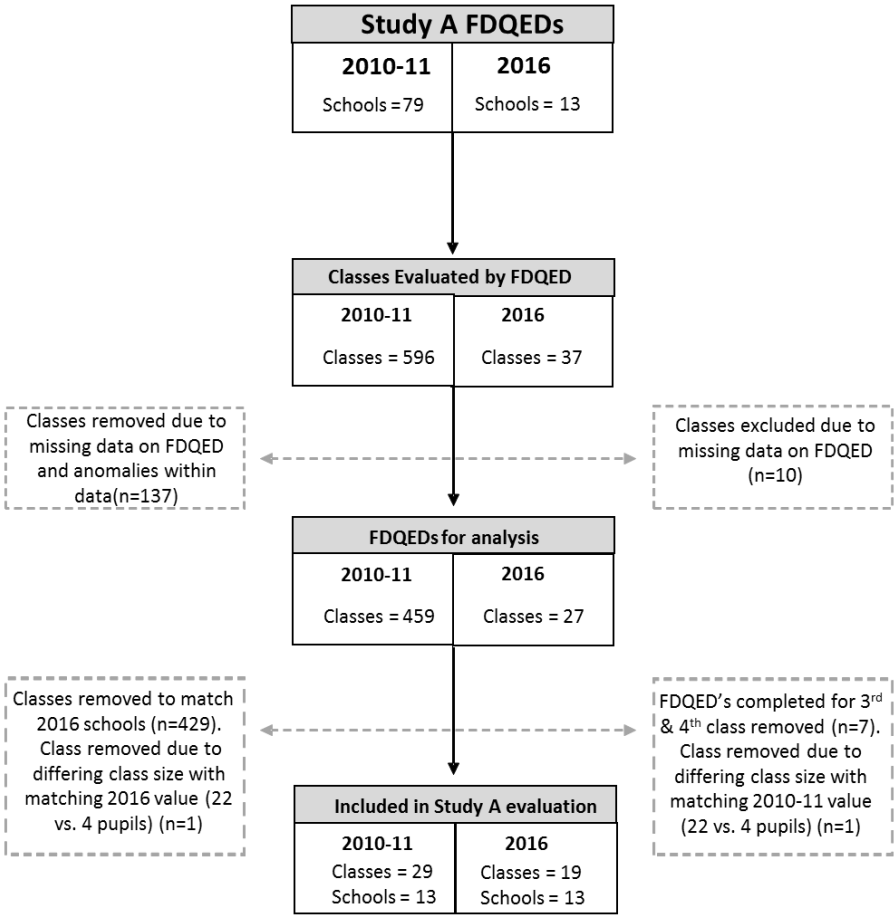

Figure 8. The number of schools and classes that participated in Study A evaluation of the FDHEP.

4.1.1 Provision and Consumption of F, V & S 2010-11 evaluation – junior pupils only

The short-term impact the FDHEP had on junior pupils in 2010-11 can be seen in Figure 9 below. A significantly higher proportion of junior pupils brought in one or more portions of F & V to school ($p \leq 0.001$; $p \leq 0.001$ respectively), and consumed one or more portions of F & V following the FDHEP ($p \leq 0.001$; $p \leq 0.001$ respectively). Likewise, a significantly lower proportion of junior pupils brought S to school following the FDHEP ($p = 0.003$), which resulted in a significantly lower proportion of junior pupils eating S at school following the FDHEP in 2010-11 ($p = 0.007$) (Tables 5-6; Figure 9).

*Table 5. Number (n) and percentage (%) of all junior pupils, who brought in one or more portions of fruit, vegetables and snacks to school pre and post the FDHEP intervention in 2010-11. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

FDQED 2010-11	Brought to School Pre (n=819)			Brought to School Post (n=809)		
	Fruit	Veg	Snacks	Fruit	Veg	Snacks
Total (n)	442	41	318	683*	471*	242*
Total (%)	54	5	39	84	58	30

*Table 6. Number (n) and percentage (%) of all junior pupils, who consumed one or more portions of fruit, vegetables and snacks in school pre and post the FDHEP intervention in 2010-11. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

FDQED 2010-11	Consumed in School Pre (n=819)			Consumed in School Post (n=809)		
	Fruit	Veg	Snacks	Fruit	Veg	Snacks
Total (n)	396	34	304	663*	446*	235*
Total (%)	48	4	37	82	55	29

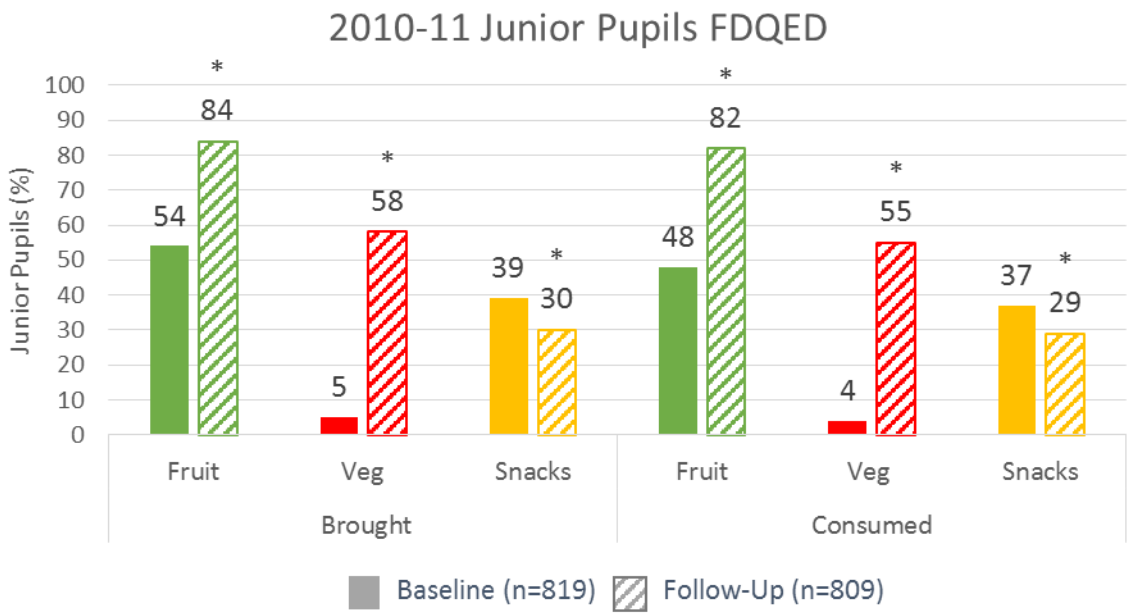

*Figure 9. The percentage (%) of all junior pupils of schools evaluated in 2010-11, who brought and consumed one or more portion of F, V & S before and after the FDHEP intervention in 2010-11. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

What is worth noting, is that consumption rates (as a percentage of those who brought in the foods) are similar pre and post the FDHEP, namely of those pupils that brought F to school the majority ate the F (90% baseline; 97% follow up) (Table 7). This was similar for V (83% baseline; 95% follow up) and S (96% baseline; 97% follow up) also – indicating that the majority of children ate what was provided for them in their lunchboxes.

Table 7. Consumption rates of junior pupils taking part in the 2010-11 evaluation study, pre and post the FDHEP intervention in 2010-11. Consumption rates are expressed as a percentage (%) of those who brought F, V & S to school.

FDQED 2010-11	**Consumption Rates Pre**			**Consumption Rates Post**		
	Fruit (n=442)	**Veg (n=41)**	**Snacks (n=318)**	**Fruit (n=683)**	**Veg (n=471)**	**Snacks (n=242)**
Total (n)	396	34	304	663	446	235
Total (%)	90	83	96	97	95	97

4.1.2 Differences between 2010-11 & 2016

For the purpose of the present study, in order to determine the long-term outcome of the FDHEP, analysis was carried out on a subset of the junior pupils who took part in the programme in 2010-11. The follow-up data collected from the FDQED in 2010-11 from junior & senior infant classes was compared with FDQED data collected in February 2016 of pupils in fifth and sixth classes of the same schools (n=13). As the number of classes evaluated in 2010-11 varied in some schools in comparison to the number of classes evaluated in 2016, averages were taken and hence results are shown on a school level rather than an individual class level.

4.1.3.1 Provision

As can be seen in Figure 10 and Table 8, the percentage of pupils bringing one or more portions of F & V to school six years after the FDHEP intervention was delivered in 2010-11, remained significantly higher than the original baseline figures prior to pupils having ever been exposed to the FDHEP intervention (**F**: 67% vs. 54%, p=0.026; **V**: 12% vs. 6%, p=0.020 respectively).

When compared to the original follow-up (2010-11 T2), the proportion of pupils bringing one or more portions of both F & V to school at 2016 T1 had decreased over time (**F**: 67% vs. 83%, p=0.017; **V**: 12% vs. 57%, p≤0.001 respectively). This indicates that the vast improvements seen as a short-term response to initial exposure to the programme, were not sustained to the same degree over a six year period, however had remained significantly higher than levels seen at the original baseline.

Furthermore, as evident in Figure 10, following the FDHEP boost intervention (2016 T2) the proportion of pupils bringing F to school had increased significantly from 2016 T1 (67% vs. 75%, p=0.047). Although the proportion of pupils at 2016 T2 remained

slightly lower than the large improvements seen following the original FDHEP intervention, these figures were not significantly different (75% vs. 83%, p=0.238), indicating that the FDHEP boost programme had restored F provision to similar levels as seen at the original follow-up in 2010-11 (T2).

This positive restoration of levels following the FDHEP boost intervention (2016 T2) however is not seen for V provision. Although a significant increase in the proportion of senior pupils bringing V to school is evident compared to 2016 T1 (27% vs. 12%, p=0.005), when compared to the original follow-up post intervention (2010-11 T2), the proportion of pupils who brought one or more portions of V to school though it remained higher than the original baseline levels (2010-11 T1), it was significantly lower than the large improvements seen resulting from the initial exposure to the FDHEP (2010-11 T2) (27% vs. 57%, p≤0.001).

In terms of S provision, the proportion of pupils bringing S to school remained similar over time, furthermore no impact on provision was seen following the FDHEP boost intervention.

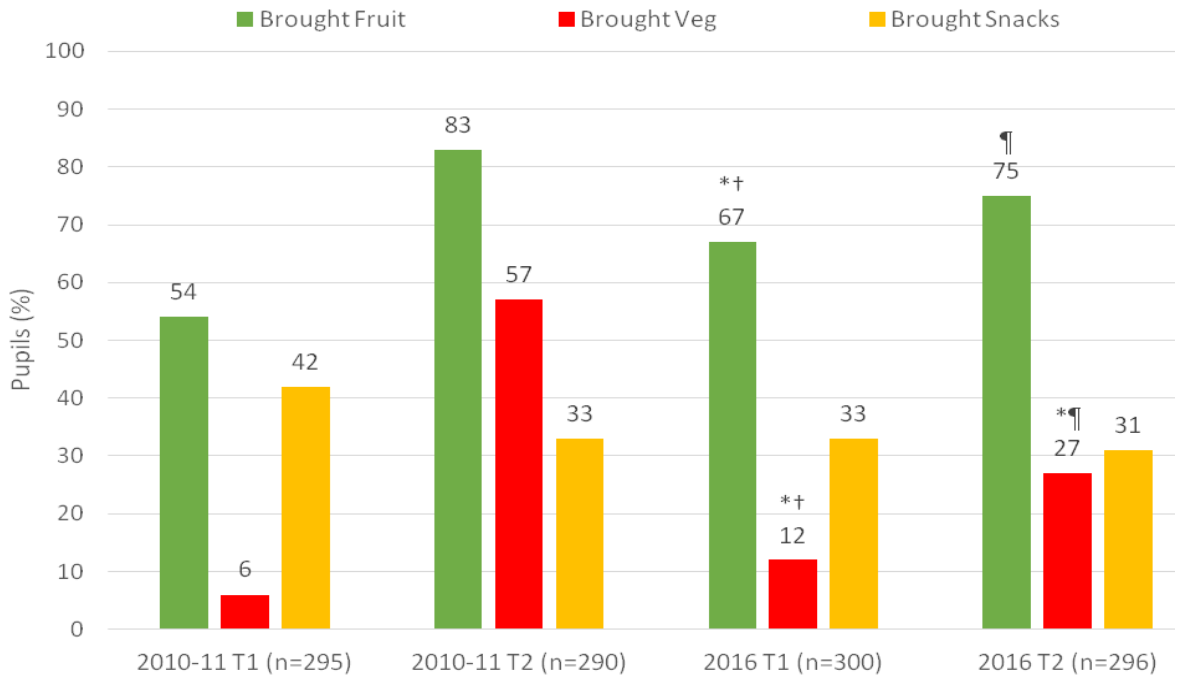

*Figure 10. Percentage (%) of pupils who brought one or more portions of F, V and S to school before the FDHEP intervention in 2010-11 (T1), after the FDHEP intervention in 2010-11 (T2) at follow up in 2016, 6 years after the FDHEP (2016 T1) and after the FDHEP boost intervention (2016 T2). * denotes a significant difference from 2010-11 T2 value, † denotes a significant difference from 2010-11 T1 value, ¶ denotes a significant difference from 2016 T1 value - statistical significance was accepted at <0.05.*

4.1.3.2 Consumption

As can be seen in Figure 11 and Table 8, the positive results seen for provision are mirrored in the consumption patterns. The proportion of pupils consuming one or more portions of F & V in school remained significantly higher (**F**: 56% vs. 47%, p= 0.039; **V**: 10% vs. 4%, p=0.032 respectively) after six years when compared to the original baseline (2010-11 T1) prior to ever receiving the FDHEP.

As seen with provision, when compared to the original follow-up post-intervention (2010-11 T2) the proportions of pupils consuming F & V had decreased over time (2016 T1) from the initial response to the FDHEP intervention (**F**: 56% vs. 80%, p=0.002; **V**: 10% vs. 53%, p≤0.001 respectively). Similarly, as noted for the impact on provision, this indicates that the vast improvements seen in the short-term response to initial FDHEP,

had decreased over six years, yet had remained significantly higher than the original baseline (2010-11 T1) prior to ever receiving the FDHEP.

Echoing the results seen for the short-term impact on provision, following the FDHEP boost intervention (2016 T2), a significantly higher proportion of pupils consumed one or more portions of F & V compared to 2016 T1 (**F**: 71% vs. 56%, p=0.010; **V**: 26% vs. 10%, p=0.004 respectively). Although further analysis revealed that the increase in the proportion of pupils consuming F at 2016 T2 was slightly less than that seen for 2010-11 T2, this difference was not statistically significant (71% vs. 80%, p=0.147) indicating that the boost programme had a similar immediate impact on F consumption as did the initial FDHEP in 2010-11.

Though the boost programme had significantly increased the proportion of pupils consuming V at 2016 T2, this increase was significantly lower (26% vs. 53%, p=0.001) than the proportion of pupils consuming V at 2010-11 T2 following completion of the initial FDHEP. This indicates that though the 8-day tasting intervention as part of the boost programme increased the proportion of senior pupils consuming V, the impact had not been to the same extent as was seen following pupils first exposure to the FDHEP intervention when they were junior and senior infants receiving the 16-day tasting intervention.

As with results for S provision, no statistically significant changes were seen in the proportion of pupils consuming S over time.

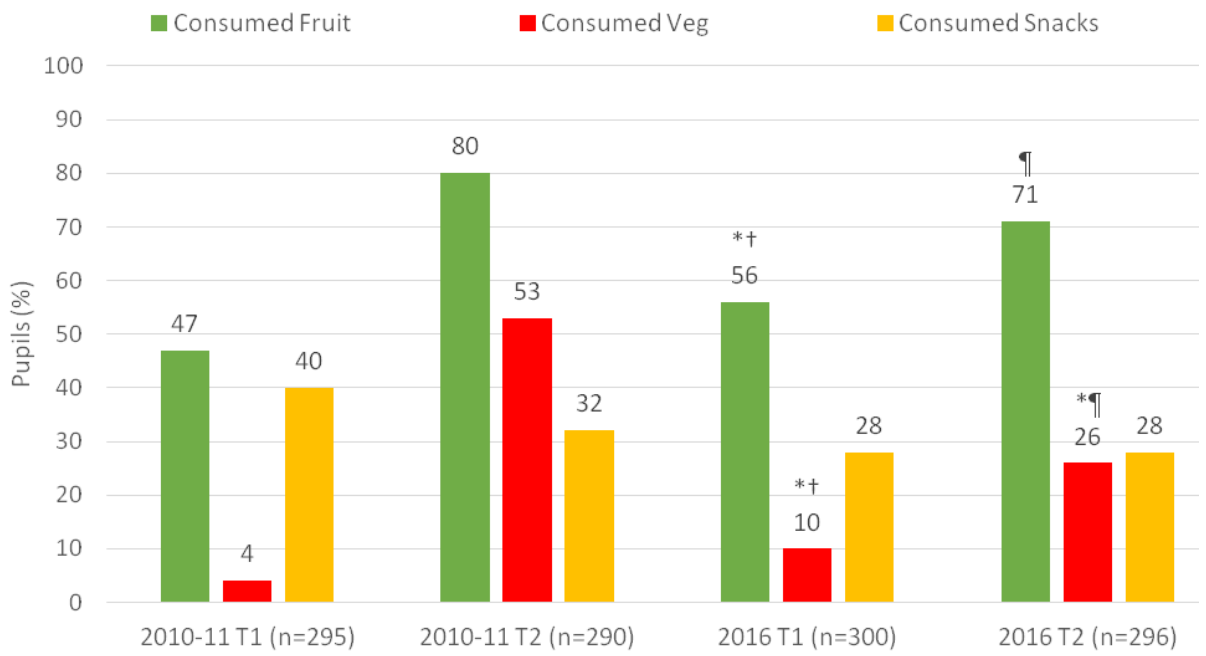

*Figure 11. Percentage (%) of pupils who consumed one or more portions of F, V and S at school before the FDHEP intervention in 2010-11 (T1), after the FDHEP intervention in 2010-11 (T2) at follow up in 2016, 6 years after the FDHEP (2016 T1) and after the FDHEP boost intervention (2016 T2). * denotes a significant difference from 2010-11 T2 value, † denotes a significant difference from 2010-11 T1 value, ¶ denotes a significant difference from 2016 T1 value - statistical significance was accepted at <0.05.*

Table 8. Number and percentage of pupils who brought in and consumed one or more portions of F, V & S before the FDHEP intervention in 2010-11 (T1), after the FDHEP intervention in 2010-11 (T2), at follow up in 2016 (T1) and after the FDHEP boost intervention in 2016 (T2).

	Brought			**Consumed**		
	Fruit	**Veg**	**Snacks**	**Fruit**	**Veg**	**Snacks**
2010-11 T1 (n=295)	161 (54%)	17 (6%)	125 (42%)	139 (47%)	13 (4%)	118 (40%)
2010-11 T2 (n=290)	241 (83%)	166 (57%)	95 (33%)	232 (80%)	152 (53%)	92 (32%)
2016 T1 (n=300)	202 (67%)	37 (12%)	99 (33%)	169 (56%)	32 (10%)	85 (28%)
2016 T2 (n=296)	223 (75%)	79 (27%)	93 (31%)	211 (71%)	77 (26%)	83 (28%)

4.1.3 Child Nutrition Survey

The Child Nutrition Survey was used to report on children's self-reported current consumption of F&V, as well as their experiences of the FDHEP intervention that they had been exposed to in 2010-2011. A total of 869 senior pupils answered the survey, with response rates per question varying from 82% to 99%, with skipped questions being the reason for this. Children reported on their current F & V consumption, with the majority of children indicating they eat at least one portion of F and one portion of V every day (Table 9). The majority of children (66.8%) reported bringing F to school at least 4 times a week, whereas only 8% reported bringing V to school at least 4 times a week, with the majority (58.1%) reporting that they never bring V to school (Table 10).

Table 9. The percentage of pupils reporting on the frequency of F & V consumption as per the Child Nutrition Survey.

	Never (n)	**1-3 Portions/Day (n)**	**3+ Portions/Day (n)**
Fresh Fruit (n=861)	3.5% (30)	61.7% (531)	34.8% (300)
Raw Vegetables (n=856)	31.1% (265)	58.1% (495)	10.8% (92)
Cooked Vegetables (n=856)	8.1% (69)	55.4% (474)	36.6% (313)

Table 10. The percentage of pupils reporting on the frequency they bring F & V to school as per the Child Nutrition Survey.

	Never (n)	**1-3 Times/Week (n)**	**4-5 Times/Week (n)**
Bring Fruit to School (n=857)	8.8% (75)	24.4% (209)	66.8% (573)
Bring Veg to School (n=855)	58.1% (497)	33.9% (290)	8% (68)

Data obtained from this survey was further analysed to identify if there was a difference between children who liked the FDHEP that was delivered six years prior in terms of F & V consumption, and provision of F & V in school lunchboxes. Results revealed that the majority of children (81.2% of 819 responders) remembered taking part in FDHEP in 2010-11, with 76% (of 713 responders) indicating that they liked the programme. As can be seen below, a significant difference was observed for F & V (both raw and cooked) consumption between those who liked the FDHEP that was delivered six years

prior, compared to those who reported not liking it (Figure 12 – 14). Senior pupils who reported liking the programme reported more often consuming three or more portions of F a day, with a higher proportion of those reporting not liking the programme more often reporting never consuming F (Figure 12). This is similar for the consumption of raw V, with those liking the programme reporting consumption of 1-3 portions of V a day more often, with those who did not like the programme more often reporting never eating raw V (Figure 13). Figure 14 shows that pupils who liked the programme reported consuming three or more portions of cooked V a day more often than those who did not like the programme. In line with the previous findings, those reporting not liking the programme in 2010-11 reported never consuming cooked V more often than those who did like the programme (Figure 14).

