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Report: Literature review on factors influencing parental dietary habits

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Executive summary

Aim: To provide a review of the literature on how parenthood affects the **healthiness of eating behaviours**, focusing on the **main factors of influence and barriers for healthier eating** reported by parents in peer-reviewed studies.

Methods: Electronic literature search in five databases employing three search techniques resulted in the finding of 33 relevant articles.

Results: The literature is ambiguous concerning the effects of parenthood on eating behaviours. There is some evidence showing that parenthood is associated with certain improvements in diet, such as breakfast consumption, intention to buy more organic foods, more fruits and vegetables and to have regular meal time. However, the majority of the studies reported a prominent drop in dietary quality when adults become parents, including a higher consumption of discretionary foods rich in saturated fat, cholesterol, sodium and sugar. The main factors of influence and barriers for healthier eating described by parents were categorized in three main domains: **1) Personal factors**: time scarcity and perceived time pressure, negligence of one's own health and nutrition, low self-efficacy for food-related activities, negative emotions, knowledge on healthy eating, negative body image; **2) Socio-economic factors**: unhealthy preference of family members, financial constraints, lack of support for food-related activities, social visits and visiting; **3) Environmental structural factors**: marketing strategies, unhealthy work environment, low durability of fresh foods.

Conclusions and considerations: The reviewed studies have shed light on the undeniable impact parenthood elicits on adults' eating behaviours. Although the majority of the studies pointed to a downturn in the healthiness of eating, there is at least some research indicating that the transition to parenthood holds great potential to take adults towards healthier choices. Nevertheless, it is important to consider that what is known about changes in eating behaviours when adults become parents is based largely on **quantitative studies** evaluating dietary intake in **demographically homogeneous** contexts.

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Main research questions

- How does the transition to parenthood affect the healthiness of eating behaviours?
- What are the perceived factors of influence and barriers for healthy eating in the transition to parenthood?

Unfolding the research question:

WHO	New parents (children 5 months – 4 years)
WHAT WHICH/ HOW/WHY	• Perceived changes in healthiness of eating behaviours • Factors of influence for the possible changes • Barriers/challenges/difficulties for healthy eating
WHEN	In the transition to parenthood (stages described by the participants)
WHERE	In the food context (home, workplace/ individual, social)

Methods

Data Sources

Electronic literature search of Pubmed, Scopus, Science Direct, Web of Science and Latin American Databases (Lilacs).

Study selection

Inclusion criteria: studies including (new) parents' eating behaviours

Criteria for exclusion: articles addressing eating behaviours *exclusively* during pregnancy and puerperium, adolescent parents, studies addressing parents with chronic (obesity, diabetes, eating disorders) or other specific conditions affecting eating behaviours.

Search techniques

Three search techniques were employed: 1) searching with key words, 2) reference search and 3) citation search. The results obtained with each technique are described below.

1) Searching with key words

A key word mapping was developed for this search technique in 4 languages: English, French, Spanish and Portuguese. However, only studies in English were found.

New parents OR Established parents OR First-time parents OR Transition to parenthood OR Transition to motherhood OR Life course perspective	AND	Eating behavio* OR Dietary habit* OR *healthy eating OR Dietary behavio* OR Food habit* OR Eating habit* OR Food choices OR Dietary patterns OR Healthiness of eating OR Dietary modifications OR Healthiness of eating

Figure 1. Key word mapping in English

A total of **19 relevant articles** were found with this technique (all in English language). Nevertheless, only 6 articles presented similar objectives and scope of the present study, focusing on barriers for healthy eating in the transition to parenthood. The majority of the studies focused on quantitative measures of dietary changes, mostly comparing the diet of parents and non-parents, not investigating the reasons for those changes and how to address them. Those articles were still included for the contribution to shed light on overall parental eating behaviours.

2) Reference search

The reference list of the 19 articles found with the first research strategy were scanned. The same was done with the new articles included, until no new relevant studies emerged. Searching for Reference List added **13 relevant articles** to the review. Still, the majority of the studies focused on paternal (mostly maternal) dietary quality and food choices by means of quantitative analysis, and not in the *transition* to parenthood.

3) Citation search

This technique involved screening articles that have cited the most relevant articles for this review. **One additional relevant article** was found using this technique.

Result of literature screening

The result of the literature screening using the 3 search techniques is presented in Table 1.

Table 1. Summary of the research strategies and number of relevant articles selected

Language	Research strategy	Number of relevant articles
English	Key words	19
	Reference list	13
	Citation search	1
TOTAL		**33**

Theoretical and methodological approaches

Overall, few studies employed a well-defined theory to present and explain their findings. The authors who counted on theories to reveal the results were diverse in the choice of the theoretical framework (Figure 4).

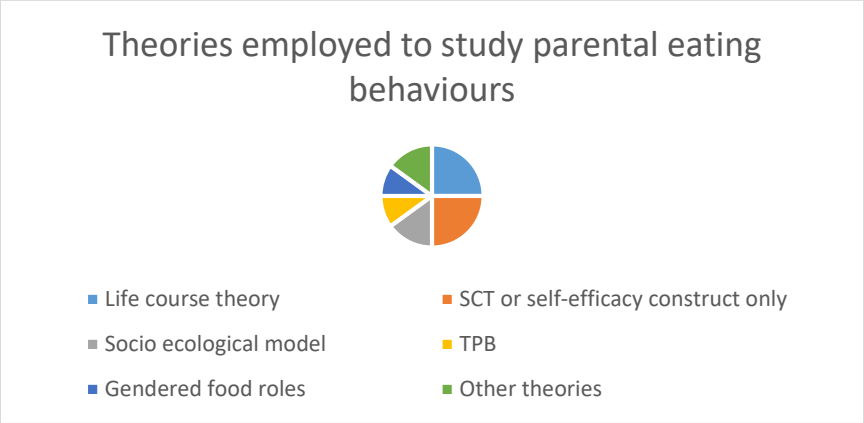

Figure 4. Main theories employed in the literature review to investigate eating behaviours among parents.

