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“We don't snack”: Attitudes and perceptions about eating in-between meals amongst caregivers of young children

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1 **Title: “We don’t snack”: Attitudes and perceptions about eating in-between meals amongst**
2 **caregivers of young children**

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18

19 **Abstract**20 **“We don’t snack”: Attitudes and perceptions about eating in-between meals amongst**
21 **caregivers of young children**

22 **Objective:** Little is known about caregiver attitudes and perceptions towards snacking by
23 toddlers and preschool children outside of the U.S. This qualitative study examined caregiver
24 attitudes and perceptions towards the provision of both foods *and* beverages in-between meals,
25 along with what constitutes a snack, or snacking occasion, amongst Swiss caregivers.

26 **Study design, setting and participants:** This qualitative study used in-depth, in-home
27 interviews (n=17) conducted with caregivers (16 = female, 3 = male, ages = 20-46y, low to high
28 income). The “Food Choice Process Model” was used as a theoretical framework. Interviews
29 explored experiences, attitudes and perceptions about the provision of foods and beverages to
30 children in-between meals (1-5y). Interview transcripts underwent a thematic analysis and key
31 themes were developed from the data.

32 **Results:** Five key themes were identified; 1) Timing is everything, 2) Location + food type =
33 snacking, 3) Snacks are junk 4) Snacks are small 5) Not in front of the children. The time at
34 which young children were fed, the location, the food type and the portion size delineated how
35 caregivers conceptualised snacking. Feeding children at 10am and 4pm was not viewed as
36 snacking, nor was providing milk before bedtime.

37 **Conclusions and Implications:** Eating in-between meals and snacking may be perceived by
38 caregivers as different concepts and vary according to culture, contexts, time of day, food type
39 and location. Findings highlight some agreement with similar studies conducted in the U.S. but
40 also provide new insights into how the consumption of foods and beverages in-between meals

- 41 may vary between geographic settings. Findings indicate opportunities for better defining
42 “snacking” within nutrition study design and how this may inform dietary intake data
43 interpretation.
- 44 **Keywords:** Snacking, preschool children, snack definition, nutrition, qualitative

45 Introduction

46 In the years before going to school, the caregiver must make choices about the timing, frequency
47 and amount of food provided. These choices may influence children's dietary behaviours and
48 subsequent risk of overweight/obesity (May & Dietz, 2010; Ventura & Birch, 2008) since food
49 preferences and dietary habits are established early in life and may track through to later
50 childhood and adulthood (Fiorito, Marini, Mitchell, Smiciklas-Wright, & Birch, 2010; Nicklaus,
51 2016; Nicklaus, Boggio, Chabanet, & Issanchou, 2005; Yang & Huffman, 2013). Dietary intake
52 data indicates that dietary patterns amongst toddlers, preschoolers, children and adolescents have
53 shifted from "3 meals a day" to meal occasions interspersed with the consumption of food items
54 in-between tradition meal patterns - contributing more than 25% of children's daily energy
55 intakes among 2-6 year olds - in various countries of the world (Duffey, Pereira, & Popkin,
56 2013; Kerr, et al., 2009; Piernas & Popkin, 2010; Rangan, Randall, Hector, Gill, & Webb, 2008;
57 Skinner, Ziegler, Pac, & Devaney, 2004; Z. Wang, Zhai, Zhang, & Popkin, 2012). However,
58 caregivers' perceptions and attitudes towards the provision of foods and/or beverages in-between
59 meals has been under-researched (Davison, et al., 2015) with the majority of studies in this area
60 being conducted in the U.S. (Blake, et al., 2015; Bleser, Rollins, & Birch, 2014; Fisher, et al.,
61 2015; Younginer, et al., 2016). New insights from ~~alternative~~ other geographic settings ~~cultures~~
62 ~~and geographies~~ are required to broaden our perspective in this field.

63 One challenge in understanding caregivers' experiences about eating in-between meals is the
64 ambiguity in the definition and use of the term "snack" or "snacking" in the literature
65 (Chamontin, Pretzer, & Booth, 2003; Gregori, Foltran, Ghidina, & Berchiolla, 2011; Johnson &
66 Anderson, 2010; Wirt & Collins, 2009; Younginer, et al., 2016). Researchers have called for
67 urgent attention to be given to the need for a universal snacking definition (Johnson & Anderson,

68 2010). Indeed, some authors argue that since the nature of the relationship between snacking and
69 overweight/obesity amongst children and adolescents remains equivocal (Kaisari, Yannakoulia,
70 & Panagiotakos, 2013) - a universal snacking definition would assist nutrition researchers in
71 teasing out the nature of the relationship between snacking and outcomes such as nutrient intakes
72 and overweight or obesity (Gregori, et al., 2011).

