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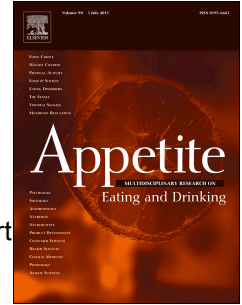
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1 **Is it still a real treat? Adults' treat food provision to children**

2 **Abstract**

3 Consumption of high-energy foods in the absence of hunger has been identified as a key target to
4 address in the area of obesity. For children, such foods are often provided by adults as treats.

5 There is limited understating of adults' treat giving. The present study aimed to understand

6 adults' provision of treats to children on the Island of Ireland. A total of 1039 participants,

7 including parents, grandparents, child minders and education practitioners completed a face-to-

8 face survey in their home. Participants defined their treats for children primarily as 'something

9 nice', 'deserved/earned' and 'something special'. The top three motivations for treat foods

10 provision were 'to reward for good behaviour' (42.3%), 'because the child(ren) ask' (42.2%) and

11 'to make the child(ren) feel better' (29.4%). Almost all participants would provide treat foods at

12 celebrations and 52.5% always did so. In addition, 68% participants had structured weekly

13 and/or daily treat for children. Treats provided to children were dominated by energy-dense

14 foods. The top three were sweets, chocolates and ice-creams, being used by 45.2%, 45.1% and

15 38.8% participants. Variations were observed across different adult groups, in terms of their treat

16 giving behaviour. The main observation was that adults' treat foods provision has become

17 habitual. The findings can help develop targeted strategies to encourage the reduction or

18 replacement of food treats for children.

19 **Keywords:** snacking, obesity, children, child feeding, parenting

Is it still a real treat? Adults' treat provision to children

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1 INTRODUCTION

2 Childhood obesity is one of the most serious public health challenges of this century, and needs
3 to be addressed on multiple levels, including the role of the environment and children's access to
4 unhealthy foods (World Health Organization, 2012). Consumption of energy-dense, nutritionally
5 poor foods in response to external stimuli and in the absence of hunger has been identified as a
6 key target to cope with this challenge (Bellisle, 2014). For children, such foods are often
7 provided by adults as treats (Bugge & Lavik, 2012). The general public are often advised to keep
8 treat food intake to a minimum (Safefood, 2016). Yet, health professionals' understanding of the
9 term 'treat' may be quite subjective; therefore it is important to investigate adults' own definition
10 and treat giving behaviour.

11 'Treat', 'sometimes foods' and 'junk' are the three most common terms parents used to describe
12 'not-everyday' foods (Petrunoff, Wilkenfeld, King, & Flood, 2014). Parents' descriptors of
13 'treats for children' are dominated by foods not recommended by healthy eating guidelines, such
14 as chips, ice-cream, chocolates, cakes, doughnuts, biscuits, takeaway and soft drinks (Curtis,
15 James, & Ellis, 2010; Petrunoff et al., 2014), although some parents also identified expensive
16 healthy foods in limited supply (e.g. strawberries), as treats (Pescud & Pettigrew, 2014).

17 Despite recognising that treat foods are less healthy and should be consumed infrequently, many
18 parents provide them daily (Pescud & Pettigrew, 2014), triggered by multiple motivations and
19 social contexts, including behavioural rewards and control, expressing love, social network
20 effects, peer-pressure, classroom celebrations, birthday parties, cultural events, such as
21 Christmas, Halloween, and Easter and other out-of-the ordinary occasions (Curtis et al., 2010;
22 Davison et al., 2015; Fisher et al., 2015; Herman, Malhotra, Wright, Fisher, & Whitaker, 2012;
23 Larson et al., 2017; Moore, Goodwin, Brocklehurst, Armitage, & Glenny, 2017; Pescud &

24 Pettigrew, 2014; Porter & Grills, 2013; Sabey, Rauer, Haselschwerdt, & Volling, 2017). Treat
25 foods can also be routinized, for instance, dessert, after-school, Fridays, and weekends (Bugge &
26 Lavik, 2012; Pescud & Pettigrew, 2014).

27 Health professionals have encouraged the reduction of treat foods for children, and the use of
28 non-food alternatives, for instance, extra play/story time, a trip to the play-ground, disco-dancing
29 at home, etc. (Sharry, 2014). Instead of food, teachers could recognize children's efforts by
30 giving them special opportunities (e.g. selecting a song/game/story book for the play group,
31 having first choice of equipment for gross motor play) (Eliassen, 2011). There is very limited
32 research about how non-food treats could be used and received by children in practice. A
33 qualitative study exploring expressions of parental love showed that, parents sometimes use toys
34 and gifts (e.g. a new book, some new playdoh) as alternatives to treat foods (Sabey et al., 2017).
35 An experimental study suggested that children were just as likely to choose a cheap toy as sweets
36 at Halloween (Schwartz et al., 2003).

37 While the literature sheds some light on the practice of adults' treat giving to children, studies
38 related to this topic are dominated by qualitative research work; there is a lack of quantitative
39 understanding about the extent to which treats are given to children in different contexts.

40 Moreover, most of the studies focused on parents only. Other adults, such as grandparents,
41 childminders, nursery practitioners, school teachers and sport coaches have received scarce
42 attention about their treat provision behaviour. Childminders are those who mind children in
43 childminders/children's home; they are self-employed, agree their own terms, fees and
44 conditions with parents (O'Hagan, 2012).