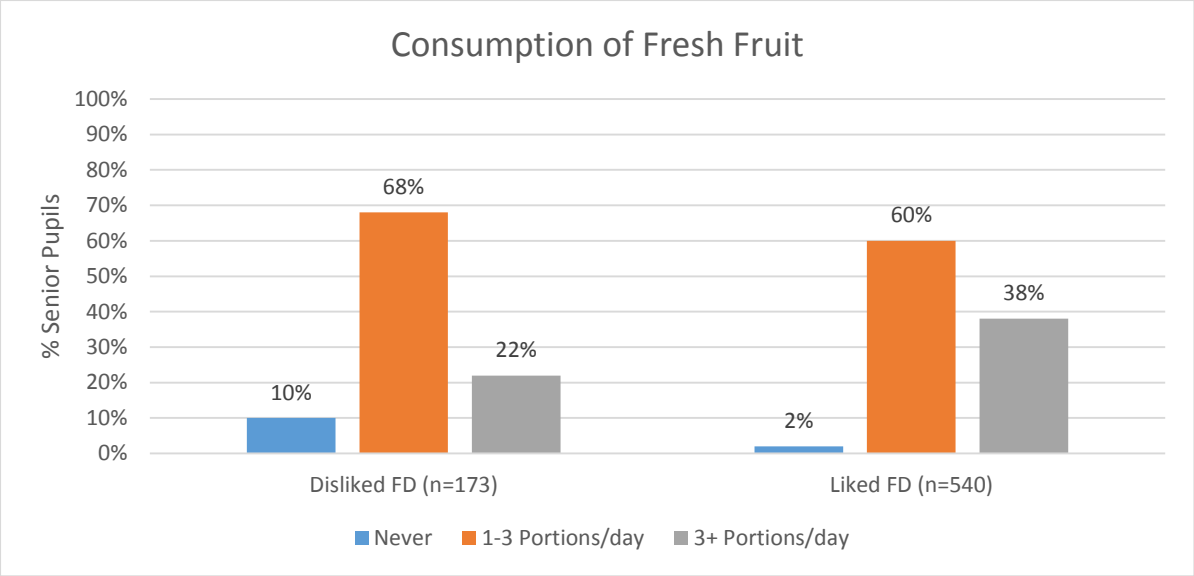

Figure 12. The frequency of fresh fruit consumption of senior pupils who disliked and liked the FDHEP delivered to them in 2010-2011 (χ^2=37.616, p≤0.001).

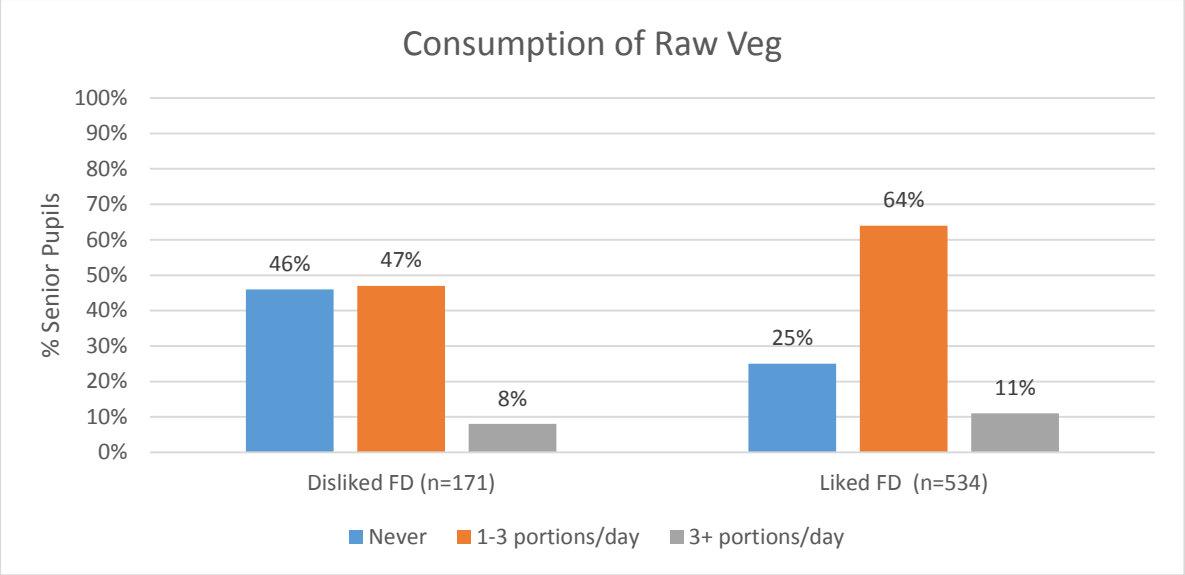

Figure 13. The reported frequency of raw vegetable consumption of senior pupils who disliked and liked the FDHEP delivered to them in 2010-2011 (χ^2=25.430, p≤0.001).

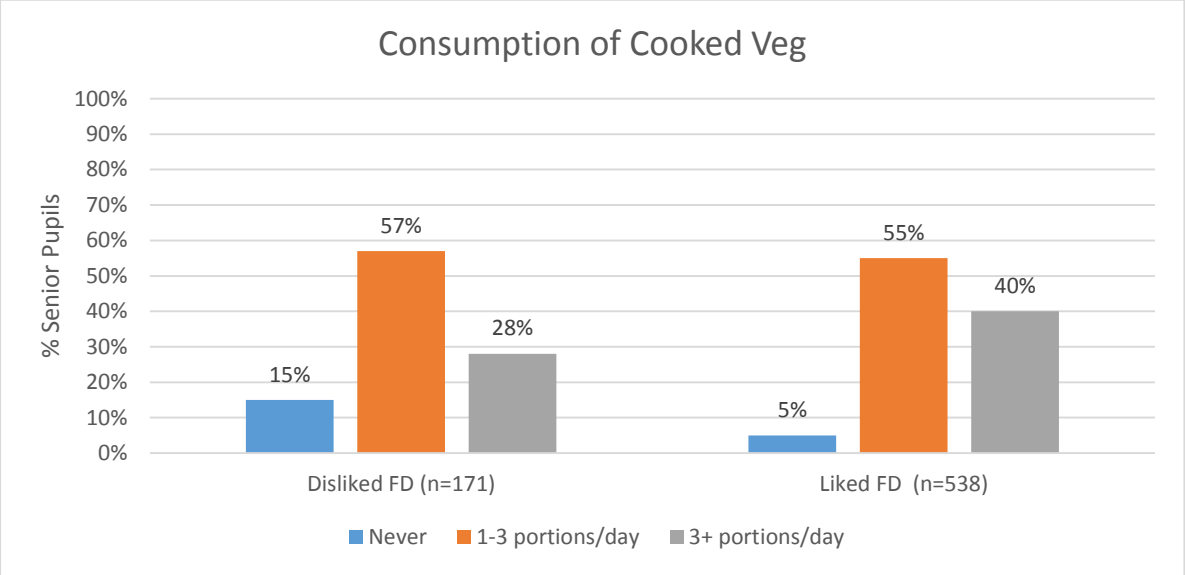

Figure 14. The reported frequency of cooked vegetable consumption of senior pupils who disliked and liked the FDHEP delivered to them in 2010-2011 (χ^2=19.626, p≤0.001).

Furthermore, a significant difference was observed for F brought into school between those who reported liking the FDHEP in 2010-11 and those who reported not liking the programme, with a higher proportion of those liking the programme reporting bringing F to school 4-5 times a week compared to those who did not like the programme. As with the findings detailed above, those who did not like the programme more often reported never bringing F to school compared to those who liked the programme

(Figure 15). This difference, however, was not observed for V being brought to school, indicating that liking or disliking the FDHEP delivered six year prior, did not have an impact on the frequency of V being brought to school (Figure 16).

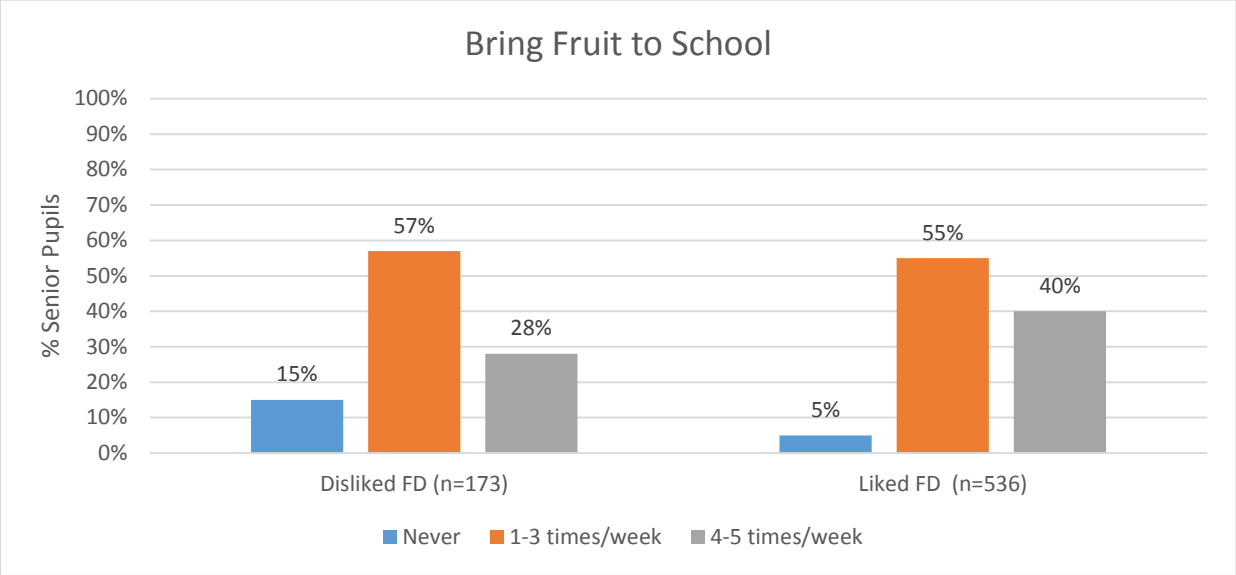

Figure 15. The reported frequency of fruit being brought to school by senior pupils who disliked and liked the FDHEP delivered to them in 2010-2011 (χ^2= 19.421, p≤0.001).

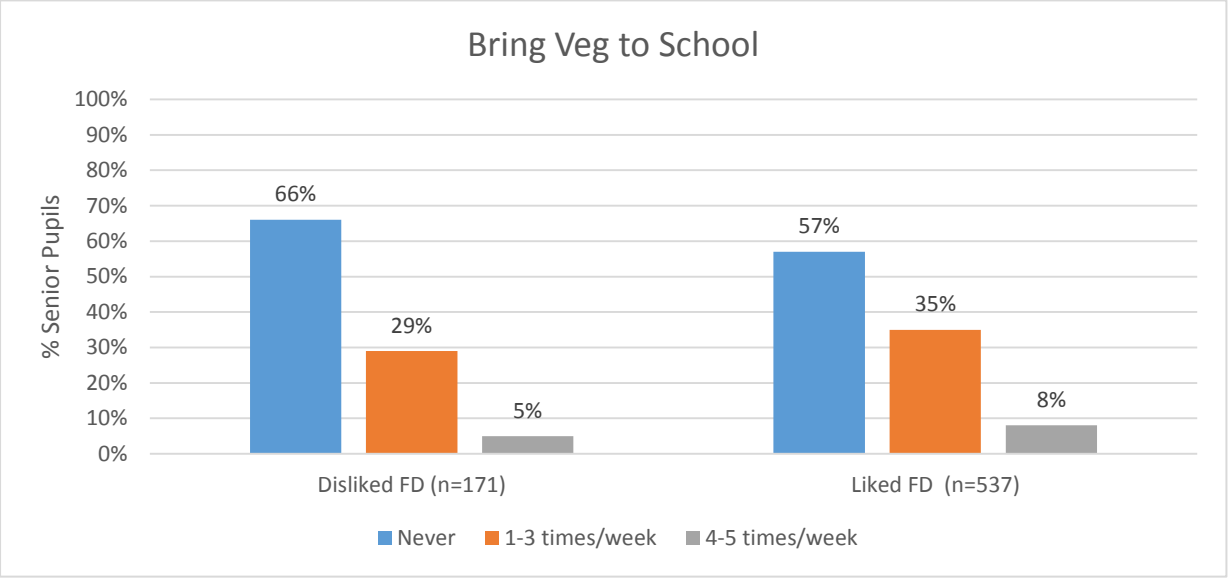

Figure 16. The reported frequency of vegetables being brought to school by senior pupils who disliked and liked the FDHEP delivered to them in 2010-2011 (χ^2= 4.864, p=0.088).

Qualitative Data

Themes that emerged in the responses (n=424) from the children indicated that favourite aspects of the programme were the actual F and/or V provided (55%) as well as the prizes and rewards received during the programme (41%). On the other hand, in terms of aspects of the programme that children did not enjoy, of those that responded (n=554), the majority (57%) indicated that they did not like the F and/or V – with cherry tomatoes and peppers being specifically reported as particular V disliked. Furthermore, the remaining responders (56%) reported that there was nothing they disliked about the programme.

4.1.4 Summary

Comparison of FDQED results from junior and senior infants classes in 2010-11 to results of fifth and sixth classes in 2016 of the same schools revealed that six years following the FDHEP both provision and consumption of F & V had remained significantly higher than the original baseline in 2010-11 prior to pupils having ever received the FDHEP. The immediate post intervention impact seen in the short-term following the initial FDHEP in 2010-11, was not sustained to the same extent over a six year period.

Interestingly, following the FDHEP boost intervention, significant improvements were seen in terms of F & V provision and consumption, with levels of F provision and consumption returning to similar levels as seen following completion of the initial FDHEP intervention in 2010-11 (2010-11 T2).

This positive restoration following the boost intervention, was however not noted for V provision or consumption. Results revealed that the FDHEP boost intervention resulted in significant improvements, with the proportion of pupils bringing and consuming one

or more portions of V remaining significantly higher than the original baseline values (2010-11 T1). However, the proportion of senior pupils bringing in V after the boost programme (2016 T2), was significantly lower than levels seen at the original follow-up (2010-11 T2), following the initial FDHEP intervention that was delivered when pupils were junior and senior infants.

Senior pupil's self-reported current consumption of F, raw V and cooked V was significantly different between those that reported liking the FDHEP that was delivered six years prior and those that did not like it. Similarly, the number of pupils who reported bringing F to school was significantly different between those who reported liking FDHEP compared to those reporting they did not like it. This however was not seen for pupils bringing V to school, indicating that senior pupils liking or disliking the FDHEP had no effect on V being brought to school.

4.2 Study B

4.2.1. Response Rates

Figure 17 gives an overview of the response rates from the schools who participated fully in the evaluation for Study B. As can be seen below, 91% of FDQEDs and 100% of teacher questionnaires were available for analysis in Study B. In total, 407 parents consented to their child's lunchboxes being measured and 76% of the 407 lunchboxes were measured (logistical issues and child assent were the main reasons impacting 24% not being measured). Finally, 84% of parents (n=340) agreed to participate in the parent questionnaire and of those who consented, a total of 37% (n=125) have completed a questionnaire, either online (n=70) or by phone (n=55).

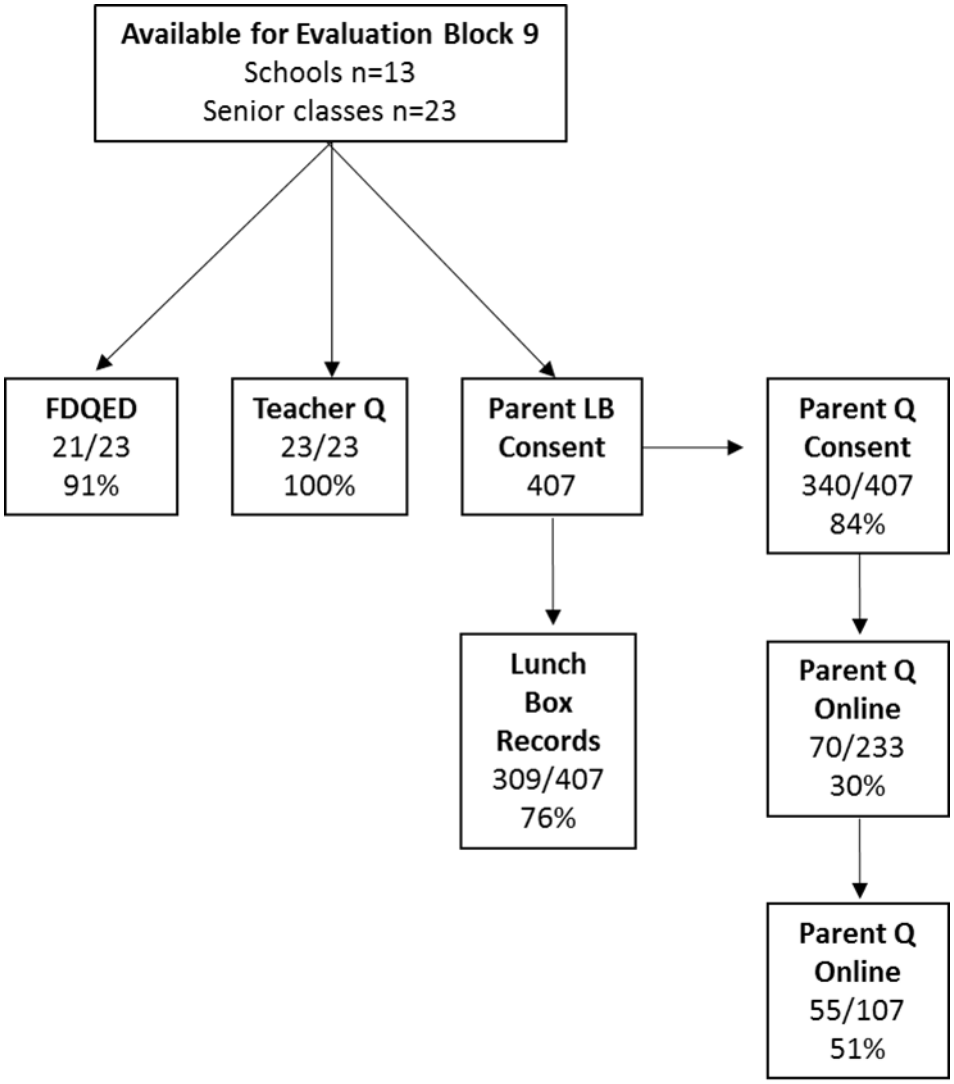

Figure 17. Response rates from Study B Schools participating in the Food Dudes Healthy Eating Programme Evaluation.

4.2.2 FDQED

FDQED results detailing the number of senior pupils who brought and consumed one or more portions of F, V & S in school pre and post the FDHEP intervention can be seen below in Table 11 and 12. As is evident in Figure 18, following the FDHEP intervention there was a significant increase in both the proportion of senior pupils bringing and consuming one or more portions of fruit (79% vs. 69%, p=0.009; 76% vs. 61%, p=0.001 respectively) and vegetables (29% vs. 13%, p=0.004; 27% vs. 12%, p=0.002

respectively). However, there was no change in either the provision or the consumption of snacks (p=0.590; p=0.673 respectively) from baseline to follow-up amongst senior pupils.