73 In particular, researcher definitions of snacking may vary according to study design (Briefel, et
74 al., 2010; USDA, 2014) or be linked to food group classification systems (Ireland, et al., 2002).
75 The increasingly popular nutrient profiling systems, in their various formats, provide largely
76 subjective definitions and classifications for snacking and snack foods (Johnson & Anderson,
77 2010; Vlassopoulos, et al., 2016). It is also plausible that the researcher perspective on snacking
78 may be different to that of the participant in a given study. Caregiver perceptions are particularly
79 important, therefore, since dietary survey methodologies which collect food intake data,
80 particularly those involving caregivers of toddlers and preschool children, often ask the
81 participant to name and define the eating occasions (Briefel, et al., 2010).

82 Culture influences attitudes and perceptions towards foods (Rozin, Fischler, Imada, Sarubin, &
83 Wrzesniewski, 1999) and, therefore, may influence attitudes towards snacking in the diets of
84 young children. Such cultural differences are somewhat exemplified in how dietary guidelines
85 and feeding recommendations, in relation to snacking amongst children, vary from country to
86 country (Afeiche, et al., 2016; Janssen, et al., 2005; Maier, Chabanet, Schaal, Leathwood, &
87 Issanchou, 2007). For example, guidance about desired feeding behaviours amongst toddlers and
88 preschool children in the U.S. advocates establishing regular mealtime routines around 4-6 eating
89 occasions per day and providing 3 meals and 2 snacks per day in order to meet nutritional
90 requirements (Kleinman, 2014). Dietary recommendations for young children in France,

91 emphasise 3 meals and the “4 o’clock” (*le quatre heures*) along with providing practical
92 recommendations for specific vegetables with an emphasis on the “discovery of new tastes, new
93 flavours and new textures” between the ages of 1-3y (Bocquet, Bresson, Briend, Chouraqui,
94 Darmaun, Dupont, Frelut, Ghisolfi, Goulet, et al., 2003). The Swiss Society for Nutrition
95 mentions specific times of the day for feeding young children in-between meals; namely at 10
96 o’clock (*le dix heures*) and 4 o’clock (*le quatre heures* or *le gouter*) and provide food-based
97 recommendations for “healthy 10 o’clock and 4’o clock” eating episodes (SSN, 2015, 2016). The
98 Australian Guide to Healthy Eating refers to “*core foods*” (foods from the major food groups)
99 and “*extra foods*” (French fries, confectionery, biscuits, soft drinks etc.) and that their
100 consumption be limited to “*sometimes*” providing between 5-20% of total daily energy intakes.
101 European practices of providing young children with a mid-morning snack have origins in the
102 post-war era of distribution of milk within schools, and in many European cultures, the mid-
103 morning eating episode amongst toddlers and preschoolers persists, although some argue this is
104 now superfluous (Bocquet, Bresson, Briend, Chouraqui, Darmaun, Dupont, Frelut, Ghisolfi,
105 Girardet, et al., 2003). It is not known to what extent ~~cultural practices~~ dietary guidelines around
106 the timing of in-between meal eating episodes influence caregiver attitudes and perceptions
107 about snacking behaviours. Different ~~cultural~~ geographical perspectives in this field are required
108 to broaden our understanding (Gatley, Caraher, & Lang, 2014) and may help support the
109 evolution of dietary guidelines about snacking.

110 Despite dietary recommendations about the timing of snacking and healthy snack choices for
111 young children, caregiver attitudes and perceptions about the type of food or beverage that
112 constitutes a snack may also vary across cultures and contexts. For example, snacking episodes
113 are known to feature beverages (Piernas & Popkin, 2010) yet beverages do not have the same

114 satiating properties as solid foods (Mattes, 2006). There is emerging evidence that preschool
115 children consume more energy from beverages when served a larger beverage serving size and
116 do not compensate for the energy from beverages when, for example, fruit juice is provided
117 alongside a solid snack-food (Norton, Poole, & Raynor, 2015). Additionally, questions have
118 been raised about whether beverages should be considered in a universal definition of snacking
119 (Johnson & Anderson, 2010). Dietary intake data from Great Britain and the U.S. express
120 concern over the intakes of sugar-sweetened beverages and fruit juice amongst preschool
121 children (Fulgoni & Quann, 2012; Ng, Mhurchu, Jebb, & Popkin, 2012). However, the caregiver
122 perception of beverages vs. solid foods and their role in snacking has been under-researched. as
123 well.

124 This study uses qualitative methods to understand caregiver attitudes and perceptions about
125 feeding toddlers and preschool children in-between meals. This research aims to contribute a
126 new perspective about how caregivers conceptualise these eating episodes and improve our
127 understanding of their attitudes and perceptions about the foods and beverages provided in-
128 between meals. Such findings may help support the development of interventions designed to
129 improve caregivers' understanding about the role of snacking in the diets of young children (e.g.
130 to help meet nutrient requirements) and how to select nutritious snacks for toddlers and
131 preschool children. These findings may also support the collection and interpretation of dietary
132 intake data and contribute to the debate about snacking definitions.