45 It is important to include grandparents because they still remain a popular form of childcare in
46 many countries including China, Australia, the US, the UK, Ireland and a few Mediterranean

47 countries (Aassve, Meroni, & Pronzato, 2012; Chambers, Rowa-Dewar, Radley, & Dobbie, 2017;
48 Chen, Liu, & Mair, 2011; Share & Kerrins, 2009). They normally feel entitled to indulge
49 children with food treats (Knight, O'Connell, & Brannen, 2014). It is also crucial to consider
50 childcare and education practitioners, given that treats are commonly employed for the
51 management systems of schools and early childhood settings, for the purposes of rewarding,
52 fundraising and classroom celebration (Causton, Tracy-Bronson, & MacLeod, 2015; Eliassen,
53 2011).

54 The current study aims to provide quantitative data of adults' treat giving understanding and
55 behaviour on the Island of Ireland (IOI), with the focus on: 1) their definition of 'treats'; 2) the
56 contexts or situations in which treat foods are provided to children and 3) the types of treats
57 (including both food and non-food options) being used. This study will also compare the treat
58 provision among parents, grandparents and education practitioners (e.g. nursery practitioners,
59 school teachers, sport coaches), so that targeted strategies can be developed to encourage
60 different groups to employ alternative strategies to their habitual treat food behaviour.

61 **METHODS**

62 **Sampling and participants**

63 A cross-sectional survey was conducted with adults (aged 18 and above), who had lived on IOI
64 for the past 3 years and who had child rearing responsibilities. Grandparents were eligible to
65 participate if they saw one or all of their grandchildren at least fortnightly. Quota sampling was
66 employed. The quotas included: area (Republic of Ireland 75%, Northern Ireland 25%), which
67 was in line with the population distribution between these two areas (Central Statistics office of
68 Ireland, 2016; UK Office for National Statistics, 2017); roles (parents 60%, grandparents 20%,
69 Crèche/pre-schooler carers, childminders, teachers and sports coaches 20%), gender (female

70 60%, male 40%) and social class (ABC1 40%, C2DE 60%). Parents and females were over
71 sampled, because they usually have a higher level of involvement in child rearing than other
72 adults. Participants from a lower social class (i.e. C2DE) were purposively slightly oversampled,
73 compared to around 50% in the whole population (Central Statistics Office of Ireland, 2017a).
74 The rationale was over-consumption of extra foods is more common among children from a
75 lower social class (Campbell et al., 2002). Participants were recruited from 104 sampling
76 districts across the IOI. A power calculation (Noordzij et al., 2010) was conducted. It suggests
77 that to estimate the proportion of the population that has a certain treat giving behaviour, a
78 minimum sample size of 134 is required to achieve 95% power with a significant level (alpha) of
79 0.05. A sample size of 1000 (around 10 participants per sampling point) was considered to be
80 sufficient to estimate the behavioural patterns of the whole population and sub-groups (i.e.
81 parents, grandparents, and other adults).

82 The survey was administered by professional fieldworkers through face-to-face interviews in
83 participants' homes. Computer assisted personal interviewing (CAPI) technology was employed:
84 the questions were displayed on a touch-screen tablet computer (one question per screen); the
85 field worker read them to the respondent, and entered the respondent's answers directly into the
86 computer. CAPI has unique advantages of ensuring responses to mandatory fields, automatically
87 bypassing questions not relevant to the respondent, randomising the order of options when
88 needed, and validating the sampling points using GPS coordinates (Caviglia-Harris et al., 2012).
89 Each interviewer was given one or multiple sampling districts. They selected a street within that
90 district and attempted to interview at every third house until the quotas were filled and they had
91 completed the ten interviews. The fieldwork was conducted between October 2017 and January
92 2018. The study was conducted according to Declaration of Helsinki guidelines and received

93 approval from the first author's university research ethics committee. Written informed consent
94 was obtained from all participants.

95 **Research instrument**

96 The questionnaire had three main sections: context/motivations for treat food provision, type of
97 treats used, and definition of treats. Cognitive interviews with eight volunteers were conducted to
98 assess the clarity of the questionnaire. The CAPI system was tested with a small sample ($n=30$)
99 of the target population.

100 For parent and grandparent participants, if they had more than one child or grandchild between 2
101 and 17, they were asked to focus on the child whose birthday came next, and this child's name
102 was referred to in all questions. The purpose was to avoid confounding factors, in light of the
103 practice used by Vereecken, Keukelier, and Maes (2004) and Gevers, Kremers, de Vries, and van
104 Assema (2015)'s study design.

105 *Contexts and motivations of treat foods provision*

106 A list of contexts or motivations (see the second column of Table 3) for treat provision to
107 children was generated from a prior focus group study (McCafferty et al., 2018) and literature
108 (Bugge & Lavik, 2012; Davison et al., 2015; Moore et al., 2017; Pescud & Pettigrew, 2014;
109 Petrunoff et al., 2014; Sabey et al., 2017). For each context, participants were first asked about
110 whether they provided treat foods in the specified context. If the participant indicated doing so,
111 they were asked about provision frequencies, using an eight-category scale adapted from the
112 Food Frequency Questionnaire (MacIntyre, 2009): 1 = rarely or never; 2 = a few times a year; 3
113 = once a month; 4 = 2-3 times per month; 5 = once a week; 6 = 2-4 times per week; 7 = daily; 8
114 = more than once a day. The frequency was not asked after the 'daily treat' and 'weekly treat'

115 questions. For the question regarding celebration occasions, the pilot test showed that
116 participants found it hard to suggest a frequency on the eight-category scale, accordingly, a four-
117 point frequency scale was used: 1 = rarely or never; 2 = sometimes; 3 = often; 4 = always. In the
118 end, participants were asked about their overall frequency of treat giving (“*in general, how often*
119 *you would give [] treat foods*”), the previous same eight-category scale was used.