*Table 11. Number (n) and percentage (%) of senior pupils who brought in one or more portions of F, V & S at baseline (pre) and follow-up (post) after the FDHEP intervention. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

	Study B FDQED Brought pre vs. post					
	Brought to School Pre (n=482)			Brought to School Post (n=479)		
	Fruit	**Veg**	**Snacks**	**Fruit**	**Veg**	**Snacks**
Total (n)	333	65	139	380*	137*	129
Total (%)	69%	13%	29%	79%	29%	27%

*Table 12. Number (n) and percentage (%) of senior pupils who consumed one or more portions of F, V & S in school at baseline (pre) and at follow-up (post) after the FDHEP intervention. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

	Study B FDQED Eaten pre vs. post					
	Consumed in School Pre (n=482)			Consumed in School Post (n=479)		
	Fruit	**Veg**	**Snacks**	**Fruit**	**Veg**	**Snacks**
Total (n)	294	59	123	366*	127*	115
Total (%)	61%	12%	26%	76%	27%	24%

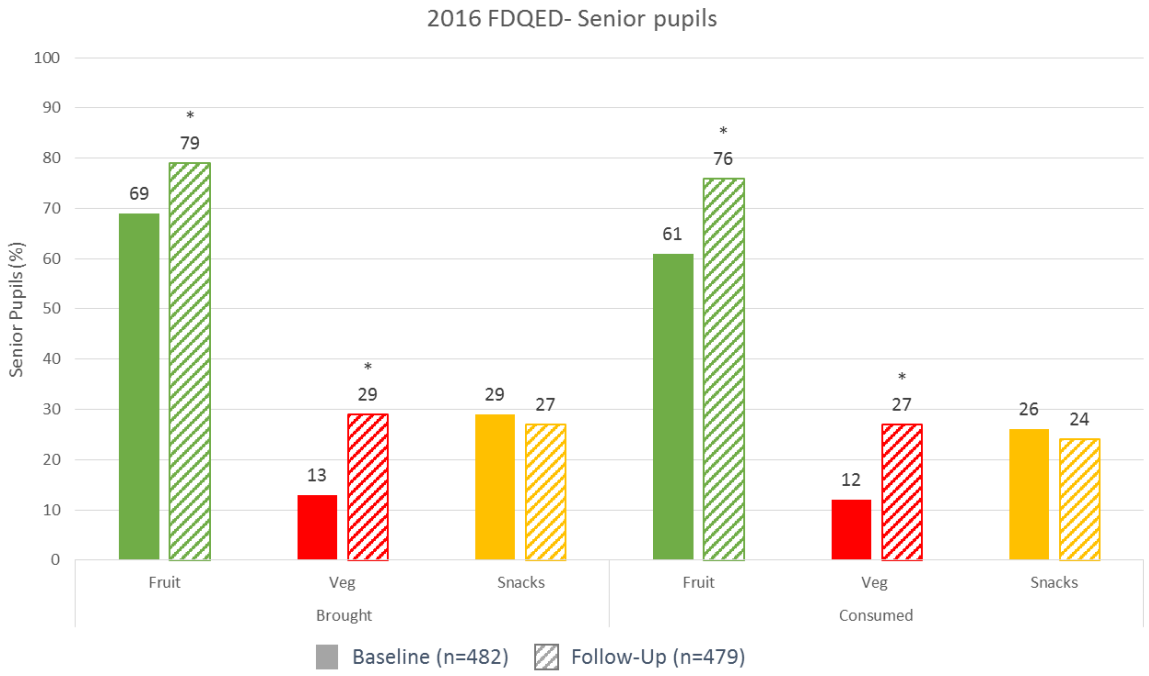

*Figure 18. The percentage (%) of senior pupils in Study B who brought in and consumed one or more portions of F, V & S before and after the FDHEP as per FDQED completed by teachers. * denotes a significant difference from baseline,*

statistical significance was accepted at <0.05.

What is interesting to note, is that the rates of consumption (as a percentage of the number of pupils who brought in one or more portion of F, V & S) have increased slightly from baseline to follow-up following the FDHEP intervention (Table 13). Indeed, 88% of the number of senior pupils who brought F in to school at baseline ate the portion, with it rising to 96% of senior pupils eating their lunchbox provided F following the FDHEP. The consumption rates of V & S, (**V**: 91% vs. 93%; **S:** 88% vs. 89%) have remained quite similar from baseline to follow-up. This indicates that the majority of senior pupils will eat one or more portions of F, V & S if it is provided in their lunchbox.

Table 13. Consumption rates of senior pupils taking part in the 2016 evaluation study, pre and post the FDHEP intervention as recorded by teachers using the FDQED. Consumption rates are expressed as a percentage (%) of those who brought F, V & S to school.

FDQED 2016	**Consumption Rates Pre**			**Consumption Rates Post**		
	Fruit (n=333)	**Veg (n=65)**	**Snacks (n=139)**	**Fruit (n=380)**	**Veg (n=137)**	**Snacks (n=129)**
Total (n)	294	59	123	366	127	115
Total (%)	88%	91%	88%	96%	93%	89%

4.2.3 Lunchbox Record Form

Lunchbox record forms were filled out by the researcher before pupils first break in the morning, and then again following their lunch break in the afternoon on both evaluation visits in February and March 2016. Out of 414 lunchboxes recorded over the two visits pre and post the FDHEP intervention, 322 were matched up using the digital photographs. Therefore, 161 lunchboxes with data from both pre and post FDHEP intervention were available for analysis (i.e. one lunchbox was recorded at two time points, therefore 322 recordings of 161 lunchboxes).

As can be seen below (Figure 19), following the FDHEP a significant increase in both the total number of portions of V being brought (57 vs. 31, p=0.003) and consumed (53 vs. 29, p=0.006) in school is evident. No significant differences were seen for the provision or consumption of F or S. It is worth noting that a reason for the lack of change in the amount of F provided and consumed in schools could be that the majority of pupils already brought and consumed (79%; 75% respectively) one or more portions of F at baseline (Figure 20). Furthermore, the increase in the provision and consumption of V is not matched with a decrease in the provision or consumption of snacks, instead it appears to be merely provided in addition to these types of foods, not replacing them.

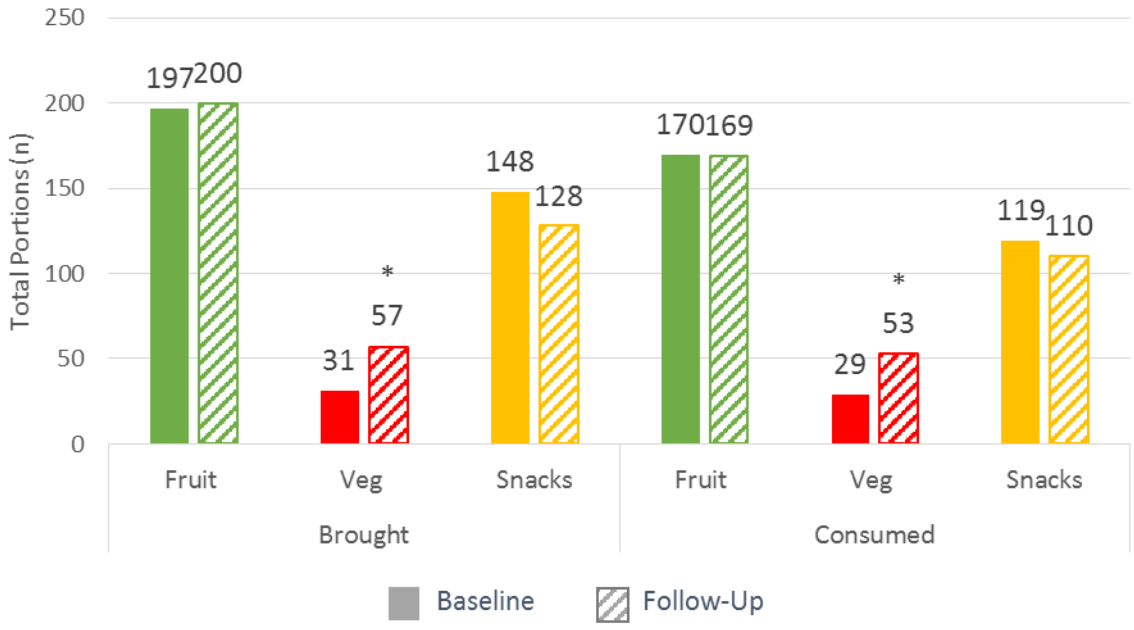

*Figure 19. The total number of portions (n) of fruit, vegetables and snacks brought to and consumed in school before and after the FDHEP as recorded on the lunchbox record form. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

Interestingly, as shown in Table 14, the rates of consumption have remained similar for baseline and follow-up. Again, indicating that the majority of senior pupils, will eat what is provided in their lunchbox irrespective of the FDHEP.

Table 14.Consumption rates of senior pupil's pre and post the FDHEP intervention as recorded by the researcher on the lunchbox record. Consumption rates are expressed as a percentage (%) of those who brought F, V & S to school

Study B Lunchbox	Consumption Rates Pre			Consumption Rates Post		
Total (n=161)	**Fruit (n=127)**	**Veg (n=25)**	**Snacks (n=78)**	**Fruit (n=133)**	**Veg (n=47)**	**Snacks (n=68)**
Total (n)	121	25	69	122	44	60
Total (%)	95%	100%	88%	92%	94%	88%

To identify whether the statistically significant changes presented in Figure 19 in terms of the number of portions of V being brought in and consumed in school was as a result of significantly more children bringing in and consuming V or if it was due to the children who already brought in V at baseline merely bringing in additional portions, a further paired samples t-test was carried out. As can be seen in Figure 20, following the FDHEP intervention a significantly higher proportion of senior pupils brought in and consumed V (29% vs. 16%, p=0.001; 27% vs. 16%, p=0.004 respectively) at school.

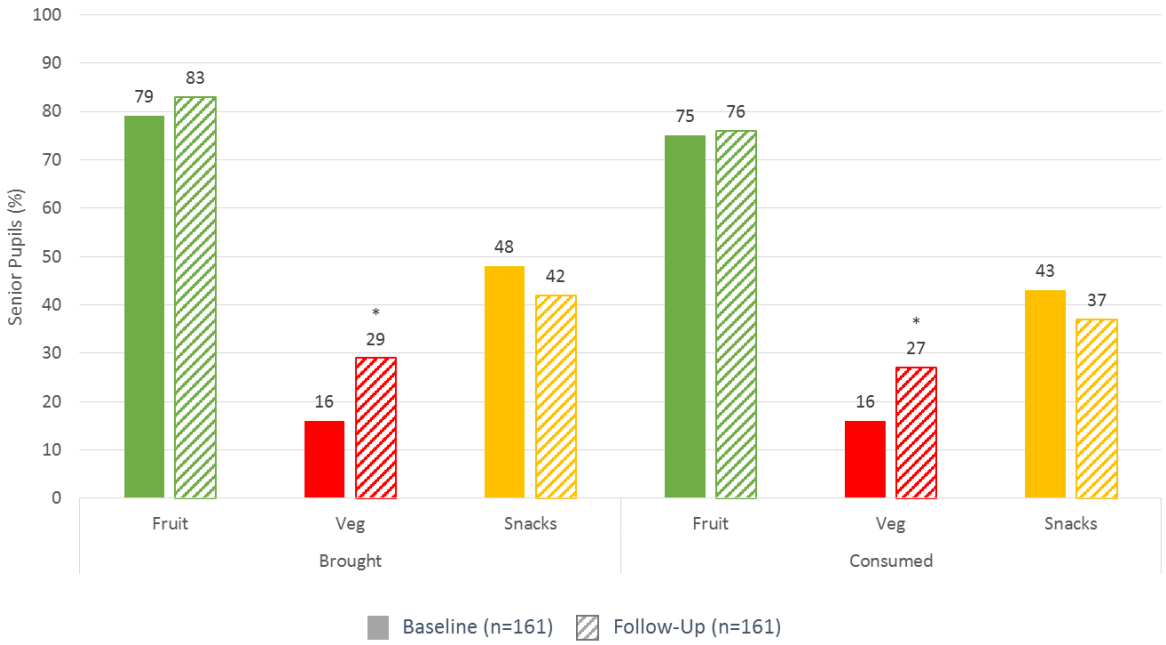

*Figure 20. Percentage of senior pupils (n=161) who brought and consumed 1 or more portions of F, V and S at baseline and follow up as per the lunchbox record form. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

4.2.4 Teacher Questionnaire

Questionnaires were completed by teachers at the end of the FDHEP in March 2016 (n=36). The questionnaire contains both quantitative and qualitative data which will be summarised in the section below.

Quantitative Data

Quantitative data can be divided into 6 different categories, as outlined below.

1. Success of the Programme

Teachers were asked a number of questions regarding how successful they perceived the FDHEP to be in their school. These questions were based on a 5-point Likert scale with an answer of 1 being the most negative answer and 5 being the most positive answer (one exception being question 7, in which 1 indicates there were no elements of the programme that were difficult to implement, and 5 indicating there were many elements). The responses to these questions have been reported as mean scores and can be seen in Figure 21.

On average, the teachers felt the FDHEP was "quite a lot" successful, with senior pupils enjoying taking part and teacher's considering it beneficial for the programme to be introduced into all primary schools in Ireland. The visits from the Food Dudes Project Managers (FDPM) were deemed helpful. The programme was on average "quite easy" for teachers to incorporate into their daily routine with between "none" and "some" elements considered difficult to implement. In general, teachers felt the culture of the school with regards to healthy eating had improved "a little" as a result of the FDHEP, with "some benefits" being noted in relation to children's enthusiasm for healthy eating.

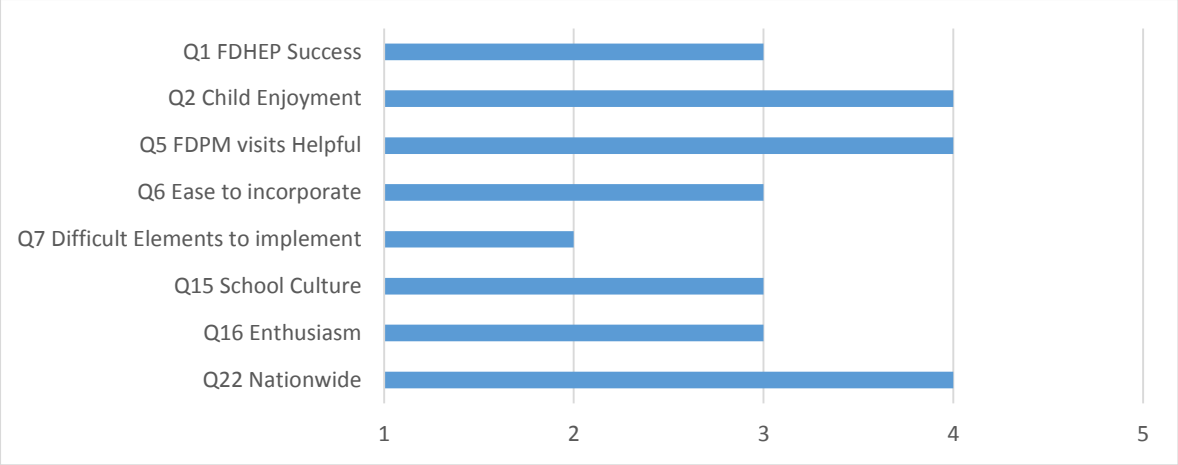

Figure 21. Mean score responses of 5-point likert scale questions within the teacher questionnaire describing teachers' perceived success of the FDHEP.

2. Elements of the programme

To determine how successful individual elements of the programme were amongst pupils, teachers were asked to select the elements their class most enjoyed and those enjoyed least (i.e. more than one element could be ticked). As can be seen in Figure 22, F was the most commonly reported element that classes enjoyed, with no teacher reporting their class did not enjoy the F element of the programme. Similarly, the rewards and certificates used as part of the FDHEP were among the most commonly reported favourite elements of the classes by teachers. Though V was reported by some teachers as an element that their class enjoyed, the majority of teachers noted the vegetables was one of the least enjoyed elements of the programme for their class (Figure 23). Furthermore, the FD letters and the DVD episodes were other elements reported by senior class teachers as aspects least enjoyed by pupils in their class.

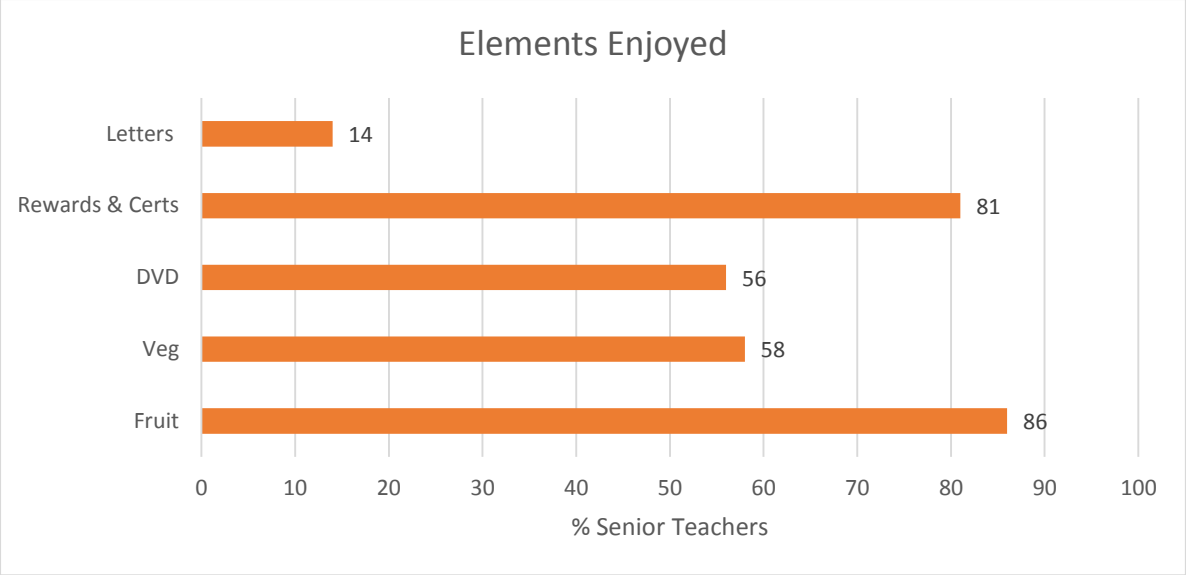

Figure 22. Percentage of senior class teachers who reported their class' most enjoyed elements of the FDHEP.

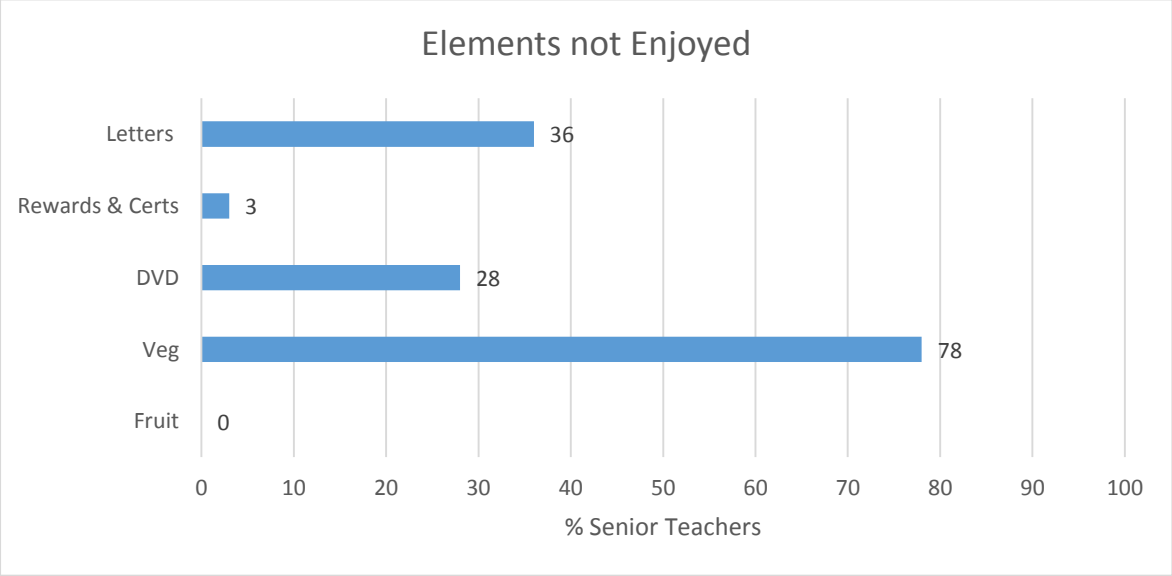

Figure 23. Percentage of senior class teachers who reported their class' least enjoyed elements of the FDHEP.

3. Parent Provided Fruit & Vegetables

To assess change in F & V provision and consumption in the classroom, teachers were asked a series of questions about changes in portions of F & V brought to and eaten in school since the FDHEP. Figure 24 shows that 77% of class teachers noted an increase of 1 more portion of F being provided in lunchboxes to school, and 17% of class teacher reported an increase of 2 or more portions of F being brought to school following the

FDHEP. Increases in consumption of F by pupils in the class are also reported, with 74% of teachers reporting an increase in F consumption by one portion a day for pupils in their class and 20% reporting an increase in consumption by 2 or more portions a day by pupils. Similarly, the majority of teachers have also noted increases in the provision and consumption of V in their classrooms following the FDHEP, however this is to a lesser extent (Figure 24).