133 This analysis was part of a wider qualitative study (and part of a doctoral research thesis) which
134 used in-depth interviews to understand the experience, attitudes and perceptions of caregivers
135 feeding toddlers and preschoolers (Jacquier, Gatrell, & Bingley, 2016). The wider study used in-
136 depth interviews to glean understandings about general feeding behaviours and included a

137 particular focus on the portioning of foods and beverages, along with attitudes and perceptions
138 related to beverages in the diets of young children. The in-depth interview from this study
139 contained a series of questions in relation to the provision of foods and drinks in-between
140 traditional mealtimes. The responses to those questions form the basis of the analysis herein. The
141 Food Choice Process Model (Furst, Connors, Bisogni, Sobal, & Falk, 1996; J. Sobal, 2006; J
142 Sobal & Bisogni, 2009) was used as a theoretical framework to inform this study. The model
143 acknowledges that choices about food are complex, situational and dynamic; evolving over the
144 life-course. The three major components are: 1) The Life Course 2) Influences and 3) The
145 personal food system. The framework was used to inform the study and to aid the interpretation
146 of findings.

147

148

149 **Materials and methods**

150 **Design**

151 The ontological position of this research is a constructivist perspective, which takes a relativist
152 stance. It assumes an interactive relationship between the researcher and the participant, and
153 aims to reconstruct participants' accounts towards a consensus (Guba & Lincoln, 1998). The
154 consolidated criteria for reporting qualitative research (COREQ) was used to organise and report
155 results (Tong, 2007).

156 **Sampling and participants**

157 To be consistent with the epistemological underpinnings of this study, participants were
158 purposively included to vary in age, gender and income (OFS, 2016). A national database of
159 Swiss landline numbers was used to recruit participants by telephone (Link Qualitative, AG).
160 Screening of the potential participants was undertaken by telephone. Potential participants
161 answered a screening questionnaire to gather demographic data and to check their eligibility for
162 participation. Demographic data for each participant was obtained in relation to age, marital
163 status, income, level of education, number of children in the family, ages of children and whether
164 the participant was born in Switzerland or had migrated to Switzerland (see Table 1).

165 Inclusion/exclusion criteria for participation reflected the requirements of the larger study and
166 included being the caregiver of a healthy child/children between the ages of 1-5y, aged 18 years
167 or older, residing in the French-speaking region of Switzerland, being primarily responsible for
168 feeding, not employed in a nutrition-related field and not having recently taken part in any
169 studies related to child-feeding.

170 Ethical approval for this research was obtained from the Faculty of Health and Medicine
171 Research Ethics Committee of Lancaster University, UK and the ethical committee of the canton
172 of Vaud, Switzerland (personal communication, December 2013). All participants were informed
173 verbally about the study aim and protocol. Informed consent was provided in written and verbal
174 formats and digitally recorded. All information was treated confidentially. Participants received
175 compensation of 50 Swiss francs for their participation.

176

177 **Interview guide**

178 An in-depth interview schedule of leading questions was developed, for the wider, doctoral
179 research, based upon the Child Feeding Questionnaire (Birch, et al., 2001) starting with
180 questions used by Sherry et al. (2004) in qualitative research with caregivers of preschool
181 children. It was subsequently adapted to include opening questions about typical meal, snack and
182 beverage pattern in a 24h period. Questions followed about their experience of feeding at
183 mealtimes and the goals of mealtimes; their experience of foods and beverages consumed in-
184 between meals; how they make choices about the types of foods and beverages to feed their
185 children; how they decide upon *the quantity* of food and beverages to feed their children and how
186 they decide which beverages to provide, and how to portion them (Jacquier & Gatrell, 2016). A
187 specific segment of the interview guide focused on foods and beverages consumed in-between
188 meals. This section referred back to the participant's description of a typical day and asked open
189 questions such as: "let's talk about snacking, does it play a role in the feeding of your child? Do
190 the children sometimes eat between meals/are they ever hungry between meals? Are there foods
191 you encourage? Foods you would like them to eat less of? How do you know to feed your child
192 in such a way?".

193 Since the interview guide was developed from English-language sources, it was first developed
194 and pilot-tested in English with an English-speaking caregiver. The English questionnaire was
195 subsequently translated into French and pilot-tested with two bilingual caregivers of young
196 children. This ensured a consistent translation, along with verifying that all questions were clear
197 and comprehensible.

198

199 **Data collection and analysis**

200 Face-to-face interviews were conducted in the homes of participants, during March and April,
201 2014, lasting approximately 60 minutes. All interviews were digitally recorded and field notes
202 were taken during the interviews. Interviews were conducted until saturation was reached,
203 themes were repeated and no new themes were reported by participants.