Notes: SCT: Socio Cognitive Theory; TPB: Theory of Planned Behaviour

The most frequently applied theory was the **life course theory**. This theory takes into account the development of practices and behaviours over time, examining special periods in life that are associated with new social environmental contexts (Aschemann-Witzel, 2013). In the context of food and nutrition, the life course theory investigates how new life circumstances and transitions from one life stage to another affect dietary patterns. Aschemann-Witzel (2013) for example, analysed Danish mother's perception of the healthiness of their dietary behaviours during the transition to parenthood. Other contexts in which this theory was applied included Switzerland (Hartmann et al., 2014) and the US (Jabs et al., 2007; Olson, 2005; Umberson et al., 2011).

Some other studies have explored **Social Cognitive Theory** domains. The majority of those considered the **self-efficacy** construct and were conducted in the US. Through semi-structured qualitative interviews, Jabs et. al. (2007) studied maternal confidence (self-efficacy) in cooking affecting food choices among working mothers. Horning et al. (2017) associated parental cooking self-efficacy with the reasons to buy prepacked, processed meals. Nogamuchi & Mikie (2003) implemented the self-efficacy concept to evaluate the effects of becoming a parent on adults' lives. Reid et al. (2015) investigated the importance of cooking and nutritional self-efficacy on parental and family healthy eating behaviours. Finally, Beshara et al. (2010) studied Australian mother's confidence in their ability to prepare healthy meals.

The **Socio Ecological Model** was employed by Haerens et al. (2009) to explain personal, socio-environmental and institutional variables influencing eating behaviours among European parents and their children (Haerens et al., 2009). Martin-Biggers et al. (2018) also used the Social Ecological Approach to identify US mothers' intrapersonal, interpersonal and physical environment's variables influencing weight-related characteristics. Another study with US mothers applied what the authors called **bioecological framework**, while analysing low-wage employed mothers' social context influencing constructions of time for food (Jabs et al., 2007).

The **Theory of Planned Behaviour** (TPB) was incorporated by two studies among the articles found in our review. The TPB is considered a valid framework for understanding dietary behaviours, considering that behaviour is the result of intentions and Perceived Behavioural Control (PBC) (Bassett-Gunter et al., 2013). Bassett-Gunter et al. (2013) concluded that the transition to parenthood for new and established parents may impact PBC. Mac Millan et al. (2018) used the TPB to describe the healthy-eating experiences of low-income postpartum women.

Some articles, although not pointing at a specific theory, explored **gendered food roles**. For example, Blake et al. (2009) examined gender differences in the integrations of work and family demands among US parents. Roos et al. (1998) compared healthy eating behaviours patterns between Finish women and men, considering domestic roles in addition to women's other roles (spouse, mother, employee).

Studies drawing upon French social scientists' ideas were also found. As an example, **Pierre Bordieu's** notions of habitus, cultural capital and field was used to construct a conceptual framework of the complex process leading to food provisioning practice among New Zealander women (Bava et al., 2008). Johansson et al. (2013) applied **Foucault's theories of power, knowledge and governmentality** to address the conflict between individual and society's responsibility for unhealthy eating (Johansson et al., 2013). Drawing on Foucault's theory, the authors criticize the view that unhealthy eating is a problem solely of the individual, emphasizing the structural factors and social inequality surrounding food and nutrition issues.

Lastly, another theory explored among the articles in this review, was the **practice theory**, applied by Johansson & Ossiansson (2012). Those authors analysed how Swedish parents deal with what the authors call **health puzzle**, meaning the many pieces of family life (time, money, health discourses, bodies, nutrition, physical activities, health care, sleep, etc.) that are put together to reach a healthy lifestyle. The

practice theory in this context considers that the healthy puzzles is solved through practices and routines (shopping, cooking, and eating) and also by "doings" and "sayings" (thinking, feeling, and valuing).

Results

Although 33 studies were considered to be insightful to the research questions, only four studies investigated eating behaviours *in the transition* to parenthood (Aschemann-Witzel, 2013; Bassett-Gunter et al., 2013; Hartmann, Dohle, & Siegrist, 2014; Laroche, Wallace, Snetselaar, Hillis, & Steffen, 2012). Therefore we present the findings on overall healthiness of parental eating behaviours, without describing the different stages in the transition.The results will be then presented in three main sections: I) Healthiness of parental eating behaviours, II) Factors and barriers influencing parents' healthy eating behaviours

I. Healthiness of parental eating behaviours

"I have to start eating more vegetables and stuff like that to show that [laughs] this is something that you actually can eat. I was brought up with a dad who never ate any vegetables, so neither did I or my brother." Swedish father (Edvardsson et al., 2011).