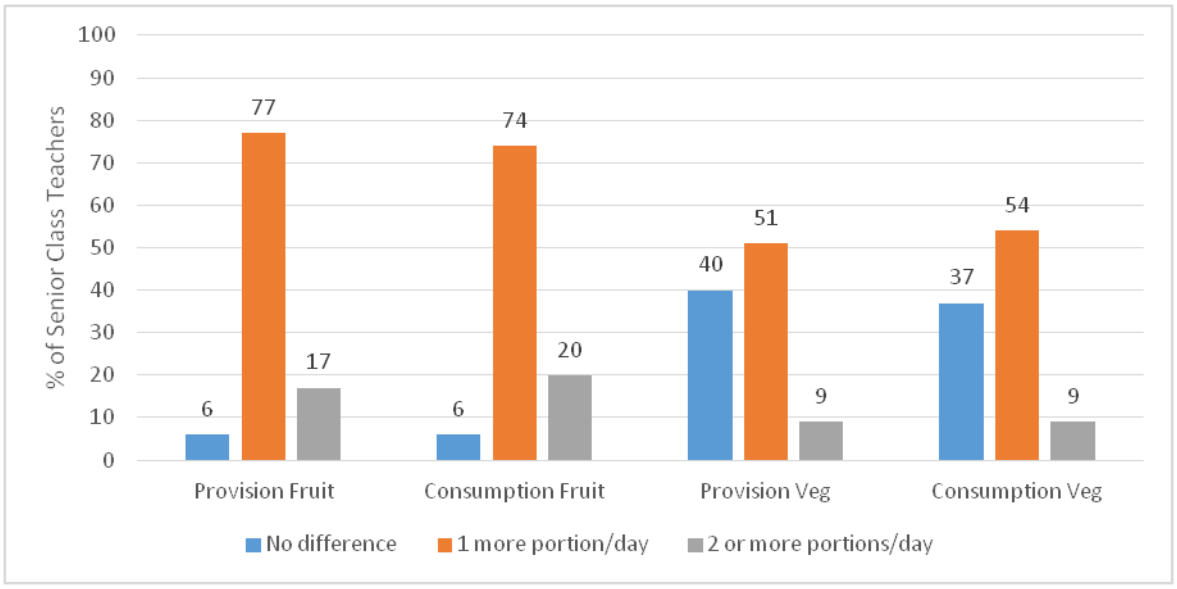

Figure 24. Percentage of senior class teachers reporting changes in provision and consumption of fruit and vegetables in their classrooms following the FDHEP.

4. Parent Provided Snacks

To determine changes in snack provision among senior pupils, class teachers were asked how many more or less portions of various snacks high in fat, salt and sugar (HFSS) were brought into school since the FDHEP or if they stayed the same. As can be seen in Figure 25, although no teacher reported any increases in the provision of snacks in pupils' lunchboxes following the FDHEP, the majority of teachers did not notice a difference in snack provision.

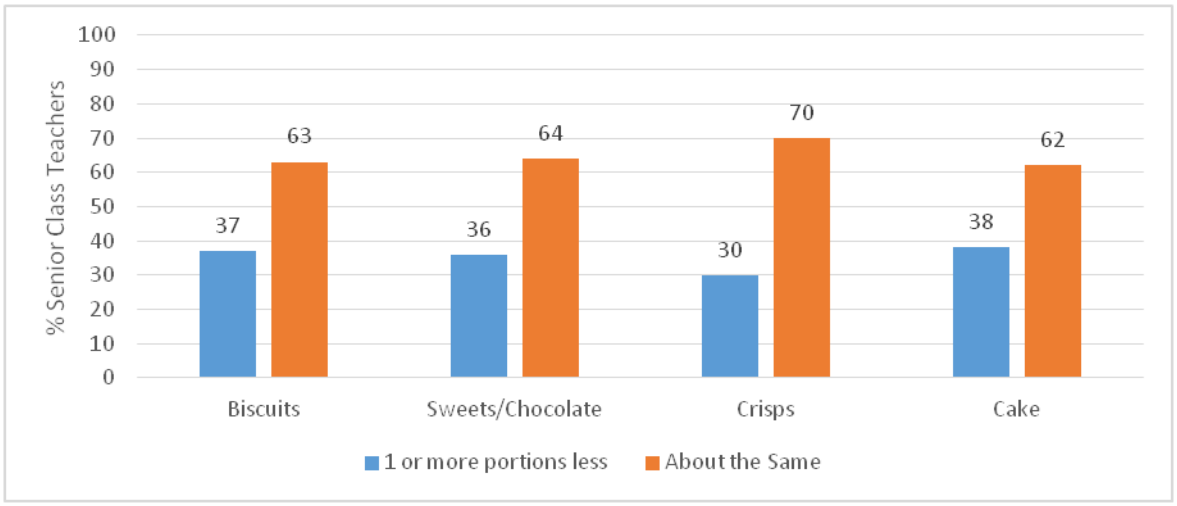

Figure 25. Percentage of senior class teachers who reported average changes in parent snack provision for pupils.

5. Teacher fruit and vegetable consumption

Changes in senior class teacher's consumption of F & V since the FDHEP was also recorded via two questions in the Teacher Questionnaire. Although 31% of senior class teachers reported no difference in their consumption of F since the FDHEP, the majority of teachers (69%) felt they had increased their intake of F by one or more portions a day since the FDHEP. Similarly, 42% of senior class teachers reported no difference in their consumption of V following completion of the FDHEP, while 59% of senior class teachers reported they had increased their consumption of V by one or more portions a day since the FDHEP (Figure 26).

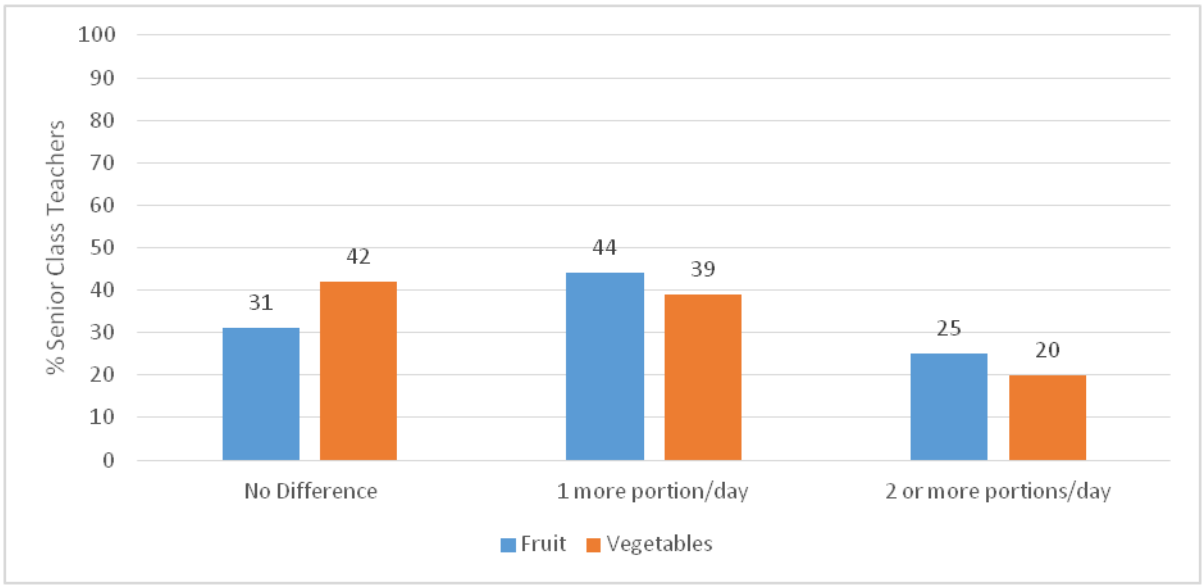

Figure 26. Percentage of senior class teachers' reported changes in fruit and vegetable consumption following the FDHEP.

6. FDHEP Impacting Behaviour

Lastly, to assess if any other behaviour changes occurred as a result of the FDHEP teachers were asked to rate their level of agreement from 1 to 5 (1 being strongly disagree and 5 being strongly agree) for a series of questions regarding behaviour in school following completion of the FDHEP. Mean scores were calculated for each question, revealing that senior class teachers "neither agree nor disagree" with any of the statements relating to improvements in children's concentration or behaviour in class, improvements in children's physical activity at breaks, improvement in children's attendance at school or improvements in children's interaction with peers following the FDHEP. Results indicate that according to teachers, the FDHEP did not impact on any other behaviours aside from F and V provision and consumption.

Qualitative Data

Additional comments made by teachers at the end of the Teacher Questionnaire provided qualitative data which were grouped into themes that emerged throughout analysis. Teachers' responses to the FDHEP were mixed with a variety of positive and negative comments. One of the key positive themes that emerged was the satisfaction with the quality of the F & V provided throughout the programme:

"Fruit and veg was of good quality"

The effect the programme had on the consumption of F & V within the class was another key theme reported by senior class teachers:

"Even those who ate a lot of fruit and vegetables said it encouraged them to try different ones"

Lastly, the effectiveness of the rewards and certificates throughout the programme was an element that many senior class teachers had positive comments about:

"The rewards were a great incentive for the children and did encourage them to eat fruit and veg"

One of the most common negative themes that emerged from the negative comments was the Food Dudes DVD episodes and their suitability for senior pupils and Gaelscoils:

"DVD very old fashioned and not appealing"

The time involved in implementing the programme was another key element that emerged in the negative comments:

"Programme too complicated for busy school day, would be better if admin load was lighter"

Lastly, the quality and quantity of the rewards and certificates was another negative theme that emerged in the comments:

> *"Pedometer broke easily – poor quality, bottles leaked repeatedly and distracting in class"*

A full list of all comments made by teachers is available upon request.

4.2.5 Parent Questionnaire

Questionnaires were completed by parents at the end of the FDHEP in April 2016 (online surveys n=70) and July 2016 (phone surveys n=55). The parent questionnaire asks similar questions to the teacher questionnaire, except directed at parents. The questionnaire contains both quantitative and qualitative data which will be summarised in the section below.

Quantitative Data

Quantitative data can be divided into six different categories, as outlined below.

1. Success of the Programme

Parents were asked a number of questions regarding how successful they perceived the FDHEP to be in their child's school. These questions were based on a 5-point Likert scale with an answer of 1 being the most negative answer and 5 being the most positive answer. Results show that in general parents felt that their children enjoyed the FDHEP, felt the family support material was helpful and that it would be "very beneficial" if the FDHEP was introduced into all primary schools in Ireland (Figure 27).

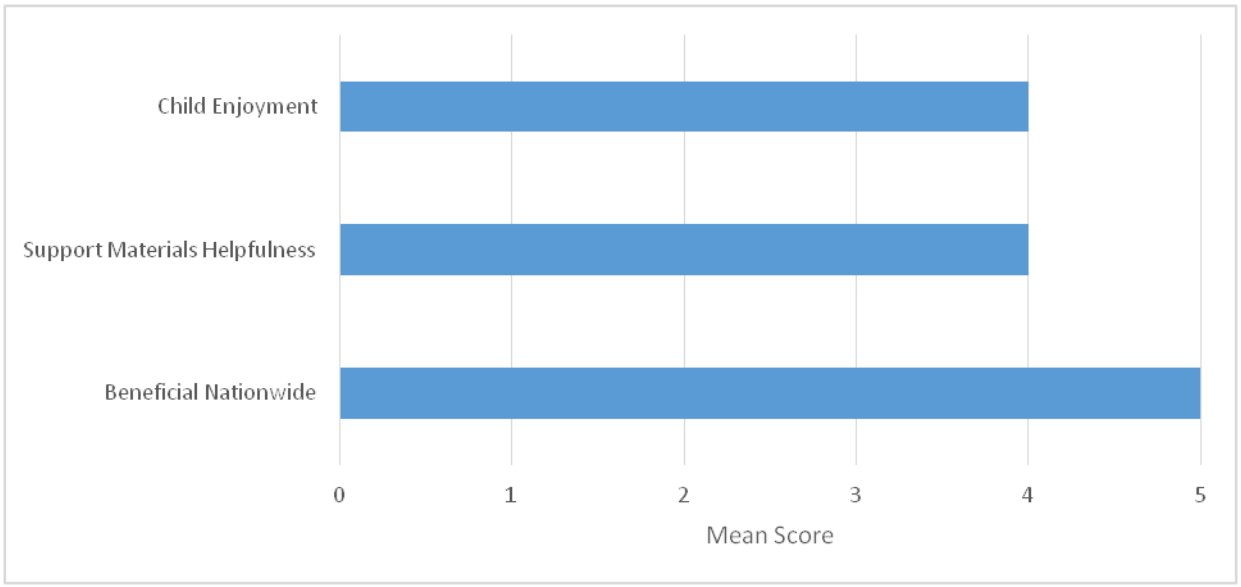

Figure 27. Mean score responses of 5-point likert scale questions within the Parent Questionnaire detailing parents perceived success of the FDHEP.

2. Elements of the Programme

To determine the success of individual elements of the programme, parents were asked to indicate which elements of the programme their children enjoyed and did not enjoy. As can be seen in Figure 28 below, rewards & certificates as well as snack-time fruit were elements of the FDHEP deemed most enjoyed by children as reported by their parents. Whereas snack-time vegetables and the Food Dudes DVD episodes were elements that parents reported most frequently as aspects of the FDHEP that were least enjoyed by their children (Figure 29).

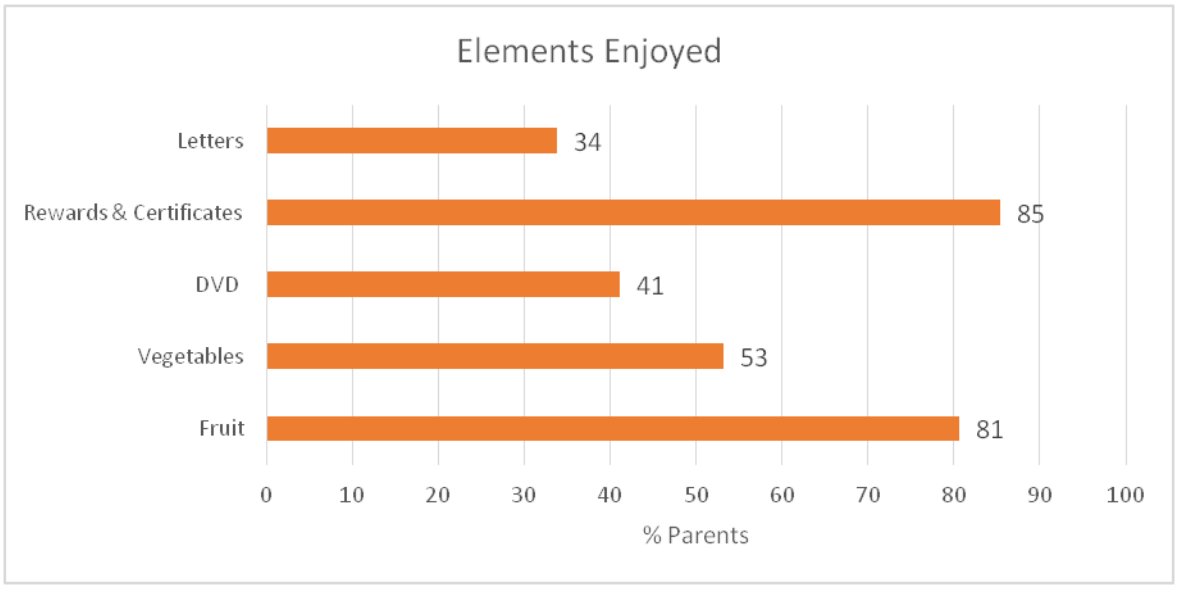

Figure 28.Percentage of parents who reported the specific elements of the FDHEP enjoyed by their children (n=124).

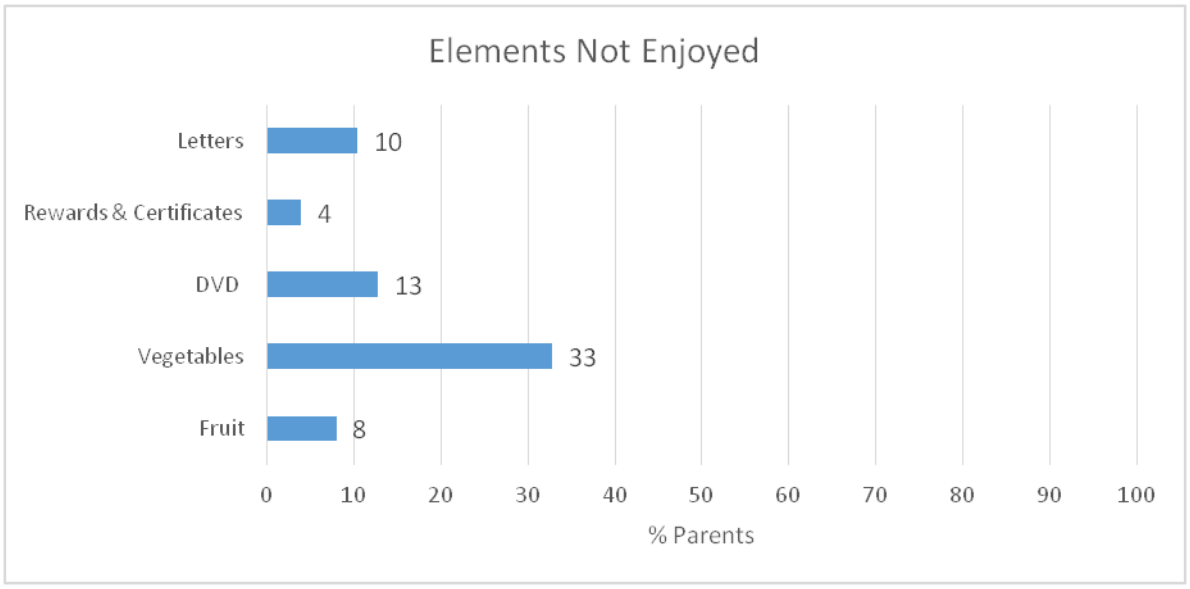

Figure 29. Percentage of parents who reported the specific elements of the FDHEP not enjoyed by their children (n=125).

3. Parent Provided Fruit & Vegetables

To assess change in F & V provision and consumption at school parents were asked a series of questions about changes in portions of F & V brought to school and eaten in school by their children since the FDHEP. As can be seen in Figure 30, the majority of parents reported an increase in one or more portions of F (67%) & V (66%) provided

for school with 68% of parents reporting their children also eating one or more portions of F and 63% of parents reporting their children eating one or more portions of V at school since the FDHEP.

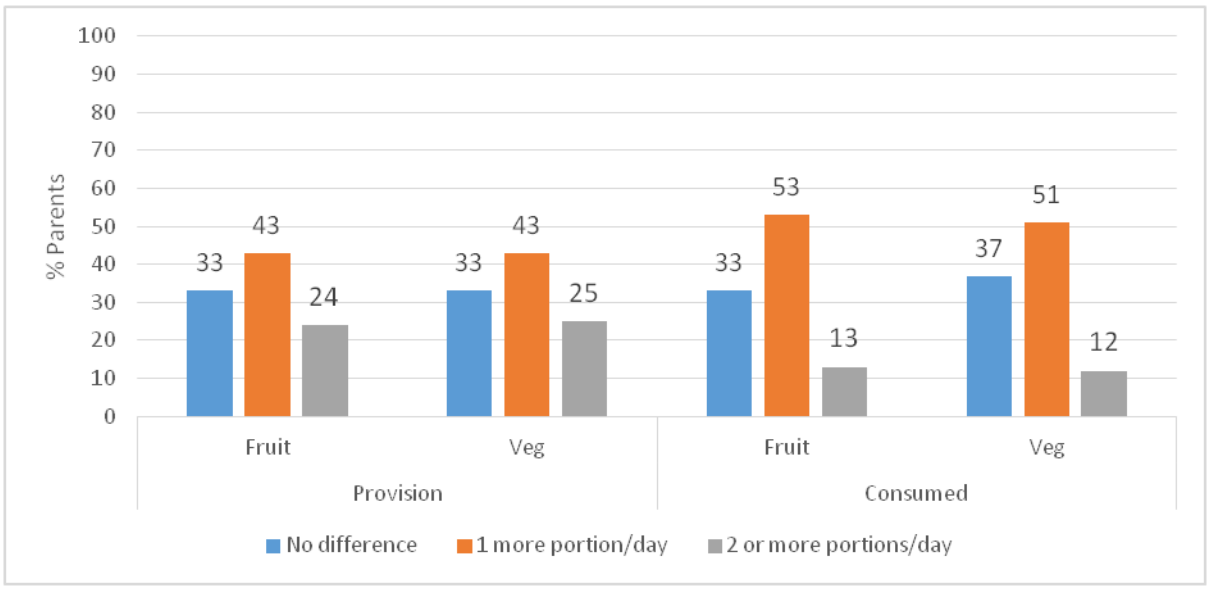

Figure 30. Percentage (%) of parents reporting changes in fruit and vegetable provision for school and consumption by their children at school following the FDHEP.

4. Parent Provided Snacks

To determine changes in child snack provision, parents were asked a series of questions relating to portions of various snacks high in fat, salt and sugar (HFSS) brought into school since the FDHEP. Very little differences were seen in changes in snack consumption as the majority of parents responded with "NA" (not applicable) (Figure 31). The reasons parents responded "NA" were: i) "I would not provide the above foods for my child's lunch" (33%), ii) "My child's school does not allow pupils to bring the above foods for lunch" (43%) and iii) other reasons (24%) including some parents reporting that although their child's school doesn't allow such foods in lunches, they would never provide such foods.