204 The recorded interview material was transcribed verbatim, into English, by a professional
205 transcriber. Thematic Analysis (TA) was used for data analysis. TA can be applied to a wide
206 range of theoretical frameworks (Braun & Clarke, 2006) and was applied in an inductive manner
207 (“bottom-up”) guided by the six-phase process described by Braun and Clarke (Braun & Clarke,
208 2006). The coding was led by one author (EJ). Two authors (AG, AB) oversaw the process and
209 reviewed the quality of the analytical phase. The first two phases of data analysis consisted of
210 familiarisation with the data and open-coding of the data. The first stage was a manual, open-
211 coding process, appropriate for text-based data (Mason, 2002). The initial units were cross-
212 checked against the theoretical framework and similarities and differences were noted. The
213 analysis then proceeded through four stages encompassing; searching for themes, reviewing
214 themes, defining and naming themes, and refinement of the analytical narrative. Central

215 organising concepts were identified in order to construct key, overarching themes for the larger
216 study (Braun & Clarke, 2013). AtlasTi was then used to electronically review, code, and
217 catalogue the transcripts as analysis moved through the six phases.

218

219

ACCEPTED MANUSCRIPT

220 **RESULTS**221 **Participant characteristics**

222 After providing informed consent, 19 participants, aged 20-46y (mean age = 36y) took part in the
 223 study. All resided in the Canton Vaud, in the Lausanne region of Switzerland. Caregivers either
 224 worked part-time (n =11) or full-time (n=4) or did not work (n=2). Two male participants were
 225 spontaneously joined by their wives, hence two interviews were conducted as a couple.

226 **Table 1. Characteristics of the participants**

<i>Characteristics of the participants (n = 19)</i>		227
Caregiver	Mother	15
	Father	3
	Child-minder	1
Marital status	Married	12
	Living with partner	5
	Divorced, no partner	2
Income	Low	7
	Middle	6
	High	6
Education	Finished school	6
	Finished college	2
	Finished University	11
Number of children in the family	1 child	5
	2 children	10
	>2 children	2
Ages of the children	1y - <2y	5
	2y - <5y	18
Caregiver place of birth	Switzerland	13
	Outside Switzerland	6

229

231 **Emergent themes**

232 Emergent themes in relation to snacking were placed in categories labelled; 1) Timing is
233 everything, 2) Location and food type, 3) Snacks are junk, 4) Portion size is small, 5) Not in
234 front of the children.

235

236 **Theme 1. Timing is everything**

237 The first of the themes indicated that caregivers were highly influenced by the time of day as to
238 whether the eating occasion was perceived as snacking or not. When asked about the role that
239 snacking played in the daily feeding of the children in their care, typical responses involved the
240 mention of a clock-time. All participants made reference to feeding their children in-between
241 meals at 10 o'clock and 4 o'clock:

242 *Participant FL20: "There is no snacking".*

243 *Interviewer: "But are they ever hungry sometimes between meals?"*

244 *Participant FL20: "It can happen but they must wait for the four o'clock."*

245

246 *Participant FM04: "No. Not for me. I'm not keen on snacking and things like that. They
247 must wait for the 4 o'clock...I try to get them used to eating at meal times".*

248

249 *Participant FM07: "Then, if they tell me they're hungry a little later, I tell them they have
250 to wait until 4:00pm. I don't like them to eat between meals. I don't want them to get
251 into the habit of snacking."*

252

253 *Participant FL08: "Sometimes, they ask (for a snack) ...I tell them to look at the clock."*

254

254 *Participant MM09: "She eats at 4:00pm, but that's not really snacking."*

255

256 Caregivers described how they felt compelled to provide their child with something to eat at

257 10am since they were aware of other children being fed at the same time:

258 *Participant FL20: "I did not have the ten o'clock when I was little. But since all their
259 friends have something at ten o'clock, I give them something as well."*

260

261 *Participant FL19: "Let's say that for the eldest, I saw, when I took him to preschool, I saw*
 262 *that everyone had a small bag for their ten o'clock, and then I thought that I would at*
 263 *least give him something. Then he eats it, or doesn't, but at least he has something at*
 264 *10 o'clock like his friends".*

265
 266 *Participant FH18: "They don't really have time to nibble at things. Her day is planned, we*
 267 *have activities and she waits for her 10 o'clock, like everyone."*

268

269 When probed further about why caregivers offer children something to eat at 10am and 4pm,

270 both social, and nutritional, reasons were cited:

271

272 **Social:**

273 *Participant FH18: "It can be a long time before supper. It helps them to wait a little*
 274 *longer, something healthy, to wait for dinner."*

275

276 *Participant FM03: "We like to eat altogether, as a family. The 4 o'clock means they can*
 277 *wait until six and we can all have supper together."*

278

279 **Nutritional:**

280 *Participant FM07: "Then, we have something at 10:00am...I give them raw carrots, or a*
 281 *small slice of bread and butter, milk. It's not a full meal, obviously. It's like a break,*
 282 *something healthy".*

283 *Participant FH13: "Then I give her a small ten o'clock - around ten. So it varies, it can be*
 284 *a cereal bar, it can be dried fruits, or any fruit, I can get her to eat fruit for the 10 o'*
 285 *clock".*

286

287 ~~Table 2. Social and nutritional reasons for feeding children and 10am and 4pm~~

Social:

~~*"It can be a long time before supper. It helps them to wait a little longer, something healthy, to wait for dinner."*~~

~~*"We like to eat altogether, as a family. The 4 o'clock means they can wait until six and we can all have supper together."*~~

Nutritional:

~~*"Then, we have something at 10:00am...I give them raw carrots, or a small slice of bread and butter, milk. It's not a full meal, obviously. It's like a break, something healthy".*~~

~~“Then I give her a small ten o’clock – around ten. So it varies, it can be a cereal bar, it can be dried fruits, or any fruit, I can get her to eat fruit for the 10 o’clock”.~~

288

289

290 **Theme 2: Location + food type = snacking**

291 ~~In light of responses that indicated how time played a large role in determining if an eating~~
 292 ~~occasion was perceived as snacking or not,~~ Participants were further probed to determine the
 293 circumstances under which eating in-between meals is perceived as snacking. Two overlapping
 294 concepts appeared; namely the location and the food type. ~~According to certain criteria,~~ Almost
 295 half of the participants described how a particular location and a particular food-type, considered
 296 together, ~~would be~~ was perceived as snacking. For example, sweet foods (e.g. confectionery,
 297 biscuits) consumed outside of the home, at special occasions or at weekends were described as
 298 snacking:

299 ~~“I will give them a sweet, if we go out, especially at the weekend.”~~

300 *Participant FL11: “We mostly come out of our routine when we are at other peoples,*
 301 *when we are invited. Because this is when I let her drink more sweet things, sugary*
 302 *things, you know...”*

303 *Participant FL12: “If we are invited to a birthday party, she eats everything she sees and*
 304 *then I tell her, it’s a party, there are snacks, sweets, crisps, there is junk to eat, have it,*
 305 *because at home they don’t have it anyway.”*

306 *Participant FM15: “So often we snack in the car because it’s quite a drive home from the*
 307 *school and when I get home it takes time to prepare supper, and for the children it’s a*
 308 *long time*

309 *Participant FH13: “At times like these, if I see that things are disrupted and we are going*
 310 *out, we are going for a walk or anything else, if he tells me, I’m hungry, I give him a*
 311 *biscuit, something to nibble on.”*

312

313

314 Similarly, eating in-between meals at home was considered snacking when the location of food
 315 consumption was not at the table. Snacking at home meant in front of the TV, or away from the
 316 table.

317 *Participant MM14: "Sometimes at home... we put on the TV...and at that moment we*
 318 *know very well we are eating crisps or crackers or things like that..."*

319 *Participant FL08: "Snacking, yes it does happen. I don't always watch over them, if*
 320 *they're playing in the room together. Once in a while, I catch them with biscuits in their*
 321 *rooms...I don't like that."*

322 *Participant FM15: "We can eat crisps together on the sofa because we are watching a*
 323 *film or we prepare popcorn, we are less strict..."*

324

325

327 **Theme 3: Snacks are junk**

328 When probed further on what was consumed during eating occasions that caregivers agreed
 329 constituted snacking, participants were very specific about what was categorized as a "snack".

330 Snacks were described as a particular group of unhealthy foods, warranting restriction, by two-
 331 thirds of the participants:

332 *Participant FM04: "We've got some, crisps, things like that...I know it's not very good, it's*
 333 *very salty but once in a while, everyone's hungry, that's a snack for us."*

334 *Participant FL08: "I don't have a snack cupboard. I usually try not to have the bad foods*
 335 *that encourage them to snack, you know, chips and sweets".*

336 *Participant FL20: "Sometimes they have one or two sweets that they must ask for, but I*
 337 *mean, there is never a packet of biscuits, a pack of crisps that we nibble. No, they eat at*
 338 *meal times".*

339 *Participant MM09: "No, they hardly ever snack, I mean apart from sweets. If suddenly*
 340 *they want a sweet, I give them a sweet. But I don't take out a packet of biscuits because*
 341 *they suddenly feel like nibbling".*

342

343 Snacks were described as sweet or salty foods, with a pleasurable, or hedonic, value. Nearly all
 344 participants described how they attempted to limit the consumption of these foods.

345 During the discussion of what constituted a snack-food, beverages were not specifically
346 mentioned as snacks. Interestingly, every participant gave milk to their child before going to bed,
347 but this was not considered as a snack, rather a daily routine habit, but also to ensure the child
348 wasn't still hungry – an assurance they would be full before going to bed:

349 *Participant FH18: "We thought that she had eaten enough. But then, once she was in*
350 *bed...she would say, "I didn't have my milk bottle. I want it." So now, we actively ask*
351 *her if she wants it, and we ask her if she wants a small, medium or large one."*

352 *Participant FM15: "And often I wonder, I don't know if milk in the evening is a habit,*
353 *because it's a habit, or whether it's because they haven't had enough to eat, they try to*
354 *compensate with milk."*

355

356 In contrast, as discussed, the foods consumed at 10am and 4pm were described as being
357 nutritious food choices, for example, more than half of the participants recounted how the 10am
358 and 4pm eating occasions were an opportunity to encourage children to eat fruit. The only
359 beverages mentioned in relation to the 10am and 4pm eating episodes were milk and water.