"One might think: if I prepare a carrot for him, I could do so for myself—but that somehow does not happen." Danish mother. (Aschemann-Witzel, 2013)

The literature is ambiguous concerning the effects of parenthood on eating behaviours. There is some evidence showing greater intentions towards healthy eating when adults become parents, especially for men (Bassett-Gunter et al., 2013), and that parenthood is indeed associated with some improvements in dietary behaviours. For instance, after having children some parents have reported to eat more breakfast (Olson, 2005; Smith et al., 2017), intended to buy more organic foods, more fruits and vegetables and to have regular meal time (Aschemann-Witzel, 2013; Edvardsson et al., 2011; Olson, 2005). Those actual positive outcomes varied by categories within social location (Olson, 2005) and gender, although the studies show mixed findings. In Finland, mothers of young children were more closely in line with the dietary guidelines than other women (Roos, Lahelma, Virtanen, Prättälä, & Pietinen, 1998). Longitudinal analysis identified that first-time Canadian fathers increased their fibre intake (Nasuti et al., 2014), whereas Swiss mothers (not fathers) were reported to have increased vegetable consumption. On the other hand, Swiss mothers were more likely to consume sweets, processed meat, beef and poultry compared to women living in households without children (Hartmann et al., 2014).

As a matter of fact, the majority of the studies reported a prominent drop in healthiness of dietary behaviours when adults become parents. Evidence from a food-frequency questionnaire investigating

Australian first-time mothers' diet, showed that overall maternal diet quality was poor, especially in low socioeconomic groups (McLeod, Campbell, & Hesketh, 2011; van der Pligt et al., 2016). These findings are congruent with those found among North-American parents, indicating that the presence of children in the household is associated with higher total fat and saturated fat intake. Adults with children ate high-fat foods more often than adults without children, including salty snacks, pizza, cheese, beef, ice cream, cakes/cookies, bacon/sausage/processed meats, and peanuts (Laroche, Hofer, & Davis, 2007). The same results were observed among Swedish women, who reported eating more discretionary food (sweets, cakes, cookies, crisps, ice cream) and decreasing the intake of fruit and vegetable after becoming mothers (Wennberg et al., 2016). Similar trends were also observed from a 3-day dietary recall among Canadian parents. First-time and second-time mothers consumed higher energy, fat, and sugar compared with women without children. Longitudinally, parenthood was associated with a decrease in first-time mothers' fruit intake and increased second-time mother's meat intake (Nasuti et al., 2014). More than half of the US women included in a large study (1000 women) had unhealthy dietary quality at 3-6 months postpartum characterized by inadequate vegetable intake (Fowles & Walker, 2006).

The decrease in diet quality appears to start early in the transition to parenthood. Danish mothers mentioned to start snacking and eating more convenience foods since the first months after birth, including sweets, cookies, bread, pasta and fast food; accompanied by a decrease in the consumption of salad, and vegetable variety (Aschemann-Witzel, 2013). In fact, detrimental changes in eating behaviours appear to be more prominent in women. Several studies with US parents (from diverse ethnic and socioeconomic backgrounds) have shown that mothers of young children may be at greater risk for overweight and other negative health outcomes than fathers. Mothers reported greater consumption of sugar-sweetened beverages, meat, total energy, higher percent saturated fat, cholesterol and sodium (George, Milani, Hanss-Nuss, & Freeland-Graves, 2005) and lower vegetable consumption compared with women without children (Elstgeest, Mishra, & Dobson, 2012; George et al., 2005), whereas no significant difference was observed between fathers and men without children (Berge, Larson, Bauer, & Neumark-Sztainer, 2011). Japanese mothers were also reported to consume more sugar and sodium than women without children (Saito, Matsumoto, Hyakutake, Saito, & Okamoto, 2018).

The scenario depicted above describes the fact that parenthood affects weight patterns over time in both men and women (Umberson, Liu, Mirowsky, & Reczek, 2011). Longitudinal evidence with a large US sample (N: 3617) has shown that parents gain weight at a more rapid rate than nonparents do (Umberson et al., 2011).

The next session of this literature review will explore the main factors affecting the healthiness of eating behaviours on parental diet.

II. Factors and barriers influencing parents' healthy eating behaviours

The literature review revealed that barriers for a healthy lifestyle during the transition to parenthood are found in the following areas: 1) personal (cognitive, behavioral), 2) socio-economic and 3) environmental structural.

1) Personal factors (cognitive, behavioural)

The main personal factors acting as barriers for healthy eating among parents were: time scarcity and perceived perception of time pressure; negligence of one's own health and nutrition, self-efficacy, negative emotions, knowledge on healthy eating and negative body image.

Time scarcity and perceived time pressure

"When it was quiet, I had to rush, because I never knew when the baby would cry again." Danish mother. (Aschemann-Witzel, 2013)

"It is stressful when you come home, you are badly prepared, you look at the potatoes that needs to be boiled for about 30 minutes, the children are yelling because they are so hungry and then you end up making sandwiches instead." Swedish mother. (Regber, 2014)

The most prominent barrier for healthy eating pointed in all studies was time scarcity, a phenomenon experienced by all parents, regardless of socio-economic and educational background. Middle-income and well-educated Danish mothers experienced time scarcity for food preparation and eating since the first months post-partum. The lack of a structured meal pattern and unpredictability of daily routines lead to increase of snacking and consumption of convenience foods (Aschemann-Witzel, 2013). Later on, mothers continue to face numerous uncontrollable events, such as children's unexpected bad temper and schoolwork and inflexible working schedules as described by working mothers in the US (Jabs et al., 2007). Similarly, New Zealander working mothers emphasized time scarcity and unpredictability of daily routines and the consequent inability to plan ahead as a constraint for healthy eating habits (Bava, Jaeger, & Park, 2008).