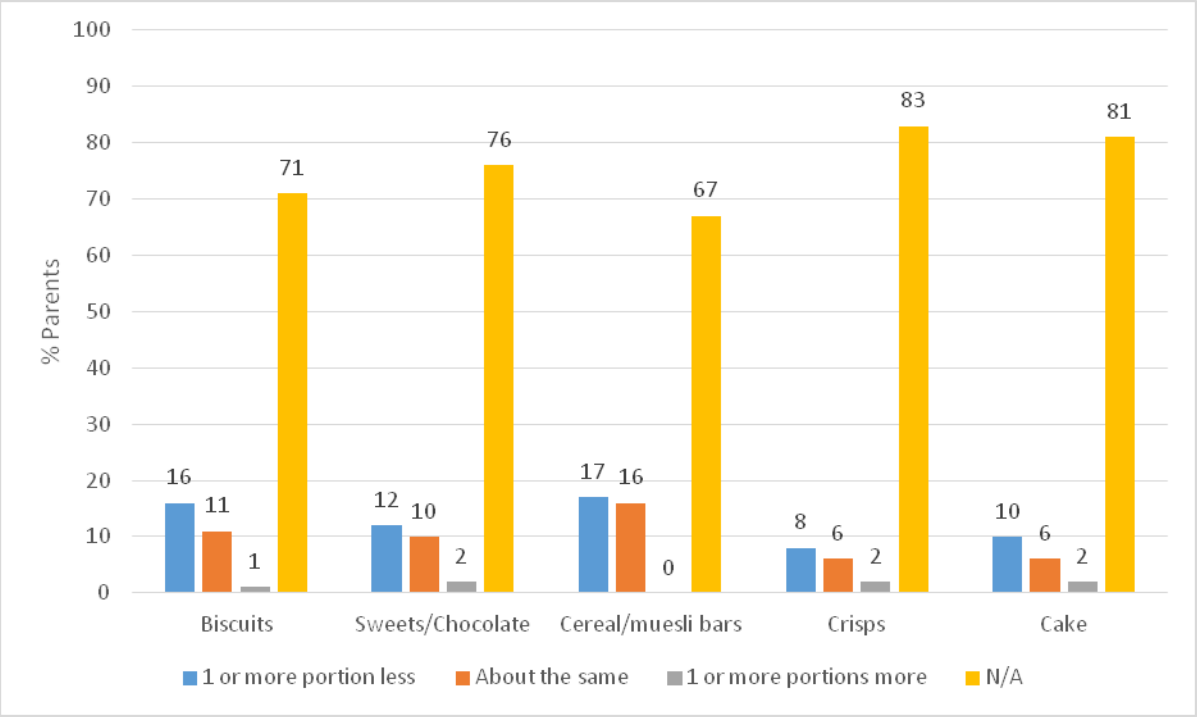

Figure 31. Percentage of parents reporting changes in provision of snacks to children since the FDHEP as per parent questionnaire.

5. Parent Fruit and Vegetables Consumption

Changes in parent's consumption of F & V since the FDHEP was also recorded via two questions in the Parent Questionnaire (Table 15). Half of parents responded that since the FDHEP they eat one or more extra portions of F & V, with the other half reporting that their consumption had not changed.

Table 15. Changes in parent consumption following FDHEP.

Question 10	**No difference**	**1 or more portions/day**
Since the FDHEP how many MORE portions of FRUIT do YOU eat each day? (n=123)	50%	50%
Since the FDHEP how many MORE portions of VEG do YOU eat each day? (n=123)	50%	50%

6. FDHEP Impacting Behaviour

Lastly, to assess if any other behaviour changes occurred as a result of the FDHEP, parents were asked to rate their level of agreement from 1 to 5 (1 being strongly disagree and 5 being strongly agree) for a series of questions regarding their child's behaviour since the FDHEP. Mean scores were calculated, with parents responses indicating that they somewhat agreed that their child was asking them to buy more fruit (n=120), however they "neither agree nor disagree" with statements relating to their child asking to buy more veg (n=118), improvements in child's concentration (n=119), behaviour (n=118), physical activity (n=119), general health (n=119) or child's interaction with other family members (n=119). These results are in line with the results from the class teachers, and indicate that parents did not perceive the FDHEP to impact on their child's behaviour aside from changes in F and V consumption.

Qualitative Data

Additional comments made by parents at the end of the Parent Questionnaire provided qualitative data which were grouped into themes that emerged throughout analysis. As with comments from the teachers, the parents' responses to the FDHEP were mixed with a variety of positive and negative comments. Overall child enjoyment of the programme emerged as one of the main key themes:

> *"My children really enjoyed the programme and have been asking to bring more fruit and veg to school"*

The programme's impact on F & V consumption was another theme that emerged from the positive comments:

"My youngest son would not eat fruit at all, now he's eating it every day… Thank you"

Lastly, the rewards used throughout the programme were another key positive element as reported by parents:

"They love the rewards system and this encourages them to bring more to school"

Themes also emerged from the negative comments made by parents, which centred largely on the lack of F & V variety throughout the course of the programme:

"Older kids were disappointed at variety of fruit and vegetables provided"

Furthermore, the quality of the F & V provided emerged as a theme from the parent's comments:

"The teachers and kids said the peppers and tomatoes provided did not taste nice compared to the ones they buy themselves"

Lastly, the delivery and suitability of the programme for senior pupils was another key negative theme identified throughout the negative comments:

"My 12 year old might have been a bit old for the way the programme is presented"

Overall parents reported being satisfied with the programme, with the positive comments outweighing the negative comments. A full list of all identified themes and comments is available.

4.2.6 Summary

Based on class teachers reporting via the FDQED, the FDHEP resulted in a significant increase in the number of senior pupils bringing and consuming one or more portions of F & V in school on a class level. Similar findings are reported by the teachers in the

Teacher questionnaire, where the majority of teachers reported an increase of one or more portions of F & V being brought to school and eaten in school by pupils in their class.

On an individual level, however, based on data collected by the researcher, on a subset of the senior pupils (n=161) a significant increase in the provision and consumption was only seen for portions of V. Further analysis revealed, that not only were significantly more portions of V being brought and consumed, but also significantly more senior pupils were bringing and consuming portions of V following the FDHEP. This indicates that the programme had positively impacted on the behaviour of pupils who had previously not brought or consumed any V in school, rather than solely further improving the behaviour of children who already brought V at baseline. It is worth noting that a reason for the lack of change seen in the amount of F provided and consumed in schools could be due to F provision and consumption levels being high at baseline. Indeed, 79% of senior pupils already brought one or more portions F to school at baseline, with 75% consuming it also.

Interestingly, consumption rates (as a percentage of those who brought) across baseline and follow-up from both the FDQED and the Lunchbox record forms were similar for F, V & S (Baseline: 88% - 96%; Follow-up: 88% - 100%). This highlights the importance of parental influence irrespective of the FDHEP, indicating that the majority of senior pupils will eat what is provided in their lunchbox.

No change in the provision or consumption of snacks by senior pupils was found on either a class or individual level following completion of the FDHEP. Likewise, no behavioural changes were identified as a result of the FDHEP based on teacher and parent data.

4.3 Study C

4.3.1 Response Rates

Figure 32 provides an overview of the response rates of the schools who fully particiapted in Study C evaluation, and shows that 88% of FDQEDs and 92% of Teacher Questionnaires were available for analysis. Of the 992 pupils who had consent from their parents to take part, 90% of them had their lunchboxes analysed at baseline, as with Study B the main reasons for the remaining 10% not being analysed were logistical issues and child assent. Of the lunchboxes analysed at baseline, 95% of those were analysed again for follow-up, the main reasons for the remaining 5% of lunchboxes not being analysed were due to absences and child assent.

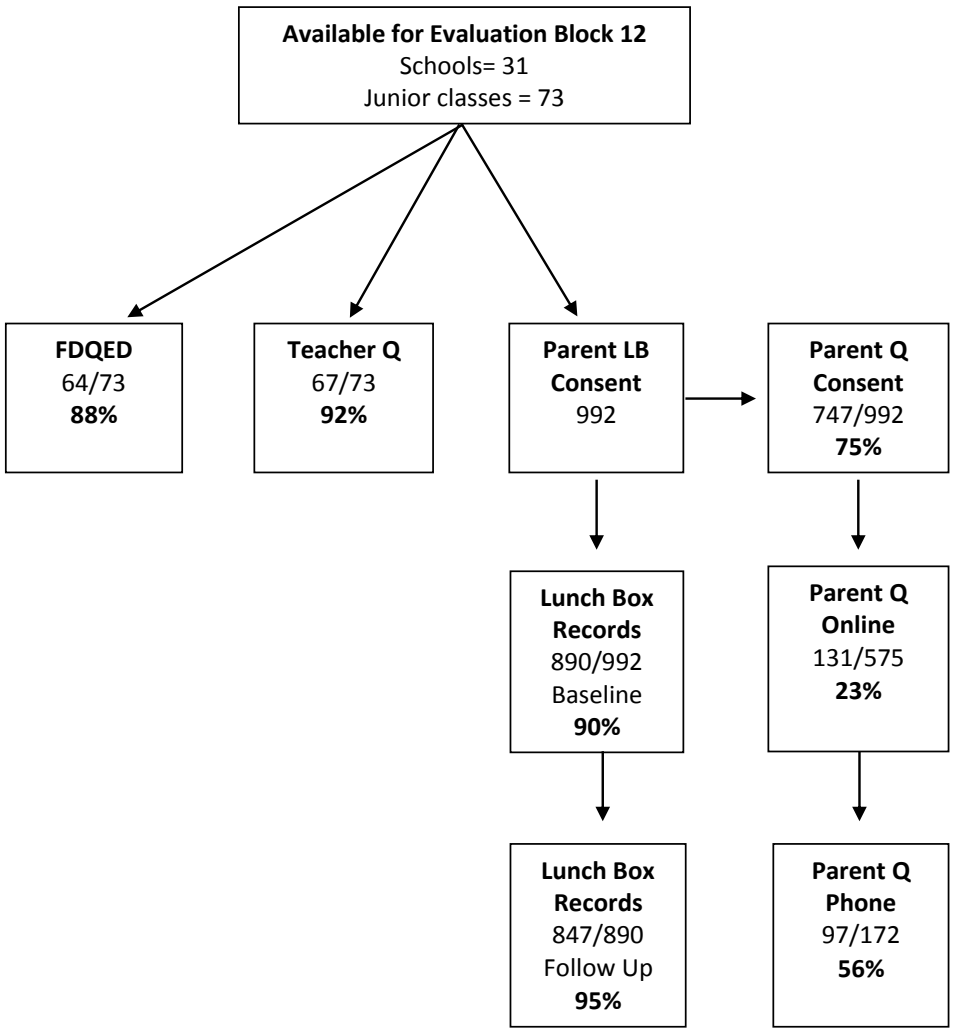

Figure 32. Response rates from Study C Schools participating in the Food Dudes Healthy Eating Programme Evaluation.

4.3.2 FDQED

FDQED results detailing the number of junior pupils who brought in and consumed one or more portions of F, V & S in school pre and post the FDHEP intervention can be seen below in Tables 16 and 17. As is evident in Figure 33, following the FDHEP intervention there was a significant increase in provision and consumption of one or more portions of V (34% vs. 7%, p=0.039; 26% vs. 5% p=0.044 respectively) for junior pupils. The increase in the proportion of junior pupils bringing in one or more portions of F at

follow-up did not reach significance (80% vs. 72%, p=0.053), however the proportion of pupils consuming one or more portions of F at follow-up was significantly greater than at baseline (65% vs. 52%, p=0.047). Significantly less junior pupils brought one or more portions of S to school at follow-up compared to baseline (51% vs. 58%, p=0.049), however the difference in the proportion of pupils consuming one or more portions of S at follow-up compared to baseline did not reach significance (42% vs. 49%, p=0.051).

*Table 16. Number (n) and percentage (%) of junior pupils in Study C evaluation who brought one or more portions of fruit, vegetables and snacks in to school before and after the FDHEP. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

	Study C FDQED Brought pre vs. post					
	Brought to School Pre (n=1108)			Brought to School Post (n=1077)		
	Fruit	**Veg**	**Snacks**	**Fruit**	**Veg**	**Snacks**
Total (n)	793	82	643	864	371*	551*
Total (%)	72%	7%	58%	80%	34%	51%

*Table 17. Number (n) and percentage (%) of the junior pupils in Study C evaluation who consumed one or more portions of fruit, vegetables and snacks in school before and after the FDHEP. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

	Study C FDQED Eaten pre vs. post					
	Consumed in School Pre (n=1108)			Consumed in School Post (n=1077)		
	Fruit	**Veg**	**Snacks**	**Fruit**	**Veg**	**Snacks**
Total (n)	579	55	546	699*	284*	448
Total (%)	52%	5%	49%	65%	26%	42%

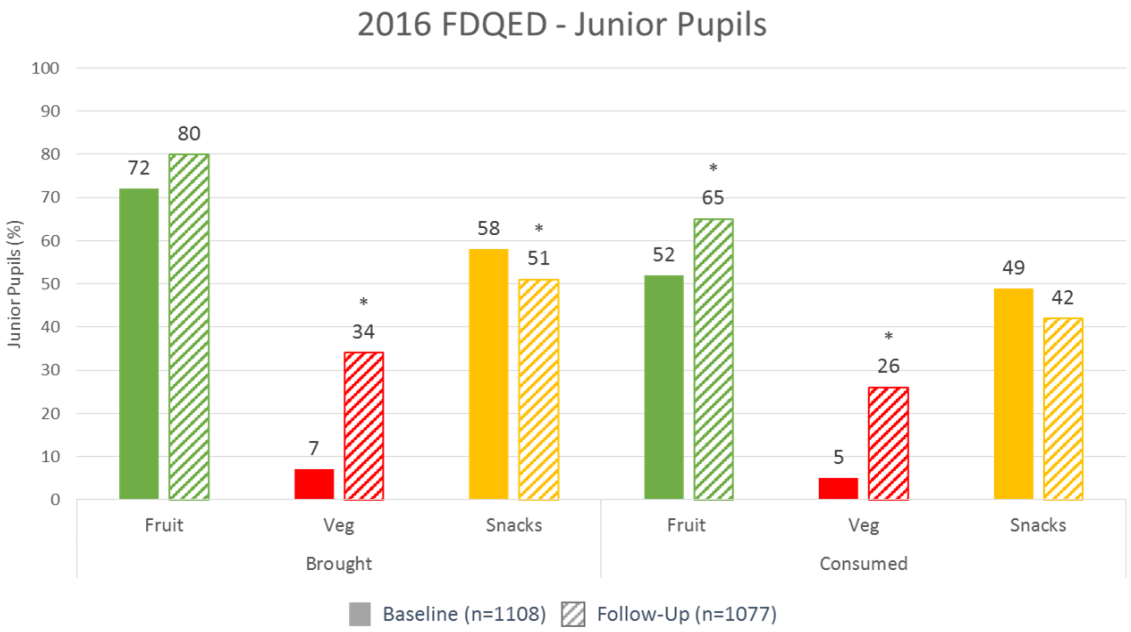

*Figure 33. The percentage of junior pupils who brought in and consumed fruit, vegetables and snacks in school before and after the FDHEP as per FDQED. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

Interestingly, as with Study B, the rates of consumption (as a percentage of the number of pupils who brought in one or more portion of F, V & S) have increased from baseline to follow-up for F & V following the FDHEP intervention (**F**: 81% vs. 73%; **V**: 77% vs. 67%) (Table 18). The consumption rates S (81% vs. 85%) have remained quite similar from baseline to follow-up. This indicates that the majority of junior pupils will eat one or more portions of F, V & S if it is provided in their lunchbox.

Table 18. Consumption rates of junior pupils pre and post the FDHEP intervention as recorded by teachers using the FDQED. Consumption rates are expressed as a percentage (%) of those who brought F, V & S to school.

FDQED 2016	**Consumption Rates Pre**			**Consumption Rates Post**		
	Fruit (n=793)	**Veg (n=82)**	**Snacks (n=643)**	**Fruit (n=864)**	**Veg (n=371)**	**Snacks (n=551)**
Total (n)	579	55	546	699	284	448
Total (%)	73%	67%	85%	81%	77%	81%

4.3.3 Lunchbox Record Form

As in Study B, lunchbox record forms were completed by the researcher before pupils' first break in the morning, and then again following their lunch break in the afternoon on both evaluation visits (September & October 2016). Out of 1623 lunchboxes recorded over the two visits pre and post the FDHEP intervention, 1228 were able to be matched up using the digital photographs. Therefore, 614 junior pupils lunchboxes with recordings from both pre and post FDHEP intervention were available for analysis.

Figure 34 shows the changes in total number of portions of F, V & S being brought to school, and consumed during the breaks following the FDHEP. A significant increase in the total number of portions of F (739 vs. 658, $p=0.002$) and V (222 vs. 68, $p\leq0.001$) being brought to school can be seen, accompanied with a significant decrease in the number of S (840 vs. 932, $p=0.006$) being brought into school by junior pupils.

These positive changes are mirrored in the number of portions of V & S being consumed in school by the pupils who brought them in, with a significant increase seen for V consumption (142 vs. 43, $p\leq0.001$) and a significant decrease seen in the number of S consumed (631 vs. 730, $p=0.001$). The increased number of portions of F consumed at follow-up did not approach significance (498 vs. 459, $p=0.052$).

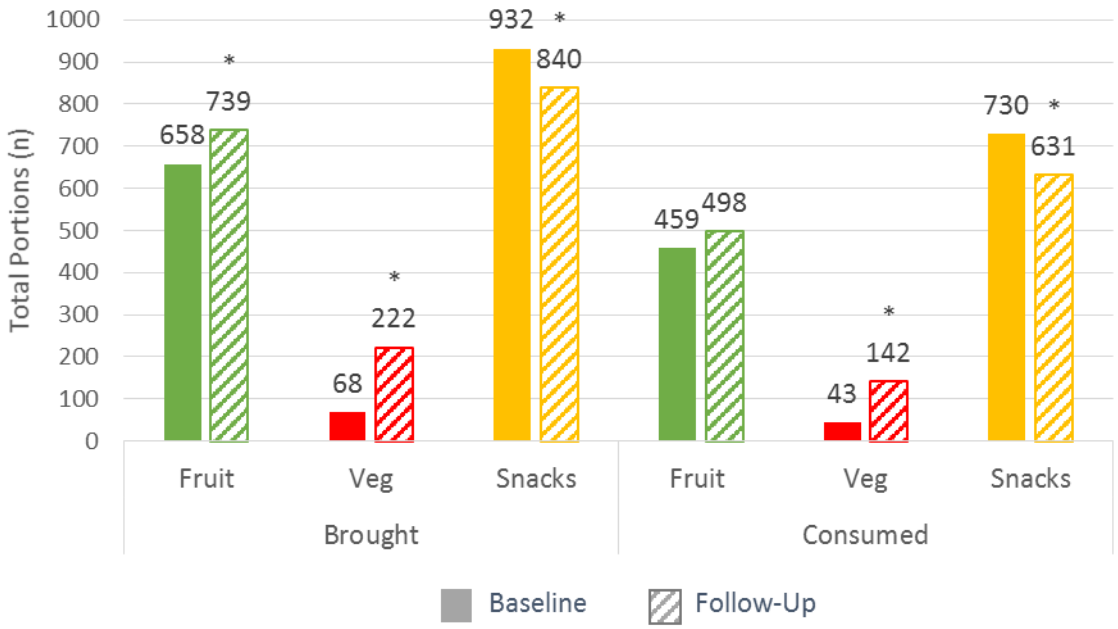

*Figure 34. The total number of portions of fruit, vegetables and snacks brought to school and consumed in school before and after the FDHEP by junior pupils (n=614) as recorded on the lunchbox record form. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

Figure 35 shows the percentage of junior pupils (n=614) who brought and consumed one or more portions of F, V & S in school at baseline and at follow-up. A significantly higher proportion of junior pupils brought in one or more portions of F & V at follow up (79% vs. 74%, p=0.019; 30% vs. 8%, p≤0.001 respectively) compared to baseline, however, no difference in the number of pupils bringing one or more portions of S at follow-up was seen (71% vs. 75%, p=0.068). With regards to consumption, a significant increase in proportion of pupils consuming one or more portions of V can be seen (19% vs. 6%, p≤0.001), coinciding with a significant decrease in the proportion of junior pupils consuming one or more portions of S (59% vs. 67%, p=0.002). However, no statistically significant increase in proportion of junior pupils consuming F was seen (57% vs. 53%, p=0.136).