360

361

362 **Theme 4: Portion size is small**

363 When caregivers were asked how they judged how much of a snack to provide the majority of
364 participants mentioned small quantities of readily available food, involving little or no
365 preparation. Again, beverages were not mentioned in relation to snack portion-sizes:

366 *Participant FH10: "Yes, that's also why I do small quantities (for a snack) because I can't*
367 *ask them to eat a real portion if they are going to eat in between meals."*

368 *Participant FL05: "It's just a little something, a few bites."*

369

370 *Participant FL02: "Something small, something to nibble on, something quick"*

371

372

373 Conversely, meals were described differently, as involving particular elements in order to be
 374 considered a meal. Caregivers talked about balance and variation, protein, vegetables and starchy
 375 foods in relation to meals, but not in relation to snacks:

376 *Participant FM04: "Let's say... in general, at midday, I make a meal that has vegetables*
 377 *and carbohydrates. That's for sure."*

378 *Participant FL05: "The meal must have proteins, chicken or fish...or from time to time*
 379 *meat. Yes, that's important for me, to have proteins, so the meal is balanced, as*
 380 *balanced as possible."*

381 *Participant FL07: "For lunch, I make sure they have everything on their plate: one fourth*
 382 *protein, one fourth carbs and half vegetables."*

383

384 **Theme 5: Not in front of the children**

385 Caregivers themselves took steps to influence children's eating behaviours by hiding their own
 386 snacking behaviour from their children. Caregivers described their ~~admitted to~~ snacking
 387 behaviours ~~which were~~ as unrelated to time and purely for pleasure. ~~They also~~ Over half of the
 388 participants, including one couple, described how this type of eating behaviour was often hidden
 389 from the children, or occurred when they had gone to bed or were out of sight. The following
 390 exchange occurred when interviewing both the male (M) and female (F) caregivers of young
 391 children:

392 *Interviewer: "So how about snacking?"*

393 *Participant FH17: "Right ... Snacking."*

394 *Participant MH17 "Not so much."*

395 *Participant FH17 "No, we try not to get them used to it. We like to snack but we*
 396 *hide."*

397 *(Laughter)*

398 *Participant FH17 "We nibble something in the kitchen but they don't necessarily*
 399 *see."*

400

401 *Participant FH10 : "Actually rarely when they are there with us, well we, it is not*
 402 *good.....we eat some chocolate for example in the evening when they are in bed. We*
 403 *allow ourselves to have small enjoyments like that".*

404

405

406 *Participant FL11: "We snack but not in front of them. They might learn our bad habits!"*

407

408

409 This conceptualisation of snacking by the caregiver was one described as being ~~amongst adults~~ is

410 purely for pleasure and is perceived as a behaviour that the children should not be exposed to.

411

412 **DISCUSSION**

413

414 This qualitative study has described how the timing of an eating episode, cultural practices, the

415 location, the food type and the portion size delineated whether or not caregivers perceived their

416 children to be engaged in a snacking episode or not. Culturally relevant eating episodes at 10am

417 and 4pm were not necessarily perceived as snacking *per se* by caregivers.

418 The exact origins of feeding young children, in-between meals, to according to specific clock-

419 times are not well understood. Indeed, an historic account of the origins of the 10am and 4pm

420 feeding occasions in Switzerland could not be found in the literature. However, similar feeding

421 practices in neighboring countries may provide relevant insights as to the roots of feeding young

422 children according to a specific time. For example, in France, the routine feeding of preschool

423 children at 10am was introduced after the second world war in order to compensate for the fact

424 that certain young children missed breakfast, had poor calcium intakes and aimed to improve

425 their intake of dairy products through the provision of milk (Thibault, et al., 2010). In light of the

426 increased prevalence of childhood overweight and obesity, and reduced numbers of preschool

427 children missing breakfast, the nutrition committee of the French Pediatric Association

428 recommended to remove the systematic morning snack and to focus on education about the

429 importance of breakfast. Mid-morning snacks were recommended for the minority of French