120 *Type of treats*

121 From the focus group study, a list of all iterations of identified treats was developed. Foods and
122 beverages were put into categories based on food groups defined in the Irish National Nutrition
123 Pre-school Survey (Irish Universities Nutrition Alliance, 2011). In total, 23 food and non-food
124 items (see the first column of Table 5) were presented to participants in a randomized order.

125 From the list, ‘chips’ means finger shaped cuts of potatoes that have been deep fried and served
126 hot; ‘crisps’ refers to thin slices of potatoes that have been deep fried until crunchy; and
127 ‘takeaways’ refers to cooked foods to be eaten off the premises. Participants were first asked to
128 select all items they used as treats for the child(ren). They were allowed to add any other treat
129 they used. Afterwards, participants were asked to indicate the most frequently used treat (single
130 answer only).

131 *Definition of treats*

132 Based on the focus group findings and literature (Pescud & Pettigrew, 2014; Petrunoff et al.,
133 2014), 15 phrases were selected to test participants’ perception of the essence of treats (see the
134 first column of Table 2). Participants were asked to select up to three phrases they felt defined a
135 treat for the child or children.

136 *Socio-demographics and background information*

137 Standard socio-demographic questions were included in the survey regarding both the
138 participants and the children in their care.

139 **Data analysis**

140 All statistical analyses were conducted using statistical software package IBM SPSS Statistics 20
141 (SPSS Inc., Chicago, IL, USA). Participants were originally classified into three groups, namely,
142 parents, grandparents and education practitioners. Sensitivity tests showed that within the group
143 of education practitioners, childminders were different from the rest of the group in terms of the
144 pattern of answers. Accordingly, a four-group division was used for final analysis: parents (i.e.
145 parents/guardians), grandparents, childminders (i.e. childminders/baby sitters/nannies) and
146 education practitioners (i.e crèche/pre-schooler carers, primary school teachers, secondary school
147 teachers, and sports and leisure coach/leaders). Pearson χ^2 tests were employed to examine
148 differences across these groups. Monte Carlo estimate of the exact P value for the Pearson χ^2 test
149 was used when over 20% cells of the frequency table have expected counts less than 5.

150 **RESULTS**

151 **Description of the participants**

152 In total, 1039 participants completed the survey (Table 1). The study sample had good
153 representation of both males and females, and different types of adults who are responsible for
154 children. The urban/rural divide and the ethnicity distribution of the participants were close to
155 the population-level statistics (Central Statistics Office of Ireland, 2017b; Northern Ireland
156 Department of Agriculture Environment and Rural Affairs, 2017; Northern Ireland Statistics and
157 Research Agency, 2014).

158

159

160

Table 1 Characteristics of the participants (*n* 1039)

| Characteristic | <i>n</i> | % |
|--------------------------------------|----------|------|
| Area of Ireland | | |
| Republic of Ireland (ROI) | 789 | 75.9 |
| Northern Ireland (NI) | 250 | 24.1 |
| Sex | | |
| Female | 634 | 61.0 |
| Male | 404 | 38.9 |
| Other | 1 | 0.1 |
| Age (years) | | |
| 18-24 | 25 | 2.4 |
| 25-34 | 215 | 20.7 |
| 35-44 | 374 | 36.0 |
| 45-54 | 201 | 19.3 |
| 55-64 | 109 | 10.5 |
| 65 and above | 115 | 11.1 |
| Role | | |
| Parent/guardian | 651 | 62.7 |
| Grandparent | 210 | 20.2 |
| Child minder, baby sitter, nanny | 61 | 5.9 |
| Crèche/pre-schooler carer | 25 | 2.4 |
| Primary school teacher | 27 | 2.6 |
| Secondary school teacher | 15 | 1.4 |
| Sports, leisure coach and leader | 50 | 4.8 |
| Living area | | |
| Urban/sub-urban | 703 | 67.7 |
| Rural | 336 | 32.3 |
| Education completed | | |
| Primary or lower | 61 | 5.9 |
| Secondary* | 491 | 47.2 |
| Apprenticeship/trade certificate | 107 | 10.3 |
| Primary degree/nursing qualification | 201 | 19.3 |
| Postgraduate/higher degree | 170 | 16.4 |

| | | |
|---|-----|------|
| Other | 9 | 0.9 |
| Ethnicity | | |
| White Irish | 806 | 77.6 |
| White British | 126 | 12.1 |
| Any other white background | 72 | 6.9 |
| Black, Asian and other including mixed background | 33 | 3.2 |
| Don't know/refused | 2 | 0.2 |
| Age range of child(ren) being reported | | |
| Pre-school age (year 2-4) | 231 | 22.2 |
| Primary school age (year 5-12) | 580 | 55.8 |
| Secondary school age (year 13-18) | 228 | 21.9 |

161 *For ROI participants, secondary-level education includes 'leaving certificate or equivalent' and 'leaving
 162 certificate applied'; for NI participants, 'GCSE or equivalent', 'GCE A level or equivalent', and 'leaving
 163 certificate applied'.