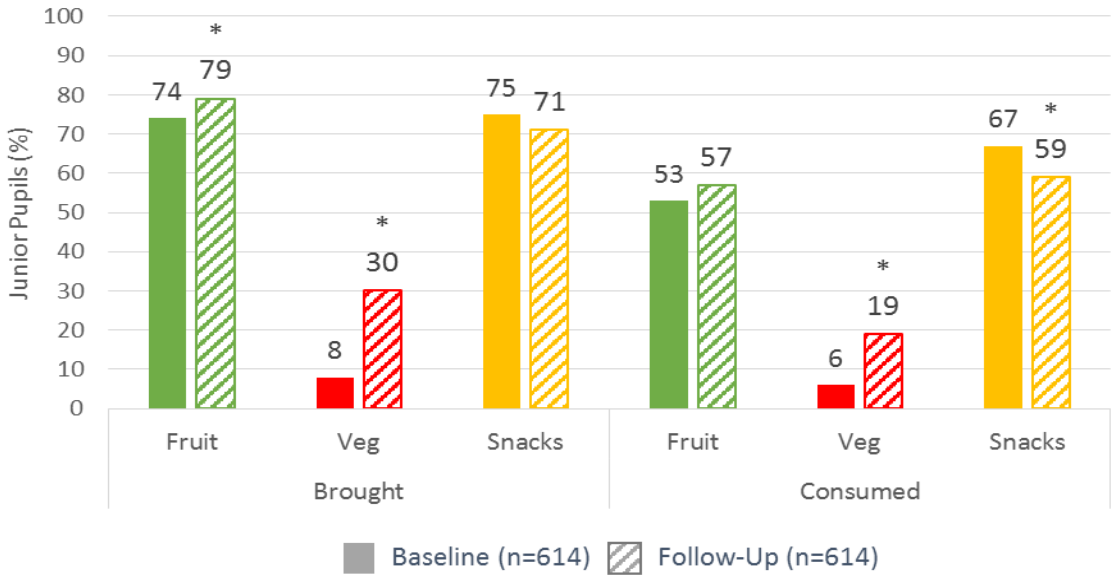

*Figure 35. Percentage of junior pupils (n=614) who brought 1 or more portions of F, V and S at baseline and follow-up. * denotes a significant difference from baseline, statistical significance was accepted at <0.05.*

The below Table shows the number of junior pupils who brought and the percentage of those who consumed one or more portions of F, V and S at baseline and at follow-up (Table 19). What is interesting to note, is that although a significant increase in the proportion of pupils consuming one or more portions of V can be seen ($p \leq 0.001$), and a significant decrease in the proportion of pupils consuming one or more portions of S is evident ($p=0.002$) (Figure 35), resulting from the significant differences in provision of such foods, the actual consumption rates (as a percentage of those who brought) have remained fairly consistent for baseline and follow-up. This indicates that the majority of junior pupils will eat what is provided in their lunchbox.

Table 19 Consumption rates of junior pupils taking part in the 2010-11 and 2016 evaluation study, pre and post the FDHEP intervention in 2010-11. Consumption rates are expressed as a percentage (%) of those who brought F, V & S to school.

	Consumption Rates Pre			**Consumption Rates Post**		
	Fruit (n=456)	**Veg (n=51)**	**Snacks (n=458)**	**Fruit (n=485)**	**Veg (n=185)**	**Snacks (n=434)**
Total (n)	326	34	409	348	115	365
Total (%)	71%	67%	89%	72%	62%	84%

4.3.4 Teacher Questionnaire

Questionnaires were completed by teachers at the end of the FDHEP in October 2016 (n=67). The questionnaire contains both quantitative and qualitative data which will be summarised in the section below.

Quantitative Data

Quantitative data can be divided into six different categories, as outlined below.

1. Success of the Programme

Teachers were asked a number of questions regarding how successful they perceived the FDHEP to be in their school. These questions were based on a 5-point Likert scale with an answer of 1 being the most negative answer and 5 being the most positive answer (one exception being question 7, in which 1 indicates there were no elements of the programme that were difficult to implement, and 5 indicating there were many elements). The responses to these questions have been reported as mean scores and can be seen in Figure 36.

On average, the teachers felt the FDHEP was between "quite a lot" and "very successful", with junior pupils "very much" enjoying taking part and teacher's considering it "very beneficial" for the programme to be introduced into all primary schools in Ireland. The visits from the Food Dudes Project Managers (FDPM) were deemed "excellent", and the programme was on average easy (between "quite easy" and "very easy") for teachers to incorporate into their daily routine however there were "some" elements considered difficult to implement. In general, teachers felt the culture of the school with regards to healthy eating had improved (between "a little" and "a lot") as a result of the FDHEP,

with the programme providing between “some benefits” and being “very beneficial” in relation to children’s enthusiasm for healthy eating.

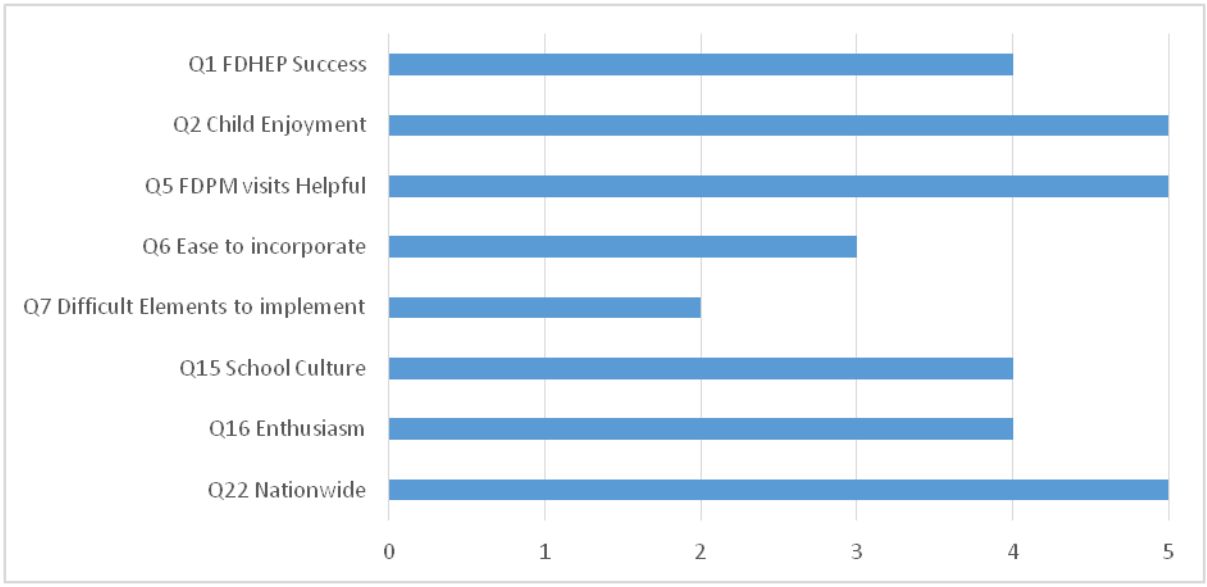

Figure 36. Mean score responses of 5-point likert scale questions within teacher questionnaire describing junior class teachers’ perceived overall success of FDHEP.

2. Elements of the programme

In order to determine how successful individual elements of the programme were amongst junior pupils, teachers were asked to select as many of their class’ most enjoyed and least enjoyed elements. As can be seen in Figure 37, rewards & certificates and the Food Dudes DVD episodes were the most commonly reported elements that junior classes enjoyed, with no teacher reporting their class did not enjoy the rewards and only 2% reporting their class did not enjoy the DVD element of the programme. Though the provided snack-time vegetables was reported by some teachers as an element that their class enjoyed, the majority of teachers noted the vegetables as one of the least enjoyed elements of the programme for their class followed by the Food Dudes letters (Figure 38).

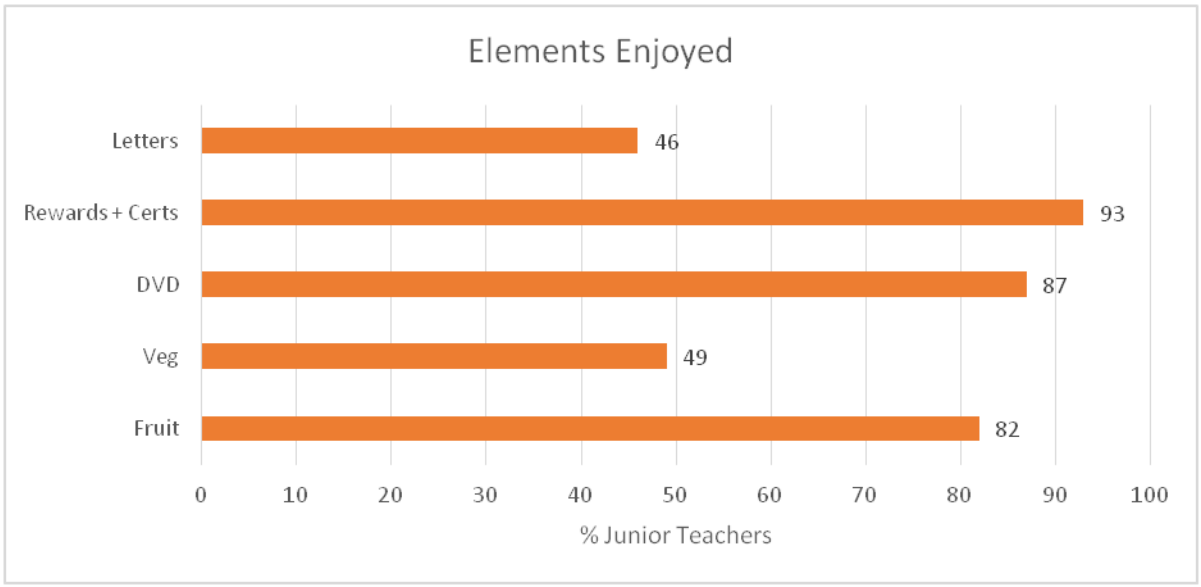

Figure 37. Percentage of junior teachers who reported their class' most enjoyed elements of the FDHEP.

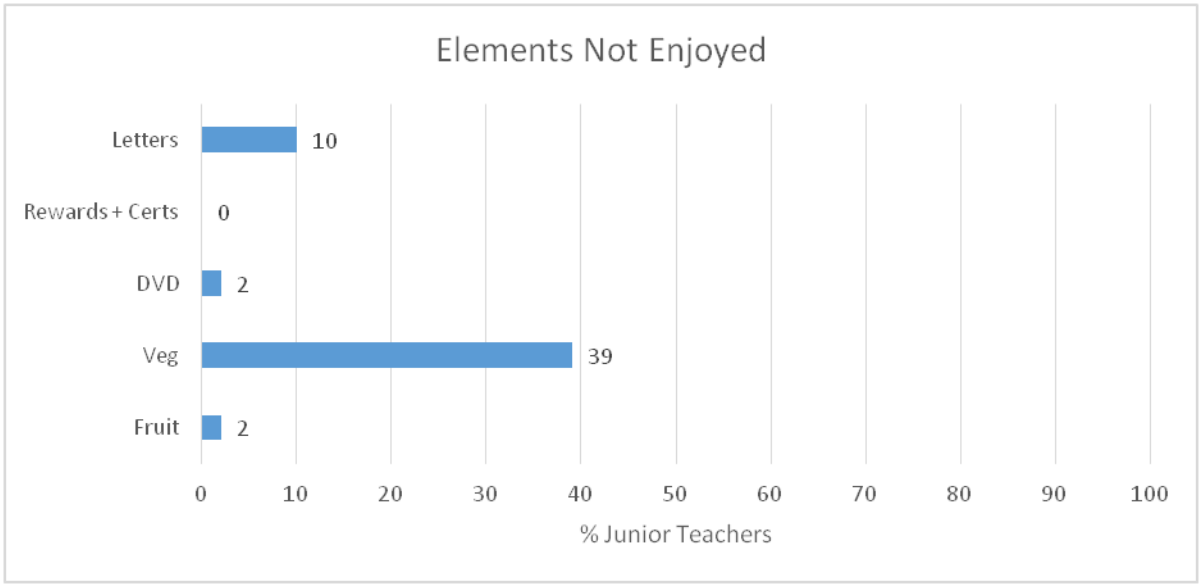

Figure 38. Percentage of junior teachers who reported their class' least enjoyed elements of the FDHEP.

3. Parent Provided Fruit & Vegetables

To assess change in F & V provision and consumption in the classroom teachers were asked a series of questions about changes in portions of F & V brought to and eaten in school since the FDHEP. Figure 39 shows that 61% of junior class teachers noted an increase of 1 more portion of F being provided in lunchboxes brought to school, and 34% of class teacher reported an increase of 2 or more portions of F being brought to

school following the FDHEP. Increases in consumption of F by pupils in the class were also reported, with 70% of teachers reporting an increase in F consumption by one portion a day and 27% reporting an increase in consumption by 2 or more portions a day by pupils who brought F to school. Similarly, the majority of teachers have also noted increases in the provision and consumption of V in their classrooms, with 85% reporting an increase in 1 more portion of V being brought to school, and 81% reporting an increase of 1 more portion of V being consumed in school following the FDHEP.

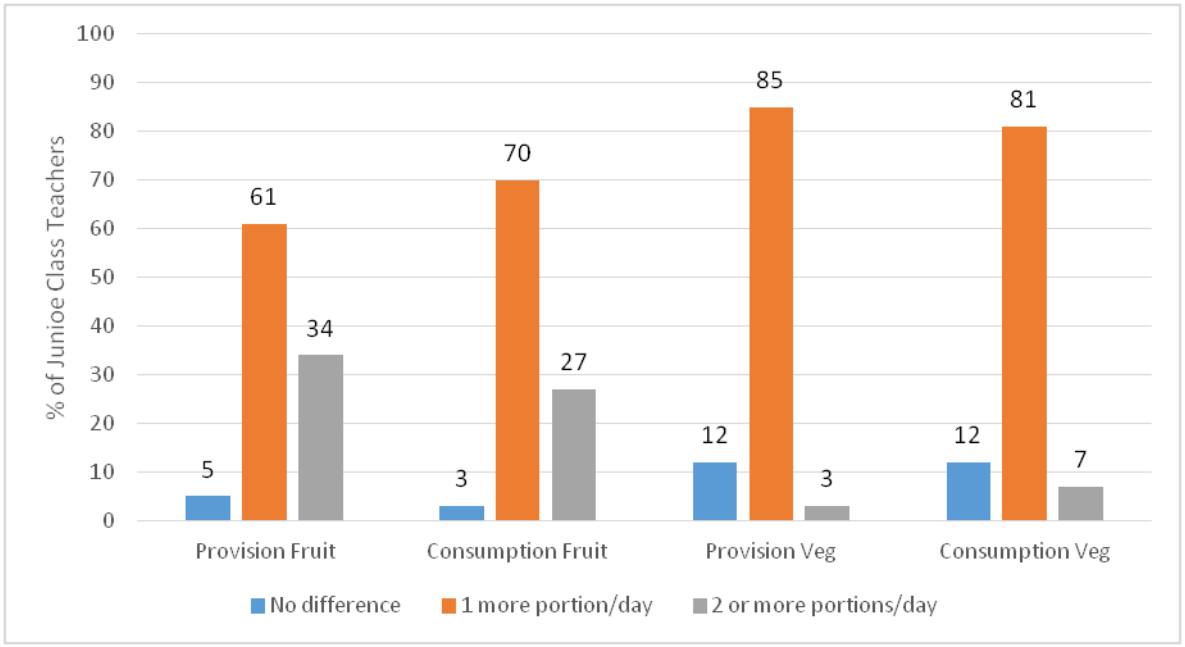

Figure 39. Percentage of junior class teachers reporting changes in provision and consumption of fruit and vegetables in their classrooms following the FDHEP.

4. Parent Provided Snacks

To determine changes in S provision among junior pupils, class teachers were asked how many more or less portions of various S high in fat, salt and sugar (HFSS) were brought into school since the FDHEP or if they stayed the same. As can be seen in Figure 40, the majority of teachers did not notice a difference in either provision or consumption of the various S following the FDHEP, apart from 55% of teachers who

reported a decrease in the number of portions of cake being brought to school in their class.

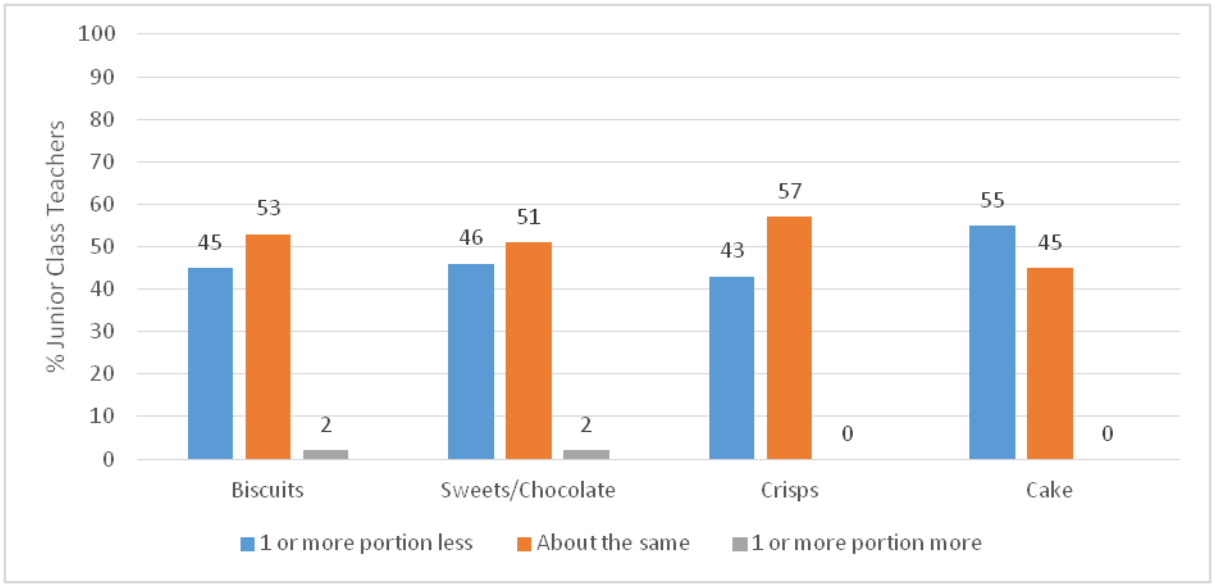

Figure 40. Percentage of junior class teachers who reported average changes in parent snack provision for junior pupils in their class.

5. Teacher fruit and vegetable consumption

Changes in junior class teacher's consumption of F & V since the FDHEP was also recorded via two questions in the Teacher Questionnaire. Only 17% of junior class teachers reported no difference in their consumption of F since the FDHEP, with the majority of teachers (83%) feeling they had increased their intake of F by one or more portions a day since the FDHEP. Similarly, the majority of junior class teachers (78%) reported an increase in their consumption of V by one or more portions a day following the FDHEP (Figure 41).

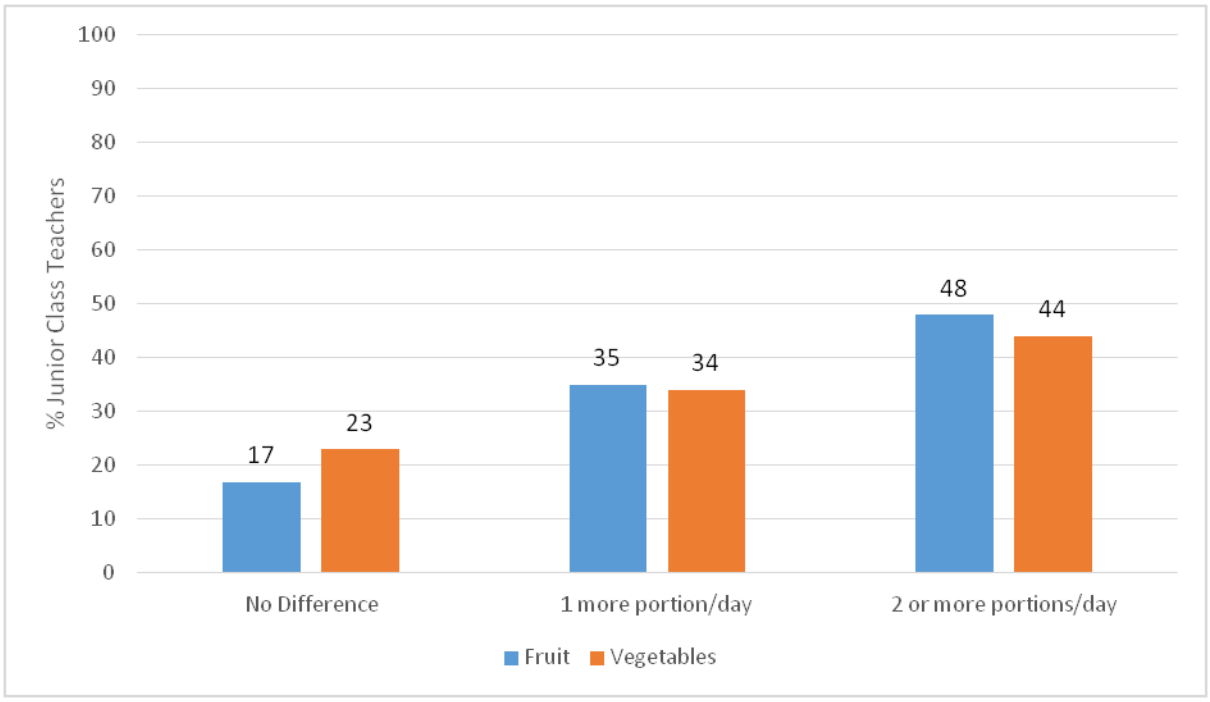

Figure 41. Percentage of junior class teachers' reported changes in fruit and vegetable consumption following the FDHEP.

6. FDHEP Impacting Behaviour

Lastly, to assess if any other behaviour changes occurred as a result of the FDHEP teachers were asked to rate their level of agreement from 1 to 5 (1 being strongly disagree and 5 being strongly agree) for a series of questions regarding behaviour in school following completion of the FDHEP. Mean scores were calculated for each question, revealing that as with senior class teachers, the junior class teachers "neither agree nor disagree" with any of the statements relating to improvements in children's concentration or behaviour in class, improvements in children's physical activity at breaks, improvement in children's attendance at school or improvements in children's interaction with peers following the FDHEP. These results are in line with results from senior teacher's responses in Study B, indicating that according to teachers, the FDHEP did not impact on any other behaviours aside from F and V provision and consumption.