430 children most at risk of nutritional inadequacies (Bocquet, Bresson, Briend, Chouraqui,
431 Darmaun, Dupont, Frelut, Ghisolfi, Girardet, et al., 2003). The feeding of toddlers and
432 preschoolers according to a clock-time and has not been reported in literature on snacking from
433 the U.S. However, the notion of culturally acceptable snacking (such as the 10am and 4pm) and
434 the more negative conceptualisation of snacking involving specific sweet foods and salty snacks
435 is supported by the theoretical framework used in this study (Jeffery Sobal, Bisogni, Devine, &
436 Jastran, 2006). For instance, Sobal et al. (2006) propose that some decisions about what to feed
437 and when may have a culturally, and socially, recognisable classification. The classification of
438 eating occasions within a personal food system may help to standardise feeding behaviours.
439 Feeding at 10am and 4pm may be a cultural classification used by caregivers to simplify
440 complex decisions about what to feed their children and when. Similarly, all participants
441 reported providing whole cow's milk before bed. This was not described as snacking by
442 participants but, as suggested by Sobal et al. (2006), may be considered as a personally
443 operational strategy or "routinization" as described by Sobal et al. (2006) to offer themselves
444 assurance their child had eaten enough. In fact, beverages were not described as "snacks" at all.
445 Any future work aimed at developing a universal definition of "snacks", or "snacking", will need
446 to carefully consider the inclusion or exclusion of beverages. ~~as~~ They are important sources of
447 calories in the diets of young children but may or may not be classified as a snack according to
448 the participant or researcher perception. ~~perception or according to a researcher defined criteria.~~
449
450 When participants described ~~describing~~ what was fed at 10 am and 4pm participants listed
451 examples of foods recommended in the Swiss Society for Nutrition (SSN) recommendations "*Un*
452 *dix heures et un goûter sain*" (A healthy 10 o'clock and 4 o'clock). Participants only mentioned

453 water and milk as being consumed at 10am and 4pm which is also consistent with the SSN's
454 recommendations. Previous studies report that dietary guidelines are poorly adhered to by both
455 adults and older children in Switzerland (de Abreu, Guessous, Gaspoz, & Marques-Vidal, 2014;
456 Suggs, Della Bella, & Marques-Vidal, 2016). Older children are likely to have more autonomous
457 dietary behaviours, whereas the diet of the young child is largely under the caregiver's control.
458 Future research may indicate if adults attempt to adhere to dietary guidelines for toddlers and
459 preschool children in their care, but not for themselves. In addition, quantitative data would be
460 required to determine actual consumption at 10am and 4pm, and how these eating episodes
461 contribute to total energy, nutrient and food intakes in order to draw conclusions about the
462 dietary behaviours and nutritional impact of these two eating episodes. When participants
463 discussed snacking outside of the 10am and 4pm eating-episodes specific food-types and
464 contexts were described. Namely, snacking would be considered as sweet or salty "junk foods"
465 consumed in a locations other than at the family table, involving a special occasion, family
466 gathering or a weekend treat. Future research in toddlers and preschoolers would warrant
467 examining the impact of location on snacking habits, food and nutrient intakes.

468 Caregivers described how they attempted to influence children's eating behaviors by the
469 avoidance of modelling snacking behaviours that were perceived as negative. ~~Adults also~~
470 ~~admitted to engaging in this concept of~~. Caregivers described snacking in the absence of the
471 children, or when the children were out of view. The negative attitudes that caregivers hold about
472 snacking, may, therefore, lead caregivers to consciously avoid modelling snacking behaviours in
473 front of their children. ~~implying a negative perception of certain snacking behaviours.~~ A
474 qualitative study from the U.S. also reported that caregivers did not view snacks as "real food"

475 and also acknowledged that they hid their snacking behaviour from their children (Fisher, et al.,
476 2015).

477 In contrast to qualitative descriptions about snacks, participants described meals as having
478 particular nutritional components, or composition, that set them apart from snacks, involved
479 preparation and were consumed at the family table. This is in agreement with research from the
480 US amongst caregivers of preschoolers who distinguished between meals and snacks in a similar
481 way (Fisher, et al., 2015). However, unlike these findings from the U.S., where snacking was
482 largely described in hedonic terms and as something problematic (Fisher, et al., 2015) the eating
483 episodes at 10 am and 4pm (although not necessarily viewed as “snacking” by the participant)
484 were described as having a nutritional role (e.g. to help encourage fruit consumption) or a
485 functional/social role such as helping them to last until dinner time and enable the family to eat
486 together. Eating in-between meals, may, therefore, not be a single concept for the caregiver but
487 may fluctuate according to time, location, food type and geography. It may also not be perceived
488 as a negative practice if the wider culture acknowledges the feeding of children in-between
489 meals.

490 When probed on the portion sizes of snack-foods, participants referred to small portion sizes
491 requiring little or no preparation and being distinctly different from meals. This is in agreement
492 with work from the U.S. in which participants made similar distinctions between meals and
493 snacks (Blake, et al., 2015). However, the same study indicated that many factors determine the
494 portion size of foods offered in-between meals such as the healthfulness of the food, the level of
495 perceived child-hunger and what has been eaten at previous meals. Less is understood about the
496 determinants of portion sizes for beverages provided as snacks. Indeed, sweetened beverages
497 were not mentioned when participants described their perceptions of what constituted a snack.