164

165 **Definition of Treats**

166 To define a treat for the child(ren) in their care, participants were invited to select up to three
 167 terms from a list. Almost all selected three terms (81.7%), most frequently 'something nice'
 168 (45.2%), 'deserved/earned' (35.1%), 'something special' (32.7%) or 'fun' (27.6%) (Table 2).
 169 Treats were less frequently defined by cost ('affordable', 'expensive'), size ('big', 'small') or
 170 nutrition ('sweet', 'healthy', 'unhealthy/bad for you'), although 22% considered a treat must be
 171 'sweet', and 16.6% selected 'healthy'. Terms indicating spoiling, bribery, and low frequency
 172 ('usually forbidden', 'rare') were chosen by less than 13% of participants.

173 Adult groups' definitions of treats varied. Education practitioners favoured 'deserve/earned'
 174 (42.7%), were less likely to define treats as 'something nice' (23.1%), and more likely to
 175 consider them 'rare' (21.4%). Interestingly 'to spoil' was among the top four terms used by
 176 childminders (27.9%), but was less frequently selected by other participants, including
 177 grandparents (18.6%).

178 Table 2 Terms participants selected to define a treat for children (*n* 1039)

| Definition of treats | Total (<i>n</i> 1039) | | Parent (<i>n</i> 651) | | Grandparent (<i>n</i> 210) | | Child minder (<i>n</i> 61) | | Education practitioner (<i>n</i> 117) | | Group differences† |
|-----------------------|------------------------|-------|------------------------|-------|-----------------------------|-------|-----------------------------|-------|--|-------|--------------------|
| | %* | Top 5 | %* | Top 5 | %* | Top 5 | %* | Top 5 | %* | Top 5 | |
| Something nice | 45.2 | 1 | 48.2 | 1 | 46.7 | 1 | 50.8 | 1 | 23.1 | 5 | <i>P</i> <0.001 |
| Deserved/earned | 35.1 | 2 | 36.7 | 2 | 29.5 | 3 | 23.0 | 5 | 42.7 | 1 | <i>P</i> <0.05 |
| Something special | 32.7 | 3 | 32.0 | 3 | 35.7 | 2 | 36.1 | 2 | 29.9 | 2 | |
| Fun | 27.6 | 4 | 27.6 | 4 | 26.2 | 5 | 29.5 | 3 | 29.1 | 3 | |
| Affordable | 23.1 | 5 | 24.3 | | 27.1 | 4 | 16.4 | | 12.8 | | <i>P</i> <0.05 |
| Sweet | 22.7 | | 24.6 | 5 | 22.4 | | 21.3 | | 13.7 | | |
| Small | 20.9 | | 20.1 | | 22.4 | | 18.0 | | 23.9 | 4 | |
| Healthy | 16.6 | | 14.9 | | 20.5 | | 11.5 | | 21.4 | | |
| Usually forbidden | 12.7 | | 13.7 | | 7.1 | | 19.7 | | 13.7 | | <i>P</i> <0.05 |
| To spoil | 12.5 | | 10.3 | | 18.6 | | 27.9 | 4 | 6.0 | | <i>P</i> <0.001 |
| Rare | 8.3 | | 6.5 | | 6.2 | | 9.8 | | 21.4 | | <i>P</i> <0.001 |
| Bribery | 5.8 | | 6.8 | | 5.2 | | 1.6 | | 3.4 | | |
| Unhealthy/bad for you | 4.1 | | 5.4 | | 1.0 | | 1.6 | | 4.3 | | <i>P</i> <0.05 |
| Expensive | 3.0 | | 3.5 | | 3.8 | | 0.0 | | 0.0 | | |
| Big | 1.4 | | 2.0 | | 1.0 | | 0.0 | | 0.0 | | |

179 * The proportion of the participants (within the specified participant group) who selected a given term to define a treat for the child(ren) they were
 180 caring for. Participants were allowed to select up to three terms. The 'Top 5' ranks were based on the percentages.

181 †Levels of significance from Pearson χ^2 tests of differences between four groups (i.e. parents, grandparents, child minders and education
 182 practitioners) in terms of the proportion of participants who selected a given term.

183 Contexts/motivations of treat foods provision

184 Participants primarily offered treat foods to reward good behaviours (42.3%) and because
185 children asked (42.2%), followed by emotion control (29.4%) and encouragement of the intake
186 of dinner/healthy foods (26.2%) (Table 3). Treat foods were least used for occupying the
187 children (14.4%), and gaining affections (12.8%). Nearly all participants (92.0%) would give
188 treat foods to children at celebrations, and 52.5% always did so. More than two thirds of
189 participants had structured weekly (64.7%) and/or daily treat foods (22.6%) for children.

190 Adult group's treat giving behaviour varied. Education practitioners did far less treat giving than
191 other groups. Parents were more likely to provide structured weekly treats (75.7%); and
192 childminders were more likely to provide treat foods to reward the child (67.2%) and to make the
193 child feel better (41.0%). In addition, childminders (37.7%) and grandparents (33.8%) were more
194 likely than parents (22.3%) to use treat foods to show love and care. Overall, a majority of
195 parents (78.5%), grandparents (58.1%) and child minders (60.7%) would give children treat
196 foods at least once a week (Table 4).