Qualitative Data

As with Study B, the Teacher Questionnaire allowed for teachers to provide comments and feedback regarding the FDHEP. This provided qualitative data which was grouped into themes that emerged throughout analysis. Teachers' responses to the FDHEP were mixed with a variety of positive and negative comments.

The key themes that emerged from positive comments were overall satisfaction with the programme and class enjoyment:

> *"The children in my class enjoyed the programme as they are the optimum age I believe – 6/7"*

Likewise, teachers reported being satisfied with the quality of the F & V provided during the programme:

> *"Fruit and veg were excellent quality"*

Another positive theme that emerged from the comments was the use of the rewards, certificates and the support materials supplied:

> *"Looked forward to the lunchboxes. Both boxes and bottles are in constant use"*

Lastly, the effect the programme had on the class' F & V consumption was another positive key theme to emerge through analysis:

> *"As an infant teacher, saw a great improvement in lunchboxes"*

The negative themes that emerged included the amount of time and practicality of implementing the programme in junior classes:

> *"Takes up a lot of teaching time. Can be difficult to administer particularly in a junior classroom without additional teachers/assistants"*

The lack of variety in the F & V supplied emerged as another key theme:

> *"I feel they would have enjoyed it more if the fruit was more exciting…most of the children bring apples, oranges and bananas to school anyway"*

Another theme that emerged in the negative comment was disappointment in the quality and quantity of the rewards, prizes and support materials provided:

> *"Some e.g. pedometer, broke quite easily and children were disappointed"*

Furthermore, many teachers expressed the difficulty in getting children to try F&V:

> *"Children struggled with cucumber and mangetout and bananas"*

The amount of waste associated with delivering the programme was another key theme that emerged in the comments of junior teachers:

> *"Large amount of packing used… feel there is a much more environmentally friendly way of supplying F&V"*

Lastly, the suitability of the Food Dudes DVD episodes emerged as a theme throughout the negative comments:

> *"The gaeilge option is just subtitles and is unsuitable for Naiorain Bheaga. Simplified versions of the cartoons need to be available as Gaeilge"*

4.3.5 Parent Questionnaire

In line with the protocol for Study B, questionnaires were completed by parents at the end of the FDHEP during November and December 2016 (Online surveys n=126, phone surveys n=97). The parent questionnaire asks similar questions as in the teacher questionnaire, except directed at parents. The questionnaire contains both quantitative and qualitative data which will be summarised in the section below.

Quantitative Data

Quantitative data can be divided into six different categories, as outlined below.

1. Success of the Programme

Parents were asked a number of questions regarding how successful they perceived the FDHEP to be in their child's school. These questions were based on a 5-point Likert scale with an answer of 1 being the most negative answer and 5 being the most positive answer. Results show that parents felt that their children in junior classes enjoyed the FDHEP "very much", felt the family support material was "very" helpful and that it would be "very beneficial" if the FDHEP was introduced into all primary schools in Ireland (Figure 42).

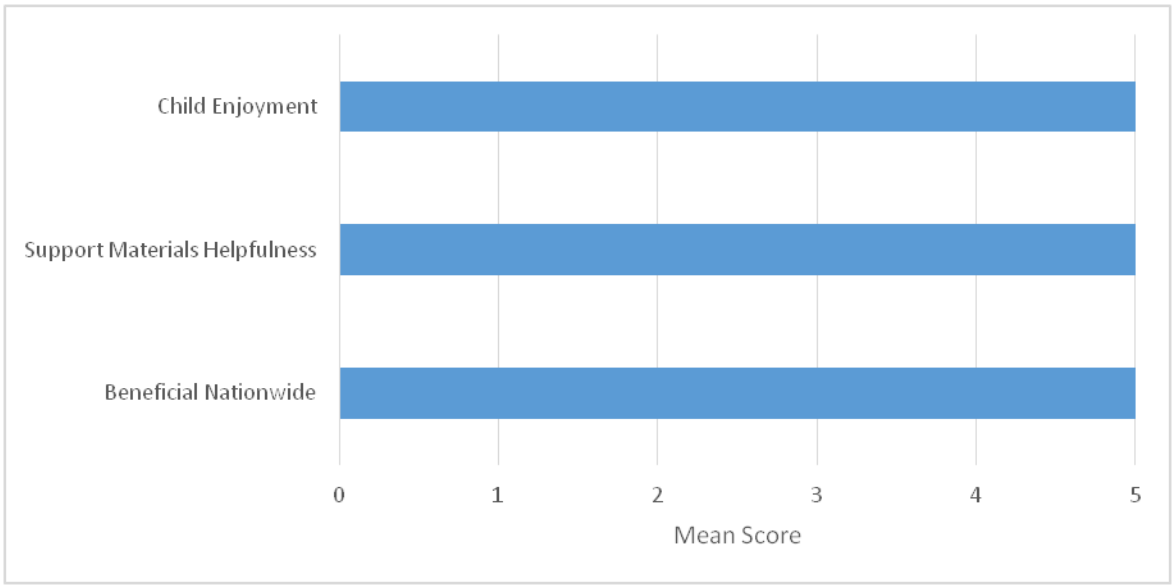

Figure 42. Mean score responses of 5-point likert scale questions within the Parent Questionnaire detailing parents perceived success of the FDHEP.

2. Elements of the Programme

Parents of junior class pupils indicated which elements of the FHDEP their children enjoyed and did not enjoy. In line with results from senior pupils' parents in Study B, rewards & certificates and snack-time fruit were elements most frequently reported as elements enjoyed and snack-time vegetables deemed as an element of the programme most frequently not enjoyed (Figure 43). In contrast to findings from Study B, junior pupils appear to enjoy the Food Dudes DVD episodes more than senior pupils, whose parents reported it more frequently as an element that their child did not enjoy in comparison to parents of junior pupils (Figure 44).

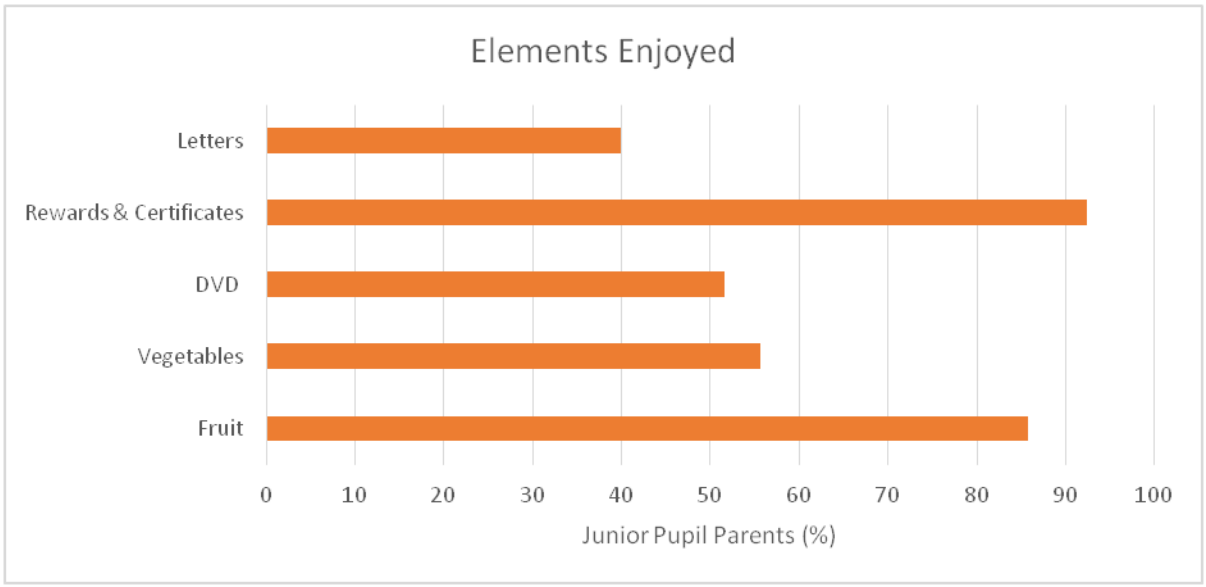

Figure 43. Percentage of parents who reported the specific elements of the FDHEP enjoyed by their children (n=223).

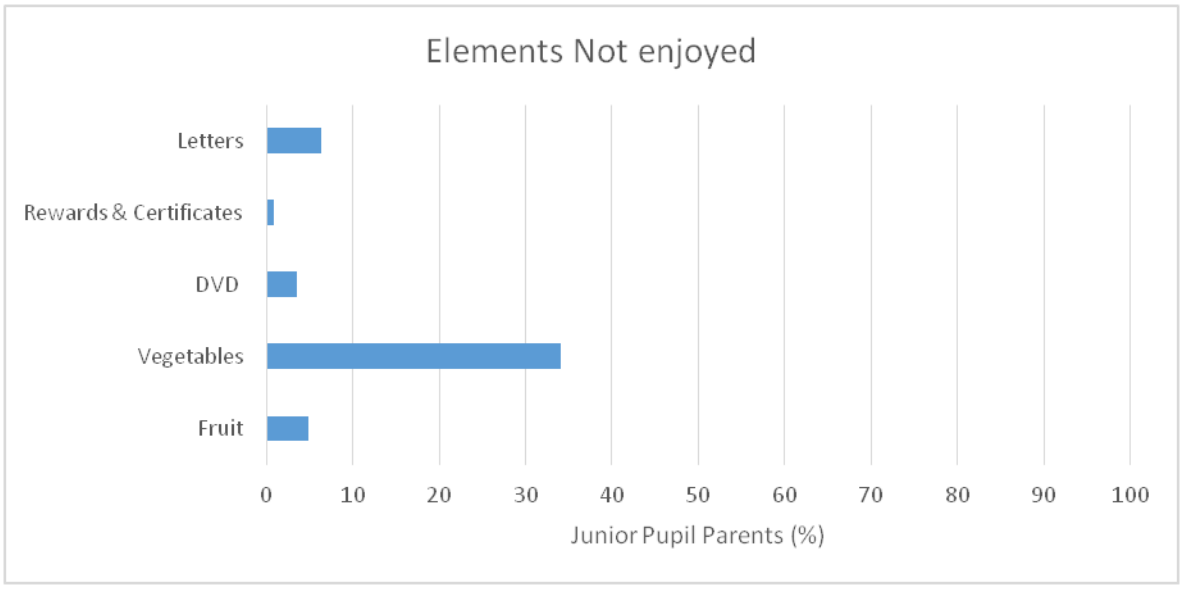

Figure 44. Percentage of parents who reported the specific elements of the FDHEP not enjoyed by their children (n=223).

3. Parent Provided Fruit & Vegetables

To assess change in F & V provision and consumption at school, parents were asked a series of questions about changes in portions of F & V brought to school and eaten in school since the FDHEP. The majority of parents reported an increase in portions of F (74%) & V (67%) provided in school lunchboxes with 74% of parents reporting their

children also ate one or more portions of F and 61% of parents reporting their children ate one or more portions of V per day at school (Figure 45).

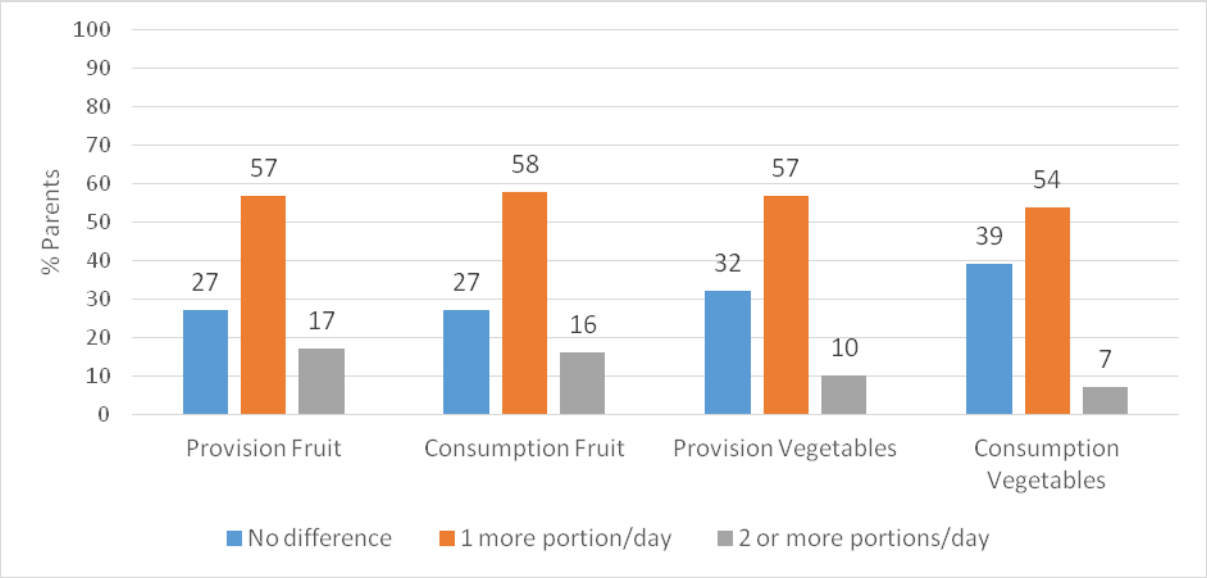

Figure 45. Percentage of parents reporting changes in fruit and vegetable provision for school and consumption by their children at school following the FDHEP.

4. Parent Provided Snacks

To determine changes in child snack provision parents were asked a series of questions relating to portions of various S high in fat, salt and sugar (HFSS) brought into school since the FDHEP. As with results from Study B, very little differences were seen in changes in S consumption as the majority of parents responded with "NA" (not applicable) (Figure 46). The reasons parents responded "NA" were: i) "I would not provide the above foods for my child's lunch" (43%), ii) "My child's school does not allow pupils to bring the above foods for lunch" (31%), iii) the parent would not provide such foods, and the school does not allow such foods (23%) and iv) other reasons (3%) such as parents providing treats on a Friday only.

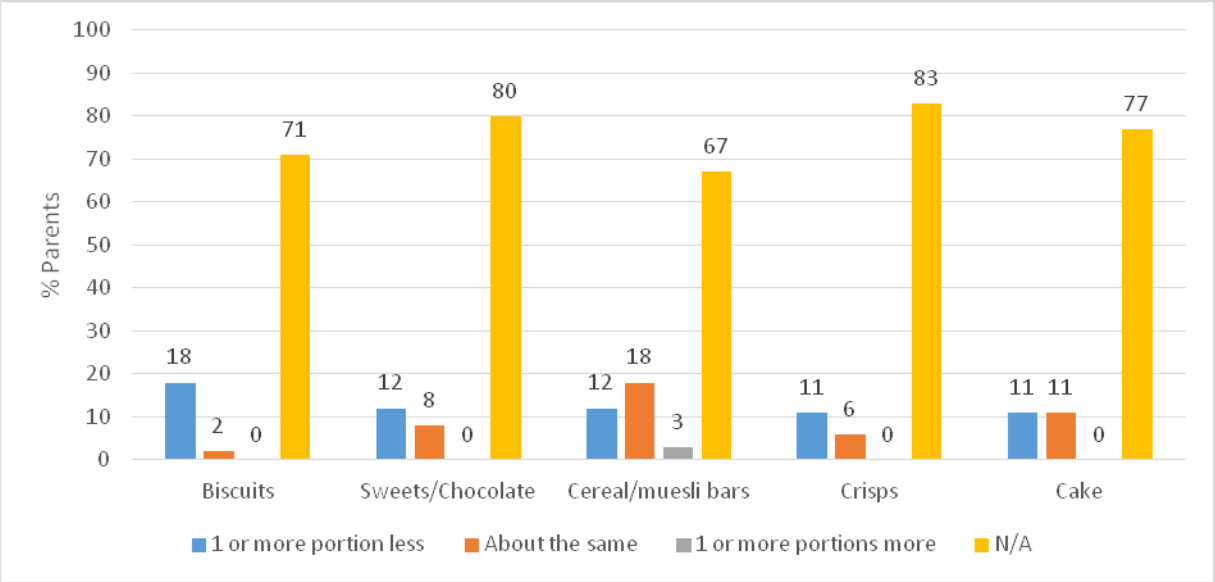

Figure 46. . Percentage of parents reporting changes in provision of snacks to children since the FDHEP as per parent questionnaire.

5. Parent Fruit and Vegetables Consumption

Changes in parent consumption of F & V since the FDHEP was also recorded via two questions in the Parent Questionnaire (Table 20). Similar results as found in Study B were found in this study, with half of parents responding that since the FDHEP they eat one or more extra portions of F & V, with the other half reporting that their consumption had not changed.

Table 20. Changes in parent consumption following FDHEP.

Question 10	**No difference**	**1 or more portions/day**
Since the FDHEP how many MORE portions of FRUIT do YOU eat each day? (n=223)	49%	51%
Since the FDHEP how many MORE portions of VEG do YOU eat each day? (n=223)	51%	49%

6. FDHEP Impacting Behaviour

As in Study B, occurrence of other behaviour changes as a result of the FDHEP was assessed by asking parents to rate their level of agreement from 1 to 5 (1 being strongly disagree and 5 being strongly agree) for a series of questions regarding their child's behaviour since the FDHEP. Mean scores were calculated, with parents responses indicating that they "strongly agreed" that their child was asking them to buy more fruit (n=150), however they "neither agree nor disagree" with statements relating to their child asking to buy more veg (n=141), improvements in child's concentration (n=127), behaviour (n=124), physical activity (n=128), general health (n=128) or child's interaction with other family members (n=125). These results are in line with the results from Study B, and mirror the opinions of the junior class teachers, indicating that parents did not perceive the FDHEP to impact on their child's behaviour aside from changes in F and V consumption.

Qualitative Data

Additional comments made by parents at the end of the Parent Questionnaire provided qualitative data which were grouped into themes that emerged throughout analysis. As with comments from the teachers, the parents' responses to the FDHEP were mixed with a variety of positive and negative comments. In line with parent responses in Study B, the comments made by parents of junior class pupils were largely positive. Key themes that emerged from positive comments were overall enjoyment & satisfaction with the programme:

"I think it is a really good initiative"

The impact the programme has had on F & V consumption of their children emerged as a key theme:

"Since Food Dudes they are much better at trying new vegetables"

Likewise satisfaction with the support materials provided emerged as a theme in positive comments:

"The plastic lunchbox given is very handy"

Themes also emerged from the negative comments made by parents, which centred on the delivery of the programme:

"I disagree with the food tasting sessions being held during the child's break time"

Overall parents of junior class pupils reported being satisfied with the programme, with many providing suggestions to further improve the programme particularly to increase parent involvement with the programme

"I would have liked to know what fruit and vegetables would be given and on what days"

A complete list of all identified themes, comments and suggestions is available.

4.3.6 Summary

Results revealed changes in the F, V and S provision and consumption varied based on a class and individual level. On a class level, the FHDEP positively impacted provision of F and S. Furthermore, using the FDQED teachers also reported a significant increase in the proportion of pupils consuming one or more portion of F & V at school following the FDHEP.

Based on more detailed data collected by the researcher on an individual level (n=614), the FDHEP resulted in a significant increase in the total number of portions of F & V being brought to school, accompanied by a significant decrease in the number of portions of S being brought to school. In terms of consumption, a significant increase was seen for total portions of V and a significant decrease was evident for total portions of S. When analysed further, the changes in portions seen for F and V being brought to school was as a result of a significantly higher proportion of junior pupils bringing one or more portions to school. No difference, however, was seen in the proportion of pupils bringing portions of S to school, indicating that pupils who brought multiple S at baseline were bringing less portions at follow-up.

5. Conclusion

The Food Dudes Healthy Eating Programme has a positive short-term impact on F & V provision and consumption in line with previous studies (1, 2). Furthermore, present findings indicate the programme has a positive long-term impact compared to the absence of an intervention.

Current results reveal that the intervention appears to be particularly effective in younger pupils with more pronounced impact on behavioural outcomes observed. This finding is supported by the comments made by teachers of both junior and senior classes, with junior class teacher more often citing the programme's suitability for the pupils' age group.

The present study also indicates that the intervention improves long-term behavioural outcomes in terms of F & V provision and consumption compared to the absence of an intervention. Though the immediate post-intervention impact was not sustained to the same degree over a six year period, nevertheless, it remained significantly higher than the original pre-intervention impact. Furthermore, the Food Dudes boost intervention in the senior cycles had a further positive impact on behaviours relating to F & V provision and consumption.

When interpreting the results relating to the long-term impact of the programme, it is worth noting that the pupils received the 16-day tasting intervention in 2010-11 when they were in junior classes, followed by the 8-day tasting intervention six years later once they had progressed to senior classes. Therefore, at follow-up, pupils were exposed to a less intense delivery of the programme. This could potentially provide insight into the lower positive impact of the programme seen in 2016. However, when taking the result of both Study B and Study C into account, a distinct difference in

response to the programme is seen between junior and senior pupils, indicating that the lower level of improvements seen could also be attributed to fact that the programme appears to be most effective with younger pupils.