498 This is contrary to findings from a qualitative study conducted in Australia amongst parents of
499 children aged 3-5y. They considered “soft drinks” as an “extra food” with the term “treat” most
500 often associated with “extra foods” (Petrunoff, Wilkenfeld, King, & Flood, 2014) In our study,
501 sweetened beverages were only classified as a snack by one participant. Milk and water were
502 provided at 10am, 4pm, and milk was provided before bed, but these routine milk-drinking
503 episodes were not considered as snacking. Future research should focus on how beverage
504 portions are determined, particularly in the context of the snack episode since larger beverage
505 portions may increase the consumption of the beverage and/or food amongst preschool children
506 (Norton, et al., 2015). Over-consumption of sweetened beverages is a risk-factor for childhood
507 overweight and obesity, therefore improved understanding about how caregivers conceptualise
508 the beverage episodes in the diet of toddlers and preschoolers may highlight opportunities for
509 interventions to reduce consumption.

510 Contrary to findings from the US (Fisher, et al., 2015) participants in this study did not report
511 using snacks to reward children’s behaviour outside of the meal occasion. ~~However, in the larger~~
512 ~~wider study, participants did report using the promise of a dessert food item to encourage~~
513 ~~children to clean their plate. Caregivers may not be aware that urging children to finish their~~
514 ~~entire meal with the promise of a food reward for doing so may not foster healthy, self-~~
515 ~~regulating eating habits (Thompson, 2010). Also, since sweet.~~ Sweet-foods were commonly
516 offered as part of/immediately following the traditional lunch or dinner meal, ~~this was not~~
517 ~~classified as a~~ and as such, were typically referred to as a ~~snack but rather a~~ dessert.
518 ~~Nonetheless, the~~ The type of food offered following ~~the~~ a meal may ~~have fallen~~ into ~~their~~ a
519 caregiver ~~definition~~ classification of a snack food e.g. chocolate, but not be considered as such
520 due to its proximity to the meal occasion. Previous studies support the notion that snacks,

521 desserts/treats may be separate concepts for the caregiver (Davison, et al., 2015; Petrunoff, et al.,
522 2014; Younginer, et al., 2016). It is plausible that the same food may be given an alternative
523 label e.g. “dessert” due to either timing, location or proximity to a meal, for example. Dietary
524 survey methodologies which measure children’s food intake, may often ask the participant to
525 define the eating occasion themselves choosing from an appropriate label such as breakfast,
526 lunch, dinner, snack etc.,(Briefel, et al., 2010). The National Health and Nutrition Examination
527 Survey (NHANES) define a snack, or snacking occasions as distinct eating occasions that consist
528 of one or more food and beverage items, including plain water (Sebastian, Goldman, &
529 Wilkinson Enns, 2011). ~~Some~~ Whereas some dietary intake data are reported as “snacking
530 occasions” using a combination of time periods falling outside the occurrence of the traditional
531 mealtimes ~~clock time~~ combined with a self-selected label for the eating occasion (D. Wang, van
532 der Horst, Jacquier, & Eldridge, 2016). According to the context, study participants may classify
533 a snack occasion as something else, or, may choose to not report a snack occasion since it may
534 have been considered a “*dessert*”, or a “*treat*”. Such terminology are not commonly available as
535 choices in surveys about dietary intake. More research is required to understand how modern-day
536 eating episodes are perceived, and thus named, by study participants since this may have
537 implications for the collection and interpretation of dietary intake data. Alternatively, survey
538 designers may wish to include other labels e.g. dessert/treat/break that could be used in a broader
539 definition of “snack” and later be coded as such. As suggested by Younginer et al., (2016)
540 dietary survey interviewers may even wish to probe for the purpose/context when asking
541 questions about the in-between meal phase during dietary interviews.

542 **Study limitations**

543

544 Qualitative methods are suited for obtaining in-depth attitudinal and behavioural insights and the
545 findings of this qualitative study are not expected to be generalisable to other populations. The
546 participant accounts of eating in-between meals cannot be interpreted as a comprehensive
547 reflection of experiences, attitudes and perceptions. The purposive sampling strategy may have
548 attracted participants that were particularly interested in the feeding of their children. In this
549 study, over half of the sample were University educated which is above the national average in
550 Switzerland. The level of education of caregivers can influence feeding (Saxton, Carnell, Van
551 Jaarsveld, & Wardle, 2009) and this may have influenced participant responses. Future research
552 is required to confirm the study findings. ~~herein.~~

553
554 In conclusion, the findings of this qualitative research indicate how eating in-between meals may
555 be perceived as multiple concepts by the caregivers of toddlers and preschool children. A notable
556 distinction between these findings and findings from the U.S, was the feeding of children in-
557 between meals, according to a specific clock time. Whilst studies involving caregivers from the
558 U.S. agree that foods consumed in-between traditional mealtimes constitute snacking
559 (Younginer, et al., 2016) providing foods in-between meals at a specific time was not observed.
560 However, this study does support the notion that the quality of the food, the location, the purpose
561 and portion size feature as specific characteristics related to how caregivers conceptualise
562 snacking. Nonetheless, beverages were not described in participant conceptualisations of
563 snacking episodes. Further research, in contrasting geographies, and in the context of modern-
564 day eating behaviours, would improve our understanding of caregiver perceptions and attitudes
565 towards the conceptualisation of snacking in the diets of toddlers and preschool children.

566

567

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