Certainly, lack of time for food provisioning exacerbates when mothers go back to work. Workload was mentioned to decrease time to plan and cook meals in several European countries as well (Haerens et al., 2009), also when considering exclusively families with low socio-economic status (SES) (Johansson, Ossiansson, Dreas, & Mårild, 2013). These findings are consistent with those of Jabs et al. (2007), who emphasized that time scarcity was overwhelmingly experienced by low-wage employed U.S mothers, independent of occupation, education and household composition, and affected their food provisioning. Time constraints decreased the pleasure of cooking among most of those women, who viewed cooking as just another task representing a barrier to other activities. Time pressure might also compromise confidence and self-efficacy to prepare healthy meals, as reported by employed Australian mothers (Beshara, Hutchinson, & Wilson, 2010). Indeed, self-efficacy and time pressure seem to be mutually related (Figure

1). The reciprocal relation time pressure-self efficacy is illustrated in Figure 1 and will be further explored in the item Self-efficacy of this review.

The primary consequence of time scarcity on meal healthiness is the frequent use of convenience foods among parents from different contexts (Bava et al., 2008; Beshara et al., 2010; Horning, Fulkerson, Friend, & Story, 2017; MacMillan Uribe & Olson, 2018). A low SES mother from the US declared: *"A grilled chicken and some vegetables and potato is not going to just pop up on your plate. You have to really take the time. So eating out at fast food and all that junk food is way easier".* (MacMillan Uribe & Olson, 2018).

The use of convenience foods was often followed by feelings of guilty, mentioned especially by mothers (not fathers) (Johansson et al., 2013). Although both US mothers and fathers declared to have a rushing, stressing and tiring routine, only mothers expressed feelings of guilt for not being always able to provide healthy meals for their children (Blake et al., 2009). Among Danish and New Zealand mothers, this feeling decreased if the child care facilities provided healthy food for children (Aschemann-Witzel, 2013; Bava et al., 2008).

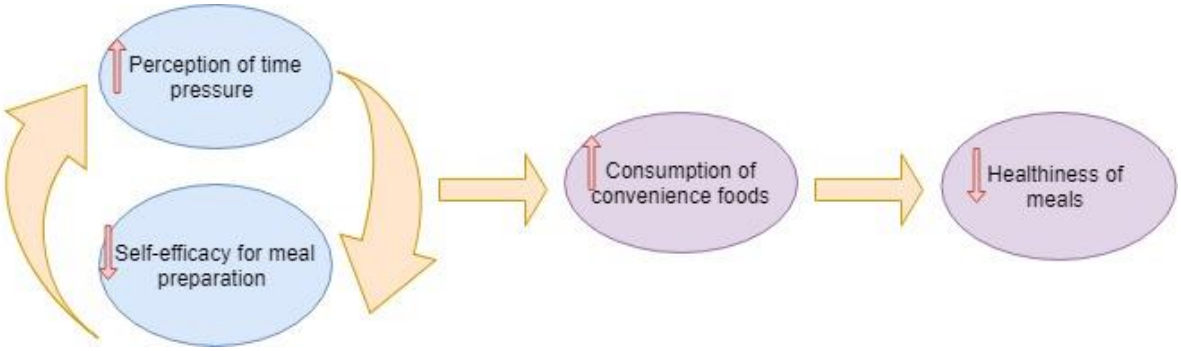

Figure 1. Illustration of the mutual effect of perception of time pressure on self-efficacy, increasing consumption of convenience foods with consequent decrease in the healthiness of meals.

Negligence of one's own health and nutrition

"You gotta feed your kids . . . that's your number one priority" U.S mother (Jabs et al., 2007).

The second most prominent factor acting as barrier for healthy eating among parents was the negligence of their own health and nutrition on behalf of the children, also observed by parents from diverse backgrounds (Haerens et al., 2009). Parents in general feel the urge to provide the best care possible for their new-born, sacrificing or postponing self-care. This attitude appeared clearly among first-time Swedish mothers and fathers, who did not seem influenced by health promotion strategies aiming to improve their own health. Those parents expressed to be aware of health problems caused by over consumption of energy dense foods, but perceived those problems as reversible, and therefore something that could be tackled later in life (Edvardsson et al., 2011). Similar pattern was observed in a later study with low SES

Swedish families, in which parents declared to sacrifice their own activities, such as physical exercise in order to provide meals for the family (Johansson & Ossiansson, 2012).

Likewise, employed US mothers indicated to trade-off personal goals to save time and energy in their busy lives, as well described in the following narration: *"My number one thing is to make sure that my kids are well taken care of. . . You can always change jobs but you do not want to see your kids mess up.*"(Blake et al., 2009). A recent study in the US supported this pattern among low-income mothers (MacMillan Uribe & Olson, 2018). In focus group discussions women declared to be unable to focus on their own diet due to preoccupation with their infant's needs. Mothers felt motivated to engage in healthy behaviours only if it would result in benefits for their babies. For example, the motivation to eat healthy foods was attached to the fact that maternal diet can improve maternal milk.

Prioritizing the child's nutrition is an attitude that accompanies parents during a long period in the transition to parenthood. Danish mothers remarked that during the first months after the birth, eating was more seen as a technical necessity to sustain strength and less as a means for self-care. Later on, when the child started to share family meals, mothers adapted their own diet to the child's dietary and food needs. Some of the changes were positive (increasing consumption of fruits and vegetables, and organic foods; having dinner earlier and at fixed times, sitting down to eat with the family and starting to cook more) and others negative (decreasing the consumption of salad and the variety of vegetables)(Aschemann-Witzel, 2013).