197 Table 3 Contexts and frequencies of the treat foods provision among participants (*n* 1039)

| Abbreviation | Item* | Total (<i>n</i> 1039) | | Parents (<i>n</i> 651) | | Grandparents (<i>n</i> 210) | | Childminders (<i>n</i> 61) | | Education practitioners (<i>n</i> 117) | | Group differences† |
|-----------------------------------|--|------------------------|-----------------|-------------------------|-----------------|------------------------------|-----------------|-----------------------------|-----------------|---|-----------------|--------------------|
| | | Yes | At least weekly | Yes | At least weekly | Yes | At least weekly | Yes | At least weekly | Yes | At least weekly | |
| Reward | Use treat foods to reward [] for good behaviour | 42.3% | 30.6% | 43.6% | 33.8% | 42.9% | 25.2% | 67.2% | 52.5% | 21.4% | 11.1% | <i>P</i> <0.001 |
| Child ask | Give [] treat foods because they ask | 42.2% | 28.4% | 47.2% | 34.1% | 45.7% | 25.2% | 45.9% | 27.9% | 6.0% | 2.6% | <i>P</i> <0.001 |
| Emotion control | Use treat foods to make [] feel better | 29.4% | 14.3% | 30.4% | 15.2% | 33.3% | 16.2% | 41.0% | 21.3% | 10.3% | 2.6% | <i>P</i> <0.001 |
| For eating dinner/fruit/vegetable | Give [] treat foods for eating their dinner or for eating fruits and vegetables | 26.2% | 19.8% | 28.6% | 23.3% | 26.2% | 17.1% | 31.1% | 21.3% | 10.3% | 4.3% | <i>P</i> <0.001 |
| Show affection | Use treat foods to show your love or care for [] | 23.5% | 13.2% | 22.3% | 12.7% | 33.8% | 18.1% | 37.7% | 21.3% | 4.3% | 2.6% | <i>P</i> <0.001 |
| Child nagging | Give [] treat foods because they kept requesting/nagging you for it | 21.8% | 15.2% | 24.1% | 17.5% | 22.9% | 14.3% | 31.1% | 19.7% | 1.7% | 1.7% | <i>P</i> <0.001 |
| Peer pressure | Give [] treat foods because they say/you know other children are given it | 19.3% | 10.1% | 21.2% | 11.1% | 19.0% | 9.5% | 31.1% | 18.0% | 3.4% | 1.7% | <i>P</i> <0.001 |
| Occupy child | Use treat foods to occupy [] | 14.4% | 8.9% | 15.1% | 9.1% | 16.2% | 10.0% | 24.6% | 16.4% | 2.6% | 1.7% | <i>P</i> <0.001 |
| Gain affection | Use treat foods so that [] will love/like you | 12.8% | 8.9% | 11.8% | 8.4% | 17.6% | 11.4% | 27.9% | 18.0% | 1.7% | 1.7% | <i>P</i> <0.001 |
| | | Yes | Always | Yes | Always | Yes | Always | Yes | Always | Yes | Always | |

| | | | | | | | | | | | | |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Celebrations | Provide [] treat foods at celebrations (e.g. birthday, Christmas, Halloween, Easter) | 92.0% | 52.5% | 96.2% | 60.2% | 90.0% | 49.5% | 93.4% | 27.9% | 71.8% | 27.4% | $P<0.001$ |
| Structured treat provision‡ | | 68.3% | | 79.4% | | 64.8% | | 54.1% | | 20.5% | | $P<0.001$ |
| Weekly treat | Normally give treat foods to [] each week (e.g. Friday treat or weekend treat) | 64.7% | | 75.7% | | 59.0% | | 54.1% | | 18.8% | | $P<0.001$ |
| Daily treat | Normally give treat foods to [] everyday (e.g. when the child comes home from school, after meal) | 22.6% | | 26.7% | | 20.5% | | 18.0% | | 6.0% | | $P<0.001$ |

198 *For parents and grandparents, the child's name was inserted in "[]". If they had multiple children or grandchildren, only one child was selected. For
199 childminders and educational practitioners, "children/pupils you are caring for" was inserted in "[]".

200 †Levels of significance from Pearson χ^2 tests of differences between four groups (i.e. parents, grandparents, child minders and education practitioners) in terms
201 of the proportion of participants answered 'yes' on a given treat giving behaviour.

202 ‡"Structured treat provision" was computed from "weekly treat" and "daily treat", i.e. a participant who answered yes to either the weekly treat question or the
203 daily treat question, was considered as having structured food treats for children.

204 Table 4 The overall frequencies of participants' treat foods provision to children (*n* 1039)

| Treat food provision in general | Total (<i>n</i> 1039) | Parents (<i>n</i> 651) | Grandparents (<i>n</i> 210) | Childminders (<i>n</i> 61) | Education practitioners (<i>n</i> 117) | Group differences* |
|---------------------------------|------------------------|-------------------------|------------------------------|-----------------------------|---|--------------------|
| Rarely/never | 8.8% | 3.8% | 9.0% | 3.3% | 38.5% | <i>P</i> <0.001 |
| Less than once a month | 7.1% | 2.5% | 8.6% | 9.8% | 29.1% | <i>P</i> <0.001 |
| 1-3 times a month | 17.7% | 15.2% | 24.2% | 26.3% | 14.5% | <i>P</i> <0.01 |
| 1-4 times a week | 57.2% | 66.2% | 53.8% | 54.1% | 14.6% | <i>P</i> <0.01 |
| At least once a day | 9.4% | 12.3% | 4.3% | 6.5% | 3.5% | <i>P</i> <0.001 |

205 *Levels of significance from Pearson χ^2 tests of differences between four groups.

206

207 Type of treats being used

208 Almost all the participants (98.3%) selected at least one item from the list as their treat for the
209 children. On average, each participant selected 5 items (mean 5.19, SD 3.65). Twenty seven
210 participants also specified other items they used as treats, such as cereal or cereal bars, yoghurt,
211 nuts, pancakes, football socks, clothes, extra playtime and makeup.