Furthermore when interpreting the results of both the long- and short-term studies, the following must be borne in mind. Firstly, the teacher completed FDQED used throughout all studies, though provides a convenient means to capture dietary behaviour relating to F, V & S provision and consumption on a class level, as with many dietary measurement tools, it is not without limitation. Indeed, as it is completed by the teacher it relied on the teacher's interpretation of what constituted a portion of F, V or S. In order to account for this, all teachers were provided with both verbal and written explanation of portion sizes, however, in a busy classroom there is a possibility that this could lead to errors when reporting. Furthermore, the FDQED records number of pupils, and cannot distinguish between the numbers of actual portions a pupil has brought to school. For instance, if one pupil brought in one piece of F at baseline, and brought in three portions at follow-up, on both occasions this pupil would be recorded as one on the FDQED. The FDQED may therefore not be a sensitive enough tool to accurately capture behavioural changes resulting from the programme in terms of portions of F, V & S. For this reason, researcher reported estimation of portion sizes were included in the methodology for both Study B and Study C, thereby adding a more complete view of behavioural changes occurring following the programme. Furthermore, in the present studies due to consent and assent restrictions, the FDQED could not be validated using the researcher reported visual estimations due to differences in total number of lunchboxes evaluated by each measurement tool (i.e. the researcher recorded less lunchboxes than the teacher).

Secondly, it is important to bear in mind that schools selected to take part in the evaluation were limited to those who elected to take part in the current blocks of the FDHEP as organised by Real Nation. Therefore, results expressed in the current report based on the distribution of evaluated schools across eight different counties, may not be explicitly representative of all primary schools in Ireland.

An interesting finding that has emerged across all three studies is that consumption rates were high at baseline and remained high at follow-up when increased portions were brought. This suggests that the majority of children ate what was provided in their lunchbox even when additional portions of F & V were provided at follow-up. This underpins and highlights the importance of parental influence on children's eating practices in school. This finding, coinciding with teachers reporting the need for parent involvement:

"Parental involvement needs to be increased to see improvement"

As well as parents wanting to be more involved:

"Would like to see more information for parents"

is an avenue worth exploring for future improvement of the FDHEP.

Overall, both teachers and parents have reported satisfaction with the programme and wanting to see it continued and rolled out nationwide. Likewise, areas for improvement have been highlighted by teachers and parents alike to further enhance the programme.

The desire for increased parental involvement and engagement in the programme has been cited by both parents and teachers, and based on the aforementioned consumption rates, could potentially lead to even further improvements in F and V consumption. Furthermore, the amount of waste associated with the delivery of the programme

caused dissatisfaction with some teachers, therefore identifying a more sustainable way to deliver the programme in the future would be beneficial.

Lastly, based on the findings outlined in this report, including comments made by teachers and parents alike, an area that warrants further investigation is the possibility of incorporating information on decreasing S consumption into the programme. In Study B in particular, though improvements were seen on an individual level in terms of V provision and consumption, no change was seen in the provision or consumption of S, indicating that pupils are not replacing unhealthy snacks with F and V, but merely eating them in addition.

An aspect of the present evaluation worth highlighting is that it is the first study evaluating the long-term impact of the FDHEP in Ireland, with data from fifth and sixth class pupils having been successfully matched up and compared to data collected six years prior. Current findings provide valuable information on the effectiveness of the FDHEP as well as insight into avenues to explore for further improvement of the programme.

In the current environment, where childhood obesity is a global concern, the Food Dudes Healthy Eating Programme is a very welcome initiative. This report has outlined the positive impact the programme has in both the short- and long-term, and has highlighted areas that warrant further exploration in order to ensure the programme continues to deliver a lasting positive impact on F & V consumption of Irish primary school aged children.

6. References

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7. Acknowledgements

We are indebted to the children and teachers who participated in the studies and to their parents who consented for their child to take part and those who themselves took part in the parent questionnaires. Further, we wish to thank all the principals involved in the studies.

The below table presents all those who have worked on the studies evaluating the Food Dudes Healthy Eating programme.

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	Caroline Brilley	
	Emma Coyle	
	Jill Daly	
	Aoife Flynn	
	Caroline Lowry	
	Louise Lynch	
	Rebecca McGrath	
	Noleen McGuirk	
	Karen Menton	
	Gillian O'Brien	
	Karla Smuts	
	Éilis Sutton	
Food Dudes Senior Project Manager	Lyndsey Whyte	Real Nation
Contributor	Mike Neary	Bord Bía
	Marian Byrne	Department of Agriculture, Food and the Marine
	Brendan Doggett	
	Maeve Lynch	
	Carmel O'Keefe	

8. Appendices

Appendix 1: Pupil Information Sheet

Lunchbox Project

Student Information Sheet

We are researchers from UCD and are inviting you and your parent to take part in a very special project.

What is this project about?

Our project is a Lunchbox Project and will look at what type of food you bring into school for your lunch. We are doing this research as we think this information is really important to help us to try improve the types of food we bring to school. It is your decision whether you want to take part in this project and you can change your mind at any time.

What will this information be used for?

The information you tell us about will help us try and make school lunches better.

What are the benefits of taking part?

If you choose to take part in this project you will help us find out more about the type of food children bring to school. We hope to use this information to help make school lunches better for all children in Ireland.

Are there any risks of taking part?

No there are no risks.

Can I change my mind if I decide I don't want to take part?

It is your decision whether you want to take part in this project and you can change your mind at any time.

What happens if I take part?

[3rd to 6th classes only]: Your teacher will hand out a short questionnaire which asks questions about the food you eat. You don't have to write your name on the sheet and you don't have to fill in the questionnaire. Just hand the sheet back to your teacher at the end.

[All classes] If you want to take part in this project, a person called a Researcher will take a photo your lunchbox and record the items in the lunchbox.

If you would like to take part in this project simply put a GREEN sticker on your lunchbox.

If you don't want to take part in this project put a RED sticker on your lunchbox.

THANK YOU!

Appendix 2: Child Nutrition Survey

Nutrition Survey

At UCD we are really interested in what kind of food you eat. If you would like to help us gather information on the food you eat please answer the questions below. Please tick the box which is the most like your answer. For the questions with no boxes just fill in your answers in spaces provided. This is an anonymous survey - you don't have to tell us your name, class or school. If you don't want to take part, just return the survey to your teacher.

1. How often do you eat fresh fruit?
   - Never ☐
   - 1-3 portions/day ☐
   - 3+ portions/day ☐

2a. How often do you eat raw vegetables?
   - Never ☐
   - 1-3 portions/day ☐
   - 3+ portions/day ☐

2b. How often do you eat cooked vegetables?
   - Never ☐
   - 1-3 portions/day ☐
   - 3+ portions/day ☐

3. Do you bring fruit to school?
   - Never ☐
   - 1-3 times/week ☐
   - 4-5 times/week ☐

4. Do you bring vegetables to school?
   - Never ☐
   - 1-3 times/week ☐
   - 4-5 times/week ☐

5. Do your parents eat fruit? Yes ☐ / No ☐

6. Do you have access to fruit at home? Yes ☐ / No ☐

7. Do your parents eat vegetables? Yes ☐ / No ☐

8. Do you have access to vegetables at home? Yes ☐ / No ☐

9. Do you remember taking part in any fruit & vegetable activity in school?
Yes ☐ / No ☐

10. Did you like the activity? Yes ☐ / No ☐

10a. If yes, what was your favourite part? _____

11. What was this activity called? _____

12. Was there any part of this activity you **didn't** like? _____

_____

13. Do you remember taking part in the Food Dudes programme in school?
Yes ☐ / No ☐

14. Did you like Food Dudes? Yes ☐ / No ☐

15. If yes, what was your favourite part? _____

16. Was there any part of Food Dudes you **didn't** like? _____

_____

I am a: Boy☐ / Girl ☐

My age: 6☐ 7☐ 8☐ 9☐ 10☐ 11☐ 12☐ 13☐ 14☐

Thank you!

Appendix 3: Food Dudes Quick Eating Diary (FDQED)

Food Dudes Quick Eating Diary: Ireland 2016

Dear Teacher or Carer,

- **Please read these instructions carefully – we need every teacher to record the children's consumption in the same way.** Thank you very much for doing this – the information you provide will be used to evaluate and improve our Programme and will be kept private and confidential.
- Please record how many children in your class have **brought** at least one portion of fruit (F), vegetables (V), and snack foods (S), and then whether they have **eaten** at least one portion of each of these foods, in the tables below.
- Fruit and vegetables could be counted raw or cooked, eaten by themselves (e.g., an apple) or as a part of a dish (e.g., salad in a sandwich). Dried fruit (e.g., raisins) should be included. Please only include juices if they are 100% fruit or smoothies, and fruit bars only if they contain at least 80% fruit. A portion of fruit or vegetables is defined as the amount that will fit into the child's cupped hand.
- Snack foods include crisps, biscuits, cakes, and chocolate bars. A portion of snack food is defined as a standard child-sized packet of crisps, or a small chocolate / cake bar, or 2 small biscuits.
- Please record that a food has been **brought** only if there is a whole portion in a child's lunch box (e.g., one salad leaf in a sandwich is not a full portion of vegetables and should not be recorded). If a child has more than one portion of any of the foods, do not count the additional portions (e.g., if a child has crisps and a chocolate bar, just count "snack" once).
- Please record that a food has been **eaten** only if a child consumes a full portion (e.g., biting into a bar but leaving the rest should not be counted).

Example: There are 25 children in a class, but only 20 are present on a measurement day. Out of these, 5 have brought a portion of fruit, none have brought a portion of veg, and 6 have brought a snack. Then, 3 have eaten their fruit, no-one have eaten veg, and 6 have eaten their snack. The class record for this day should look like this:

Date	Children present in class	How many children BROUGHT these foods in their lunch boxes?			How many children ATE these foods?		
		Fruit	**Veg**	**Snacks**	**Fruit**	**Veg**	**Snacks**
11/11/11	20	5	0	6	3	0	6

- TIP: Many teachers find it easier to record this information against a copy of the class record, and then add up the numbers before transferring them to this form. Do not worry if you make a mistake – just cross it over and write the correct figure next to this.

- Please record what children bring to school in their lunchboxes, and their consumption, on two consecutive school days, at two different time points (pre-phase and at follow-up), each time starting on the date given to you by your Food Dudes co-ordinator. He or she will be able to advise if you have any questions, and will collect these records after they have been completed.

- Thank you very much for your time and help!

Please turn over to record the information for your class.

School: _____

Teacher: _____

Class: _____

PRE-PHASE CLASS RECORD

Please record below how many children have brought and eaten fruit, veg, and snacks over the two pre-phase days – remember to start on the day given to you by the Food Dudes coordinator. Please be as accurate in your recording as you can. Thank you.

Date	Children present in class	How many children BROUGHT these foods in their lunch boxes?			How many children ATE these foods?		
		Fruit	Veg	Snacks	Fruit	Veg	Snacks

Any comments you wish to make about this: _____
_____
_____
_____
_____

FOLLOW-UP CLASS RECORD

Please record below how many children have brought and eaten fruit, veg, and snacks over the two follow-up days – remember to start on the day given to you by the Food Dudes coordinator. Please be as accurate in your recording as you can. Thank you.

Date	Children present in class	How many children BROUGHT these foods in lunch boxes?			How many children ATE these foods?		
		Fruit	Veg	Snacks	Fruit	Veg	Snacks

Any comments you wish to make about this: _____
_____
_____
_____
_____

Appendix 4: Teacher Questionnaire

FOOD DUDES IN IRELAND – TEACHER QUESTIONNAIRE

SCHOOL .....

ROLL NUMBER.....**CLASS**.....

Thank you for taking the time to complete this questionnaire.

All information provided is treated in strict confidence.

If you have any queries regarding this questionnaire or the research, please ask the researcher in your school.

Please select your response to each question by placing a tick in the appropriate box(es). Please try to answer the questions as accurately as possible.

Q1	Not At all		Quite A Lot		Very Successful
	1	2	3	4	5
1. Your class recently participated in the Food Dudes Healthy Eating Programme. Overall, how successful was the Programme?					

Q2	Not At all		Quite A Lot		Very Much
	1	2	3	4	5
2. Overall, did the children in your class enjoy taking part?					

Q3-Q4	Snacktime Fruit	Snacktime Vegetables	DVD Episodes	Rewards and Certificates	Letters from the Food Dudes	Other (please state)
3. Which elements of the programme did the children enjoy? (tick all that apply)						
4. Were there any elements of the programme that the children didn't enjoy? (tick all that apply)						

Q5	Poor		Fair		Excellent
	1	2	3	4	5
5. How helpful did you find class visits by the Food Dudes Project Manager? (Any comments may be included in Question 24)					
Q6	**Not At All Easy**		**Quite Easy**		**Very Easy**
	1	2	3	4	
6 How easy did you find the Food Dudes Programme to incorporate into your daily routine?					

PTO

FOOD DUDES IN IRELAND – TEACHER QUESTIONNAIRE

Q7	No None		Some (please elaborate)		Many (please elaborate)
	1	2	3	4	5
7. In general, were there any elements of the programme you found difficult to implement? (Any comments may be included in Question 24)					

Q8-Q11: **Parent-provided fruit & veg**	NONE	1 portion more a day	2 portions more a day	3 or more portions more a day
8. Since the Food Dudes programme began, on average how many **MORE** portions of **Lunchbox FRUIT** have you noticed **parents PROVIDING** for each child to eat at **SCHOOL each day**?				
9. Since the Food Dudes programme began, on average how many **MORE** portions of parent-provided **Lunchbox FRUIT** have you noticed each child in your class **EATING** at **SCHOOL each day**?				
10 Since the Food Dudes programme began, on average how many **MORE** portions of **Lunchbox VEG** have you noticed **parents PROVIDING** for each child to eat at **SCHOOL each day**?				
11. Since the Food Dudes programme began, on average how many **MORE** portions of parent-provided **Lunchbox VEG** have you noticed each child in your class **EATING** at **SCHOOL each day**?				

Q12	LESS Portions			About The Same	MORE Portions		
12. Since the Food Dudes programme began, how many **MORE** or **LESS PORTIONS** of the following foods have you noticed parents provide their children with to eat in school **EACH DAY**:	3 portions LESS	2 portions LESS	1 portion LESS	About the Same	1 portion MORE	2 portions MORE	3 portions MORE
Biscuits							
Sweets/Chocolate Bars e.g. Mars, Twix, etc.							
Crisps							
Cake							
Other (please specify)							

FOOD DUDES IN IRELAND – TEACHER QUESTIONNAIRE

Q13-Q14: YOUR Fruit and veg Consumption	NONE	1 portion more a day	2 portions more a day	3 portions more a day	4 portions more a day	5 portions more a day
13. Since the Food Dudes programme began, how many **MORE** portions of **FRUIT** do **YOU** eat **each day** (total across all eating occasions)?						
14. Since the Food Dudes programme began, how many **MORE** portions of **VEG** do **YOU** eat **each day** (total across all eating occasions)?						

Q15	No Change		A little		A Lot
	1	2	3	4	5
15. Do you feel the **culture** of the school with regard to healthy eating has improved since the Food Dudes programme was introduced?					

Q16	None		Some Benefits		Very Beneficial
	1	2	3	4	5
16. Do you think there have been more **general benefits** in relation to children's **enthusiasm for healthy eating**?					

For the following questions, please indicate how much you agree/disagree with each statement by placing a tick in the box.

Q17-Q21	Strongly Disagree		Neither Agree Nor Disagree		Strongly Agree
	1	2	3	4	5
17. Since the Food Dudes Programme began I and/or other staff members have noticed improvements in the children's **attention/concentration in class.**					
18. Since the Food Dudes Programme began I and/or other staff members have noticed improvements in the children's **behaviour/attitude/compliance in class.**					
19. Since the Food Dudes Programme began I and/or other staff members have noticed improvements in the children's **physical activity at break times.**					
20. Since the Food Dudes Programme began I and/or other staff members have noticed improvements in the children's **attendance in school.**					
21. Since the Food Dudes Programme began I and/or other staff members have noticed improvements in the children's **interaction with peers.**					

FOOD DUDES IN IRELAND – TEACHER QUESTIONNAIRE

Q22	Not At all		Fairly Beneficial		Very Beneficial
	1	2	3	4	
22. How beneficial do you think it would be for the health of children in Ireland if the Food Dudes Programme were to be introduced into all primary schools?					

PTO

Q23

Is there a healthy eating policy in operation in your school?

Yes [ ] **No [ ]**

If yes, in what year was it introduced?.....

Q24

24. Please write below any comments you would like to make about the Food Dudes programme (e.g. suitability of the rewards, distribution and quality of fruit & vegetables presented during the Programme, use of materials, training issues, etc).

.....

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Please return the questionnaire to the researcher

Thank you for your help

Appendix 5: Parent Questionnaire

Food Dudes Parent Questionnaire

ID:

Q1. To what extent did your child enjoy the Food Dudes programme?

Not at All Very Much

□ □ □ □ □

Q2. Which elements of the programme did your child enjoy? (Select all that apply)

□ Snack-time Fruit

□ Snack-time Veg

□ DVD Episodes

□ Rewards & Certificates

□ Letters from the Food Dudes

□ Other (please state)

Q3. Were there any elements of the programme that your child didn't enjoy? (Select all that apply)

□ Snack-time Fruit

□ Snack-time Veg

□ DVD Episodes

□ Rewards & Certificates

□ Letters from the Food Dudes

□ Other (please state)

Q4. How helpful did you find the family support materials that were supplied for the Food Dudes Programme?

Not at All Very Much

□ □ □ □ □

Do you have any comments about the support materials provided?

Q5. Since the Food Dudes programme began, how many **MORE** or **LESS** portions of the following foods do you **PROVIDE** your child with to eat in **SCHOOL** each day (one portion is equivalent to a fun-sized bar or small packet of crisps).

	-3 port.	-2 port.	-1 port.	Same	+1 port.	+2 port.	+3 port	NA
Biscuits	□	□	□	□	□	□	□	□
Sweets/Chocolate	□	□	□	□	□	□	□	□
Cereal/Museli	□	□	□	□	□	□	□	□
Crisps	□	□	□	□	□	□	□	□
Cake/Muffins/Pastries	□	□	□	□	□	□	□	□

Q6. If you answered '**not applicable**' to Q5 is this because:

□ I do not provide the above foods for my child's lunch.

□ My child's school does not allow pupils to bring the above foods for lunch.

□ Other (please state) [ ]

Q7. 7. Since the Food Dudes programme began, how many **MORE** portions (the amount that would fit in your child's cupped hand) of Lunchbox FRUIT and VEG do you **PROVIDE** your child with to take to **SCHOOL** each day?

	None	+1 portion/d	+2 portion/d	3+ portions/d
Fruit	□	□	□	□
Veg	□	□	□	□

Q8. Since the Food Dudes programme began, how many **MORE** portions (amount that would fit in your child's cupped hand) of Lunchbox FRUIT and VEG that you provide does your child **EAT** at **SCHOOL** each day?

	None	+1 portion/d	+2 portion/d	3+ portions/d
Fruit	□	□	□	□
Veg	□	□	□	□

Q9. Since the Food Dudes programme began, how many **MORE** portions (amount that would fit in your child's cupped hand) of FRUIT and VEG does your child **EAT** at **HOME** each day?

	None	+1 portion/d	+2 portion/d	3+ portions/d
Fruit	□	□	□	□
Veg	□	□	□	□

Q10. Since the Food Dudes programme began, how many **MORE** portions (amount that would fit in your cupped hand) of FRUIT and VEG do **YOU** eat each day (total across all eating occasions)?

	None	+1 portion/d	+2 portion/d	3+ portions/d
Fruit	□	□	□	□
Veg	□	□	□	□

Q11. Since the Food Dudes Programme began my child has asked me to buy more:

	Strongly Disagree				Strongly Agree
Fruit	□	□	□	□	□
Veg	□	□	□	□	□

Q12. Since the Food Dudes Programme began I have noticed improvements in my child's:

	Strongly Disagree				Strongly Agree
Concentration	□	□	□	□	□
Behaviour	□	□	□	□	□
Physical Activity	□	□	□	□	□
General Health	□	□	□	□	□
Interaction with Other family members	□	□	□	□	□

Q13. How beneficial do you think it would be for the health of children in Ireland if the Food Dudes Programme were to be introduced into all primary schools?

Not at All				Very Beneficial
□	□	□	□	□

Q14. Is there any other comments you would like to make about the Food Dudes Programme?

Appendix 6: Lunchbox Record Form

Lunch Box Record Form

Time 1 (Pre-Intervention)

Box ID:	
Class:	

Photo Taken	
Date	
Time	

	Fruit Type	Portion Provided	Amount left over	Comments
1				
2				
3				
4				

	Vegetable Type	Portion Provided	Amount left over	Comments
1				
2				
3				
4				

	Snack Type	Portion or weight	Brand	Amount left over	Comments
1					
2					
3					
4					

Lunch Box Record Form

Time 2 (Post-Intervention)

Box ID:	
Class:	

Photo Taken	
Date	
Time	

	Fruit Type	Portion Provided	Amount left over	Comments
1				
2				
3				
4				

	Vegetable Type	Portion Provided	Amount left over	Comments
1				
2				
3				
4				

	Snack Type	Portion or weight	Brand	Amount left over	Comments
1					
2					
3					
4					

Appendix 7: Study A & B sample numbers for FDQED