Another factor described in the literature worth mentioning, is the relief parents felt right after pregnancy and breastfeeding for not having to eat healthy once the baby was born. Relapsing to a less healthy lifestyle, including consumption of sugary products was narrated by first-time Swedish mothers and some fathers (fathers who changed habits in order to support their partners during pregnancy). Incentives for healthy eating habits became weaker when the perceived health risks of exposing the fetus were no longer present (Edvardsson et al., 2011).

Low self-efficacy for food-related activities

A few studies have applied the Social Cognitive Theory framework, emphasizing the importance of self-efficacy for providing healthy foods and meals. The increased unfamiliar demands of early parenthood might reduce feelings of control over healthy eating (Bassett-Gunter et al., 2013). Research conducted with low-wage employed mothers in the US, identified that the lack of confidence for food provisioning was exacerbated by time scarcity, lack of support for household tasks, stress and fatigue (Jabs et al., 2007). More recent studies with US parents confirmed the lack of cooking skills and low meal-planning abilities as barriers for healthy eating, with consequent increased purchase of pre-packaged, processed meals (Horning et al., 2017). Those trends were also observed with other population, particularly among employed mothers from New Zealand (Bava et al., 2008). To illustrate, Figure 2 adds extra factors to explain how decreased self-efficacy interferes on parental meals' healthiness.

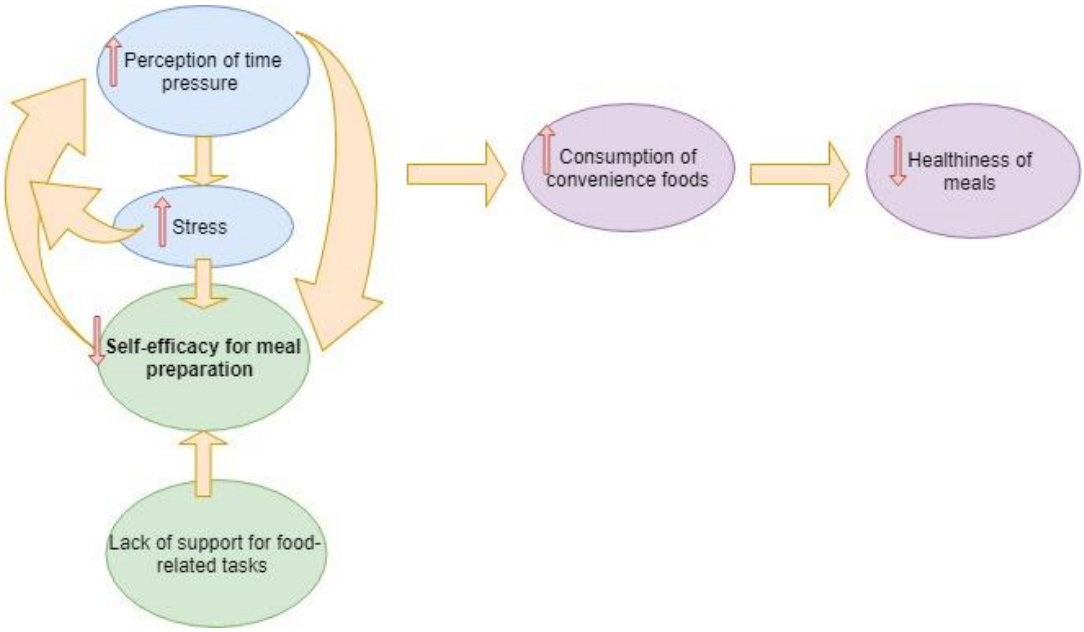

Figure 2: Factors and pathways related to self-efficacy leading to decrease in healthiness of meals among parents.

By contrast, the mothers who reported having greater cooking skills (greater self-efficacy for cooking) declared to prioritize cooking over other activities (Jabs et al., 2007). US and Australian dietary gatekeepers who had higher self-efficacy in choosing healthy foods were likely to increase use of vegetables in meals, gave greater focus for freshness rather than highly processed foods, had a more considered approach to transforming ingredients into healthy meals and were more likely to reduce impulsive snack food purchasing (Reid, Worsley, & Mavondo, 2015). As a matter of fact, previous study with Australian employed mothers has found self-efficacy to prepare a healthy meal as the unique significant predictor of a healthy evening meal (Beshara et al., 2010).

Notably, lack of cooking self-efficacy was less emphasized by low SES parents (Johansson et al., 2013). For example, a Swedish mother from a low-income family declared to be proud of managing to put proper food on the table every day in spite of time constraints and small resources (Johansson et al., 2013).

Another theoretical construct reported in the literature, similar to self-efficacy, is the perceived behavioural control (PBC), from the Theory of Planned Behaviour. A quantitative study with new and established parents in Canada identified a decrease in parents' PBC during the six-month post-partum. The authors observed that decrease in feelings of confidence and control might extend to healthy dietary behaviours (Bassett-Gunter et al., 2013). This idea is supported by the findings of Nomaguchi & Milkie (2003) with parents from the US, who pointed out that young children might decrease adults' sense of power to achieve their own goals (Nomaguchi & Milkie, 2003).