212 In general, participants' most used treats were unhealthy foods (57.8%), followed by non-food
213 treats (24.4%) and healthy foods (14.8%) (Table 5). Sweets (45.2%), chocolates (45.1%) and ice-
214 cream (38.8%) were the most popular treats, followed by time on screen, crisps, takeaways and
215 biscuits. In comparison, some healthy foods including berries, dried fruit, breadsticks and cheese
216 were least popular treats.

217 Significant differences were observed across the adult groups. For instance, money was
218 particularly favoured by grandparents (36.2%). In contrast to other groups, education
219 practitioners had less treats for children. Fruit (27.4%) and stickers/stationary (27.4%) were
220 among their top treats; however, unhealthy choices such as sweets (37.6%), chocolates (23.9%)
221 and time on screens (23.1%) were equally favoured by them.

222 Table 5 Items participants used as treats for children (*n* 1039)

| Item | Total (<i>n</i> 1039) | | | Parents (<i>n</i> 651) | | | Grandparents (<i>n</i> 210) | | | Childminders (<i>n</i> 61) | | | Education practitioners (<i>n</i> 117) | | | Group differences‡ |
|--|------------------------|--------|------------|-------------------------|--------|------------|------------------------------|--------|------------|-----------------------------|--------|------------|---|--------|------------|--------------------|
| | Used as treat* | | Most used† | Used as treat* | | Most used† | Used as treat* | | Most used† | Used as treat* | | Most used† | Used as treat* | | Most used† | |
| | % | Top 10 | % | % | Top 10 | % | % | Top 10 | % | % | Top 10 | % | % | Top 10 | % | |
| Sweets | 45.2 | 1 | 13.7 | 48.4 | 2 | 13.4 | 37.1 | 3 | 10.5 | 54.1 | 1 | 14.8 | 37.6 | 1 | 20.5 | <i>P</i> <0.01 |
| Chocolates | 45.1 | 2 | 13.0 | 49.5 | 1 | 13.8 | 42.4 | 1 | 12.9 | 49.2 | 2 | 14.8 | 23.9 | 4 | 7.7 | <i>P</i> <0.001 |
| Ice-cream, ice-lollies | 38.8 | 3 | 7.0 | 44.4 | 3 | 7.8 | 38.6 | 2 | 7.6 | 32.8 | 3 | 3.3 | 11.1 | 10 | 3.4 | <i>P</i> <0.001 |
| Time on iPad/screens/TV/DVD/play station, etc. | 31.2 | 4 | 8.5 | 35.8 | 5 | 9.5 | 23.3 | | 2.9 | 24.6 | 4 | 13.1 | 23.1 | 5 | 10.3 | <i>P</i> <0.001 |
| Crisps | 31.1 | 5 | 5.0 | 36.1 | 4 | 6.6 | 25.2 | 8 | 3.3 | 23.0 | 7 | 0.0 | 17.9 | 7 | 1.7 | <i>P</i> <0.001 |
| Takeaways, pizza, burgers, fast foods | 29.3 | 6 | 6.9 | 34.9 | 6 | 7.1 | 24.3 | 10 | 8.6 | 21.3 | 10 | 6.6 | 11.1 | | 3.4 | <i>P</i> <0.001 |
| Biscuits | 29.0 | 7 | 7.5 | 31.6 | 7 | 7.1 | 32.4 | 5 | 11.0 | 24.6 | 5 | 9.8 | 10.3 | | 2.6 | <i>P</i> <0.001 |
| Fruit (e.g. apples, bananas, oranges) | 27.2 | 8 | 7.4 | 28.0 | 10 | 6.9 | 26.2 | 7 | 8.1 | 23.0 | 6 | 11.5 | 27.4 | 2 | 6.8 | |
| Toys and gifts | 26.5 | 9 | 3.3 | 28.9 | 8 | 3.5 | 31.9 | 6 | 4.3 | 13.1 | | 0.0 | 10.3 | | 1.7 | <i>P</i> <0.001 |
| Trips out (e.g. beach, park, match, soft play) | 25.9 | 10 | 3.6 | 27.8 | | 4.0 | 24.8 | 9 | 3.8 | 21.3 | 9 | 1.6 | 19.7 | 6 | 1.7 | |
| Popcorn | 21.7 | | 1.9 | 28.1 | 9 | 2.8 | 12.4 | | 1.0 | 9.8 | | 0.0 | 8.5 | | 0.0 | <i>P</i> <0.001 |
| Cakes, pastries, buns, apple tart | 20.6 | | 1.6 | 22.7 | | 1.4 | 20.5 | | 1.9 | 8.2 | | 0.0 | 15.4 | 9 | 3.4 | <i>P</i> <0.05 |
| Money | 20.5 | | 5.8 | 20.0 | | 4.0 | 36.2 | 4 | 15.2 | 6.6 | | 1.6 | 2.6 | | 0.9 | <i>P</i> <0.001 |
| Soft/fizzy drinks | 18.2 | | 2.3 | 19.5 | | 2.5 | 17.1 | | 1.0 | 23.0 | 8 | 6.6 | 10.3 | | 1.7 | |
| Fruit juices | 17.7 | | 2.2 | 17.8 | | 2.5 | 17.6 | | 0.5 | 18.0 | | 3.3 | 17.1 | 8 | 3.4 | |

| | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|---|------|-----------------|
| Stickers, stationary | 16.4 | 2.4 | 15.4 | 0.9 | 13.8 | 1.4 | 14.8 | 1.6 | 27.4 | 3 | 12.8 | <i>P</i> <0.01 |
| Chips | 15.0 | 0.8 | 18.0 | 1.1 | 12.9 | 0.0 | 9.8 | 0.0 | 5.1 | | 0.9 | <i>P</i> <0.01 |
| Berries | 11.9 | 0.8 | 13.7 | 0.9 | 11.0 | 0.5 | 11.5 | 1.6 | 4.3 | | 0.0 | <i>P</i> <0.05 |
| Fidget spinners, dabbing, collectable cards, Jojo Bows, etc. | 10.3 | 0.4 | 12.9 | 0.5 | 7.6 | 0.5 | 1.6 | 0.0 | 5.1 | | 0.0 | <i>P</i> <0.01 |
| Dried fruit | 9.9 | 1.0 | 10.1 | 1.4 | 8.6 | 0.0 | 16.4 | 1.6 | 7.7 | | 0.0 | |
| Crackers, bread sticks | 9.1 | 1.2 | 10.0 | 0.8 | 11.0 | 2.9 | 4.9 | 1.6 | 3.4 | | 0.0 | |
| Cheese | 6.0 | 0.4 | 7.1 | 0.3 | 5.7 | 0.5 | 4.9 | 1.6 | 0.9 | | 0.0 | |
| Homework pass | 3.9 | 0.5 | 3.4 | 0.0 | 1.9 | 0.0 | 3.3 | 0.0 | 11.1 | | 4.3 | <i>P</i> <0.001 |
| Most used treat§ | | | | | | | | | | | | |
| Unhealthy foods | | 57.8 | | 60.7 | | 56.7 | | 55.7 | | | 45.3 | <i>P</i> <0.05 |
| Healthy foods | | 14.8 | | 15.5 | | 13.3 | | 21.3 | | | 10.3 | |
| Non-food treats | | 24.4 | | 22.4 | | 28.1 | | 18.0 | | | 31.6 | |

223 *The proportion of the participants (within the specified participant group) who selected a given item as a treat for the child(ren) they were caring for. The 'Top
224 10' ranks were based on the percentages.

225 †The proportion of the participants (within the specified participant group) who selected a given item as the most used treat for the child(ren) they were caring
226 for. Participants were instructed to select only one item as the 'most used treat'.

227 ‡Levels of significance from Pearson χ^2 tests of differences between four groups (i.e. parents, grandparents, child minders and education practitioners) in terms
228 of the proportion of participants who selected a given item as a treat for children.

229 §To offer top line results regarding participants' most used treats. The items were divided into three categories: unhealthy foods (sweets, chocolates, ice-
230 cream/ice-lollies, crisps, takeaways etc., biscuits, popcorn, cakes etc., soft/fizzy drinks, and chips); healthy foods (fruit, popcorn, fruit juices, berries, dried fruit,
231 crackers/bread sticks, and cheese); and non-food treats (time on digital devices, toys/gifts, trips out, money, stickers/stationary, fidget spinners etc., and
232 homework pass). The division between unhealthy foods and healthy foods was based on food pyramid (The Irish Department of Health, 2016).

233

234 **DISCUSSION**235 **Significance of the results and implications**

236 The current research is the first quantitative study investigating treat definitions and practices of
237 adults who care for, educate or coach children. This study can assist the development of target
238 strategies to reduce the use of unhealthy foods.

239 Participants in our study primarily defined a treat as ‘something nice’, ‘deserved/earned’ and
240 ‘something special’ – this is in contrast with two Australian studies (Pescud & Pettigrew, 2014;
241 Petrunoff et al., 2014) showing that parents defined a treat as something infrequent, unhealthy,
242 rare or expensive. Low-frequency or rarity was not essential to our participants’ definition of a
243 treat, possibly because of cultural differences and the wide accessibility to unhealthy foods in the
244 modern age.

245 ‘Reward for good behaviour’ was the participants’ primary motivation for treat food provision,
246 in accordance with previous knowledge that the use of foods for behavioural control is a
247 common practice among parents and teachers (Blaine et al., 2015; Kubik, Lytle, Hannan, Story,
248 & Perry, 2002; Raaijmakers, Gevers, Teuscher, Kremers, & van Assema, 2014). Research has
249 shown that using unhealthy foods as a reward or an emotion control instrument may reinforce
250 children’s preference of those foods, and may increase the risk of dietary disorders, such as binge
251 eating, emotional eating and dietary restraint (Benton, 2004; Farrow, Haycraft, & Blissett, 2015;
252 Puhl & Schwartz, 2003). It was interesting to see ‘child asking’ ranked equally high as ‘reward’
253 as a trigger for treat foods provision, highlighting the importance of empowering adults to
254 navigate such requests.

255 According to our study, treat foods had become a norm at celebrations: 90% of adults would
256 provide treat foods at celebrations, and 52% always did so. One may argue that Christmas,
257 Halloween and the birthday only happen once a year. However, children might also receive treat
258 foods at classroom celebrations, classmates' birthday parties, family events, graduations, fund
259 raising, etc. The totality of these celebrations in a given year could be quite substantial for many
260 children (Caparosa et al., 2014; Isoldi, Dalton, Rodriguez, & Nestle, 2012; Porter & Grills, 2013;
261 Schwartz, Chen, & Brownell, 2003), therefore their overall significance on dietary behaviour
262 should be recognised.