Negative emotions

"I also would have needed more support after delivery when food became my comfort while struggling with breastfeeding and depression!" Swedish-speaking mother. (Christenson, Johansson, Reynisdottir, Torgerson, & Hemmingsson, 2016)

"I ate a huge amount of carbohydrates, food that gave me energy, sugar of course, to be able to cope (stay awake). I felt that when I was tired and slow I had to eat something, not because I was hungry but to get energy. I was aiming to be there for him (the baby) 24h/day" Swedish speaking mother. (Christenson et al., 2016)

Eating in response to negative emotions was an issue expressed by several mothers, especially from higher socio-economic status. For instance, Swedish-speaking women with postpartum weight retention declared to eat as a strategy to relieve psychological, emotional and physical discomfort such as: **anxiety**, **depression**, **stress**, **boredom**, **restlessness**, **tiredness**; a phenomenon called by the authors **"eating for relief".** Those mothers also attributed (over) eating as a as way to distract **physical pain** or **discomfort** (pelvic joint pain) felt during pregnancy and the first months post-partum (Christenson et al., 2016). Likewise, Danish mothers pointed to discomfort during pregnancy as a factor affecting the healthiness of their diet (Aschemann-Witzel, 2013).

Nevertheless, eating for relief is an occurrence not exclusively to the post-partum period. The same Danish mothers mentioned to snack discretionary foods as a "treat" after a busy day, when the children are put to the bed and they can finally relax (Aschemann-Witzel, 2013). In the same way, New Zealanders working mothers reported the consumption of energy drinks and sugar-rich foods as a coping mechanism in a busy and tiring lifestyle (Bava et al., 2008).

Interestingly, seeking solace in food seems not to be an issue affecting fathers, rather the contrary. The motivation to eat for some fathers in low SES families seemed to be related predominantly to satisfy physiological needs. A Swedish father from a low-income family declared: "*I eat to be satisfied, nothing more*."(Johansson et al., 2013). Comparatively, one father from the US expressed the following statement when asked about how he dealt with food and eating in spite of a hectic life: *''It's all the same. . . no change in the meals. . . still gotta eat no matter how stressed you get. . . it's a repetitive thing. I mean every day is the same thing.*''(Blake et al., 2009).

Notwithstanding, emotional eating among mothers is especially worrying considering that parenthood is marked by increased risk for weight gain and decreased healthiness of dietary habits. US parents of minor children in a behavioural weight loss program had suboptimal weight loss compared to non-parents, and pointed to greater stress, higher depression scores and more time-related issues as weight loss barriers (Rosenbaum, Remmert, Forman, & Butryn, 2018). Equivalently, a previous study with the US population demonstrated that stress from work and financial issues were associated with limited compliance with dietary guidelines among mothers (George et al., 2005).

Although much less likely, stress and negative emotions might decrease food intake for some people, as well described by a North-American mother: *''I have to work around [my daughter's] time*

schedule.. . . A lot of times. . .I get so caught up in doing things, sometimes I will forget to eat. . . .I'll snack on something here and there but as far as making a meal I won't. . . .It's a lot on my plate.. . .There's times that I could go and just cry for a little bit and then just breathe and then start back up on my normal routine again.''(Blake et al., 2009).

Knowledge on healthy eating

It is remarkable that lack of nutrition knowledge was not referred to as barrier to healthful food choices by expectant and new parents. The most common sources of information on healthy eating referred to by European parents were: their own parents and family background (Aschemann-Witzel, 2013), the media (radio, journals, internet, newspaper, etc.), free booklets and magazines, pamphlets (especially from super markets or shops), the food pyramid, and conversations with friends and relatives (Aschemann-Witzel, 2013; Haerens et al., 2009). Low-income Swedish parents referred to getting inspiration by commercial and recipes from food shops to choose what to cook during the week (Johansson & Ossiansson, 2012).

In contrast, working mothers from New Zealand found it difficult to recall channels of information about food and meals, as illustrated from one mother*: "I think I always knew and I don't think I've ever been taught. It's part of what I learn and absorb. I can't recall any time being told about the food pyramids and things. [It's] osmosis*." (Bava et al., 2008).

Negative body image

A last personal factor worth mentioning is the negative body image associated with the transition to motherhood. Negative body image was associated with less healthful diets and lifestyle in the late post-partum among low income mothers from the US (George et al., 2005).

2) Socio-economic factors

The main socio-economic factors acting as barriers for healthy eating among parents were: unhealthy preference of family members, financial constraints, lack of support for food-related activities, social visits and visiting.

Unhealthy preference of family members

"There are many things that you cannot eat anymore because the children won't like it." Danish mother. (Aschemann-Witzel, 2013)

Unhealthy preference of family members, such as (grand) parents (Haerens et al., 2009), husband and children emerged as a constraint for healthy dietary habits among European mothers (Aschemann-Witzel, 2013; Johansson et al., 2013). Danish mothers referred to some negative influence of the partner in the healthness of their diet, for example, that the partner did not use enough vegetables when cooking and ate more crisps and sweets (Aschemann-Witzel, 2013). Similar situations were narrated by low SES families (Haerens et al., 2009; Johansson et al., 2013). As expressed by a Swedish mother, it can be tiring and frustrating to put efforts into trying new dishes that children refuse to eat (Johansson et al., 2013). Especially

for low SES parents, an appropriate meal was considered one that can be cooked quickly and appeals to all family members' tastes (Johansson et al., 2013). Those parents also remarked that discretionary foods were the cheapest way to make the weekends a cozy and special occasion for the family, as happens in "Cozy Fridays". In Sweden, the concept of Cozy Fridays is a way of bringing the family together on Friday evenings while watching family TV and giving themselves and their children's a "treat", in the form of sweets and snacks, after a tiring and busy week (Johansson et al., 2013). In fact, parents with minor children are more likely to have discretionary foods available in the home (Laroche et al., 2007; Wennberg et al., 2016)

Financial constraints

'We have to do other sacrifices to be able to buy healthy foods. We don't buy things children don't like as it is a waste of money if they don't eat it'. Low-income parent in Europe (Haerens et al., 2009)

The ideal of proper, healthy food is challenged by financial constraints as stressed by low SES European parents (Haerens et al., 2009; Johansson & Ossiansson, 2012; Johansson et al., 2013). The need to prioritize more urgent issues other than their own health and self-care, was well explored by a Swedish father in the study of Johansson & Ossiansson (2012) with low socio-economic status families. In his narrative, the father claimed health to be a class issue, that parents with low-paying jobs do not have time, money or energy to take care of their health, including buying healthy foods (Johansson & Ossiansson, 2012). The same authors in a following publication criticized the current view that unhealthy eating is a solely individual problem, in a society in which people do not have equal possibilities to live healthy lives; and called attention to the structural factors and social inequality that play important roles in healthy eating. (Johansson et al., 2013).

Lack of support for food-related activities is an issue reported by mothers since the first months post-partum. At this period, all focus is on the baby and low support is given from spouses, family, friends and health professionals to new mothers to take care of their own health. This was evident from Swedish-speaking mothers' narratives, who expressed a feeling of being left on their own as soon as the baby was born. Paradoxically, some of those mothers declared to reject support at this period, due to feelings of shame of not being an able mother (Christenson et al., 2016).

Regrettably, the lack of support for food provisioning follows mothers during and after the transition to motherhood, and seems more remarkable in low socio-economic families. Low SES German and Swedish mothers reported that the responsibility for foods and meals relies predominantly on mothers (Johansson & Ossiansson, 2012; Johansson et al., 2013). Among employed, low/moderate-income US parents, mothers were twice as likely to say they carried the primary food role. Some of those mothers described their food responsibilities as an unwanted burden and expressed frustration over a lack of support and help with food chores from family members (Blake et al., 2009). Previous research with another group of US mothers have already called attention to the predominance of women as family food managers, even when they work outside the home. A married mother of 3 who worked 40 hours a week at night as a

caregiver declared: *"I do all the shopping. I do all the laundry. I do all the cleaning. I do everything . . . I don't have a choice*." (Jabs et al., 2007). The lack of support represents an important barrier for mothers´ healthy eating habits, as well represented by a low SES Swedish mother, who indicated that absence of support from her partner and her worries about her "picky" daughters, made her almost to give up her ideal of eating proper meals (Johansson & Ossiansson, 2012).

Certainly, planning, buying, cooking and serving meals are still gendered food related activities, with mothers holding cultural responsibility for food and meals in almost all populations included in this review, even if both parents worked the same number of hours (Johansson & Ossiansson, 2012). Only in Denmark and among high income Swedish families, fathers' role in food provisioning appeared to be bigger than in other countries, with some fathers even having the main responsibility for household duties including cooking (Aschemann-Witzel, 2013; Edvardsson et al., 2011). In other settings, men only contributed to household chores once the spouse (who held the primary food role) asked for help. A father in the US narrated this pattern: *"(my wife) finally told me ''You're gonna have to help me.'' Then when I started doing it I realized I enjoyed it. . .I know she was busy and after a while it just got to the point where I prefer to do it and I got better at it."* (Blake et al., 2009). In other situations, mothers compelled to be most responsible for food-related tasks due their partner's lack of commitment with healthy food provisioning, as well expressed by a low SES Swedish mother: "*Once in a while he shops but I like it better when I shop, 'cause he shops so lousy. You know, he buys these big packs of cinnamon rolls and lots of ice cream and cookies and chocolate and cheese snacks*" (Johansson & Ossiansson, 2012).

It is remarkable that some women may find more help from other women than from the fathers of their children. One single mother from the US declared to count on her neighbour to take care of her son when she needed to work in the night shift. Her neighbour's help enabled her to make healthy meals and spend more time with her child during the day (Blake et al., 2009).

Social visits and visiting

"In the mother-and-baby group we really ate lots of white bread and cake." Danish mother (Aschemann-Witzel, 2013)

Danish mothers gave examples of social situations during the first months after birth that increased the offer of discretionary foods. Social visits and visiting involve the consumption of sweets (i.e. cake), which is consumed during and after the event, due to the usually remaining leftovers (Aschemann-Witzel, 2013).

3) Environmental structural factors

The main environmental structural factors acting as barriers for healthy eating among parents were: marketing strategies, unhealthy work environment and low durability of fresh foods.

Marketing strategies

Adults with children are likely to be more susceptible to the marketing of convenience and ready-to-eat meals as well as to the marketing directed at their children (Laroche et al., 2007). Other marketing related

issues such as difficulties with understanding food labels, low price, free gadgets, persuasive advertisement and high availability to unhealthy products were mentioned by European parents as barriers for healthy eating behaviours (Haerens et al., 2009).

Unhealthy work environment

Unhealthy habits related to the work place appeared in the narratives of Danish mothers, such as to drink more coffee, having cake, and eating a second and less healthy breakfast in the company of colleagues. Depending on the work routine, some mothers also reported to eat in front of the computer (Aschemann-Witzel, 2013). Stress at work might have the opposite effect, decreasing food consumption, as well illustrated by a mother in the US: *"[work] gets crazy where you're almost sick to your stomach, because you're just trying to get everything done, you're completely frazzled so you don't even think about eating"*(Blake et al., 2009).