263 The current study also revealed adults' choice of treats for children: they were dominated by
264 unhealthy foods, with sweets and chocolates as the most popular options. Unhealthy foods are
265 usually widely available and cheap, and generate hedonic experience (van den Bos & de Ridder,
266 2006). Packaged unhealthy foods, takeaways, and time on screens have the advantage of
267 convenience. These factors partly explain their popularity as choices of treats, especially for
268 those parents who are challenged with low income and/or time scarcity in their daily practice
269 (Pescud & Pettigrew, 2014). Certain non-food alternatives, such as trips out, gifts and toys could
270 possibly involve a higher time or financial cost, and a risk of failing to meet children's
271 expectations if the provision of unhealthy food treats has become habitual; thus they were less
272 popular than food treats according to our data. The promotion of non-food treats should be
273 carefully planned and tested. To our knowledge, the only study experimenting non-food
274 alternatives to sweets was carried out fifteen-years ago, and it focused on a particular social
275 event – Halloween (Schwartz et al., 2003). More research should be conducted to examine the
276 feasibility, facilitators and barriers of all those non-food treats suggested by health professionals
277 (Sharry, 2014; Eliassen, 2011).

278 By including a diverse range of adults, the present study compared the patterns of treat giving
279 among different groups. Parents, grandparents and childminders were comparable on all
280 measurements. Between these three groups, parents had a higher use of structured weekly and
281 daily treats, and overall provided treats more frequently. Part of the reasons behind this
282 phenomenon is parents usually see their children more frequently than other adults, such as
283 grandparents and sports coaches. Parents often complain that grandparents are over-indulgent,
284 and give too many sweets and high energy-foods to children (Curtis et al., 2010; Knight et al.,
285 2014). However, according to our study, grandparents were not more likely than parents to
286 provide food treats in many contexts, neither did they have a higher tendency to choose
287 unhealthy items as treats. The frequency these grandparents met their grandchildren, and the
288 quantity of their treat giving should be taken into account to make a reliable judgment on
289 grandparents' use of food treats (as opposed to parents). The third group, child minders, are
290 barely reported in the literature. Our study revealed that this group demonstrated a substantial
291 use of treat foods as a reward, and they were also more likely than parents and grandparents to
292 use treat foods in some other contexts. On the IOI, informal childminding arrangements with
293 childminders is a grey area: there is little regulation; most childminders are not registered with
294 the Health Service Executive, and haven't gained any formal training including nutrition
295 education (O'Hagan, 2012). A very recent survey showed that 30% of families in Ireland opted
296 for childminders (Congress, 2016), thus this group should be included in children's health
297 intervention initiatives. The current study indicated that education practitioners provided much
298 fewer treats than other groups. Healthier choices such as fruits, sticker and stationary were
299 among their most used treats. This is expected because many schools and childcare centres on
300 IOI (especially at primary level), have a formal healthy-eating policy and curriculum in place.

301 However, there is still room to improve as 71.8% of education practitioners provided treat foods
302 at celebrations, and sweets were their first treat choice. Calorie intake during classroom
303 celebrations and rewards could contribute 20-35% of students' daily estimated energy needs
304 according to some observational studies (Caparosa et al., 2014; Isoldi et al., 2012).

305 It is worth mentioning that the study was carried out shortly after the Irish Department of Health
306 published a revised Food Pyramid: the 'top shelf' (i.e. foods and drinks high in fat, sugar and salt)
307 was separated from lower shelves (The Irish Department of Health, 2016). In line with this
308 change, the 'Health Promoting School' program has encouraged schools to remove Treat Day
309 Friday from their policies (Walsh, 2017). With this background in mind, the current study
310 provided baseline data to set targets and to monitor progress for improvement.

311 **Strengths, limitations and future research**

312 The current study included a diverse range of adults who had responsibilities in child rearing,
313 providing a comprehensive picture of their perceived essence of treats, and their treat food
314 behaviour. The questionnaire was well established from the literature and a prior focus group
315 study, and it was carefully tested. The sample had good geographical spread and resembled the
316 characteristics of the research population. One limitation of this study is, in participant
317 recruitment, for teachers, sports coaches, pre-school carers and child minders, there was no
318 screening criteria regarding their frequencies of caring for children. There is a chance that some
319 ad-hoc teachers or coaches might have been included in the sample, and 'diluted' the treat giving
320 practice we observed from this adult group. Another limitation is this survey was based on self-
321 reported responses to a face-to-face interview and it is possible that biases may have been
322 introduced through memory errors and the natural tendency of under-reporting certain
323 behaviours that are socially undesirable. A previous qualitative study shows that many parents

324 give children treat foods on a daily basis (Pescud & Pettigrew, 2014). In our study, participants
325 reported much lower frequencies. It is likely some participants under-reported their behaviour.
326 The findings should be triangulated with diaries and observation studies to provide a more
327 accurate estimation of adults' treat giving. Future research should also be conducted to examine
328 if the provision of treat foods varies across different social-demographical segments. Another
329 interesting area to explore is children's own perspectives on treats, for instance, do they define
330 treats the same way as parents? What type of treats (other than unhealthy foods) they would like
331 to receive?

332 **Conclusions**

333 In the current food environment, it would be naive to think that the use of food as a treat can be
334 avoided altogether. However, there is merit in considering how their use could be recalibrated.
335 Greater awareness needs to be created on the fact that adults in various contexts 'treat' children
336 with unhealthy food and that it is no longer a 'treat' when this behaviour has become normalised
337 into their daily or weekly routine. Strategies should be developed to support adults to reduce
338 their current use of unhealthy foods as treats, taking into account the subtle differences between
339 different types of adults.

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