Low durability of fresh foods exacerbated by the fact that children would not eat them, prevented low income families in Sweden and Germany to be motivated to buy and prepare fruits and vegetables (Johansson et al., 2013). A similar trend was found among US low SES families. During focus groups discussions mothers described grocery store trips as burdensome, and pointed out that providing highly-perishable products required frequent trips, and risked food spoilage, what was seen as a barrier for healthy eating. Such a situation was well narrated by one of the mothers in the focus group: "*The hardest part about eating healthy is that it goes bad so fast, and you have to prepare it. You have to slice the vegetables. You have to wash them, take the time to do it. And so, if somebody would come over and help me, I would have it all on hand, and then 3 days later it goes bad. And it's too hard to take the baby to the store*" (MacMillan Uribe & Olson, 2018).

Figure 3 summarizes the main variables affecting parental eating behaviours encountered in the literature.

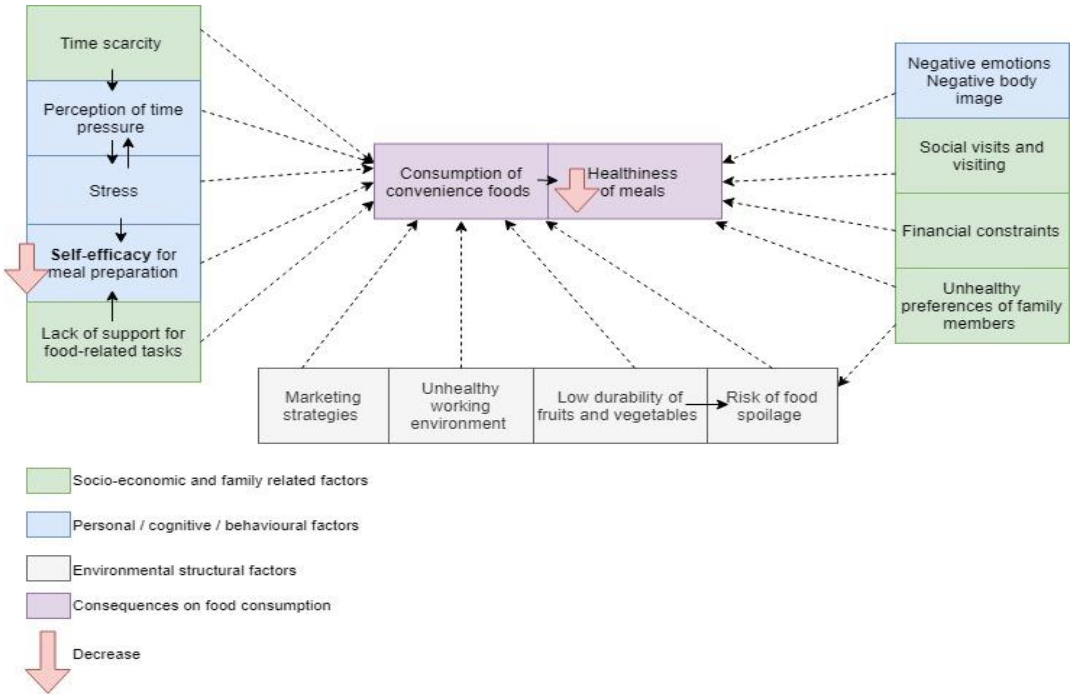

Figure 3. Structural paths of influence wherein personal, socio-economic and environmental factors affect the healthiness of eating behaviours among parents

Conclusion and discussion

This literature review has shed light on the undeniable influence parenthood has on adults' eating behaviours and habits. In essence, the general decrease in individuals' health outcomes and behaviours after becoming a parent has been called the "child effect" (Rosenbaum et al., 2018).

All things considered, there are still some points not covered by the recent literature. In particular, what is known about changes in eating behaviours when adults become parents is based largely on **quantitative studies** evaluating dietary intake in **demographically homogeneous** contexts. The restricted context diversity where the studies were conducted, covering exclusively individuals from affluent societies (illustrated in Figure 5), might limit the understanding of child effect on eating behaviours. Even though several studies included individuals from low socio-economic backgrounds, we believe that remarkable differences between low SES parents from developed countries and those from economically emergent nations might exist in terms of healthfulness of eating habits.

Figure 5: Demographic distribution of the peer-reviewed studies investigating parental eating behaviours.

Moreover, most studies focused on a narrow range of foods or behaviours, employing quantitative approaches or semi-structured questionnaires, with pre-defined variables, preventing the appearance of new perceptions and factors considered important by the investigated group. In addition, the majority of the studies investigated the overall parental dietary quality, or compared dietary habits of parents and adults without children and thus failed to obtain an in-depth understanding of the variety of changes in dietary behaviours that occur along the transition to becoming a parent.

It is useful to reiterate here that effective healthy lifestyle interventions targeted at parents in the emerging and early transition to parenthood remain to be found. The classical food and nutrition interventions have proven to be insufficient to sustain behaviour change in the long run. This calls for a greater and more holistic, theory-based understanding of the full interplay of socio-cognitive, interpersonal factors and environments associated with healthy eating behaviours in diverse demographic settings.

At least some of the research findings presented in this review indicate that the transition to parenthood holds great potential to support adults for healthier dietary choices and lifestyles. What remains to be elucidated are the unknown interrelated factors and mechanisms preventing parents to do so. It is important to go further in richness and depth of the variables involved as barriers for healthy eating. A greater understanding will only be accomplished by giving voice to parents to express the constraints they face in their own words. That is to say that we need to immerse ourselves in parents' natural context in their homes, listen to them, and to know their environment as they know it. This is only possible to accomplish by producing qualitative evidence.

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