Parental feeding practices and parental involvement in child feeding in Denmark: Gender differences and predictors

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Abstract: Studies about fathers and feeding are scarce and little is known about predictors of parental involvement in child feeding and of paternal feeding practices. Therefore, this study aimed to examine possible differences between Danish mothers and fathers with regard to their feeding practices and involvement in feeding related tasks, and to assess possible parent-related predictors of parental practices and involvement. A total of 261 mothers and 321 fathers of pre-schoolers completed an online survey with items from validated questionnaires. Gender differences were observed; fathers reported using higher levels of coercive control practices, while mothers reported using higher levels of structure practices and autonomy support practices. Both mothers and fathers reported to be highly involved in feeding their child. Regressions showed that a higher concern for child weight and a higher motivation for child preference when buying food were linked to a higher use of coercive control practices while a higher motivation for health control when buying food, cooking confidence, feeding/general self-efficacy and perceived responsibility for feeding were linked to a higher use of structure and autonomy support practices. The results of this study provide valuable insight into maternal and paternal practices in Denmark and their determinants.

Keywords: preschoolers, food parenting practices, fathers, mothers, gender differences

1. Introduction

Previous research has shown that eating habits established during childhood can persist into adolescence and adulthood (Nicklaus et al., 2005; Nicklaus & Remy, 2013), and that parents play a key role in the development of children's eating habits (Birch, 1999). Parental feeding practices, or the behavioural strategies parents use to control what, how much, when and where the child eats (Ventura & Birch, 2008), have been identified as possible levers to prevent the development of « unhealthy » eating behaviours and obesity in children (Birch, 1999). There is a growing consensus that the use of coercive control practices (e.g., restriction, pressure to eat) should be avoided by parents, while the use of structure practices (e.g., rules about where, when and what to eat) and autonomy support practices (e.g., modelling healthy eating, encouraging balance and variety) should be encouraged among parents (see, for example, the review by Vaughn et al., 2016).

However, most studies about parental feeding were conducted with mothers. The role of fathers in feeding – their involvement in feeding and their feeding practices – has received less attention in research (Khandpur et al., 2014; Litchford et al., 2020). This gives an incomplete picture of the child's feeding environment, and does not properly correspond to the shift in gender roles observed in society. Despite mothers still being mainly responsible for the household and childrearing in Europe, fathers are gradually taking up more tasks in the household and becoming more involved in childrearing (Eurofound, 2018; European Union, 2017). This is especially true in the Nordic

countries where the household tasks are more equally shared than in other European countries (Eurofound, 2018; European Union, 2017). These countries actively stimulate parental involvement in childcare by providing good conditions to reconcile work and family; e.g., with financially stimulated maternal and paternal leave and options for remote working (Greve, 2011; European Union, 2020). There are also indications that fathers are becoming increasingly involved in the food domain – for example, taking more meals with their children than fathers did years ago and participating more regularly in food related tasks such as cooking, clean-up, grocery shopping and meal planning (e.g., Grønhøj & Gram, 2020 (Denmark); Jones et al., 2013 (US); Philippe et al., 2021 (France)). Research on this topic is however limited, as stated above.

Taken together, in order to create an optimal feeding environment for the child, it is crucial to stimulate favourable eating behaviours and feeding practices among parents, as they influence children's eating behaviour and consequently their weight status (Davinson & Birch, 2001). To achieve this, it is necessary to understand how mothers AND fathers feed their child and what drives their practices or behaviours. In this context, very little is currently known about predictors of parental involvement in feeding and about parent-related predictors of feeding practices, especially in fathers (e.g., Mallan et al., 2014). Furthermore, it is interesting to study this in a country like Denmark, where gender equality is high (EIGE, 2021) and where little data is available on parental feeding practices and involvement in child feeding.

The objectives of this study were therefore twofold. The first objective was to examine possible differences between Danish mothers and fathers with regard to their involvement in child feeding (i.e., the number of meals they take with their child, their involvement in grocery shopping, cooking, etc.) and their feeding practices. The focus is on parents of children aged 3-6 years, because this can be a particularly challenging period for child feeding as this period is characterized by a peak in food rejections in children (Nicklaus & Monnery-Patris, 2018). For this first objective, we hypothesized that mothers would be more involved in feeding than fathers (Eurofound, 2018; European Union, 2017; Philippe et al., 2021). Regarding feeding practices, we hypothesized, based on the results of studies in other countries, that fathers would report higher levels of pressure to eat and food rewards, but lower levels of monitoring (Haycraft & Blissett, 2008; Hendy et al., 2009; Loth et al., 2013; Philippe et al., 2021; Tschann et al., 2013).

The second objective of this study was to identify possible parent-related predictors of parental feeding practices and of parental involvement in child feeding at home. This part was explorative and two theories and results of past empirical research were used to select possible predictors of interest. A visualization of the conceptual model used for this study is presented in Figure 1.

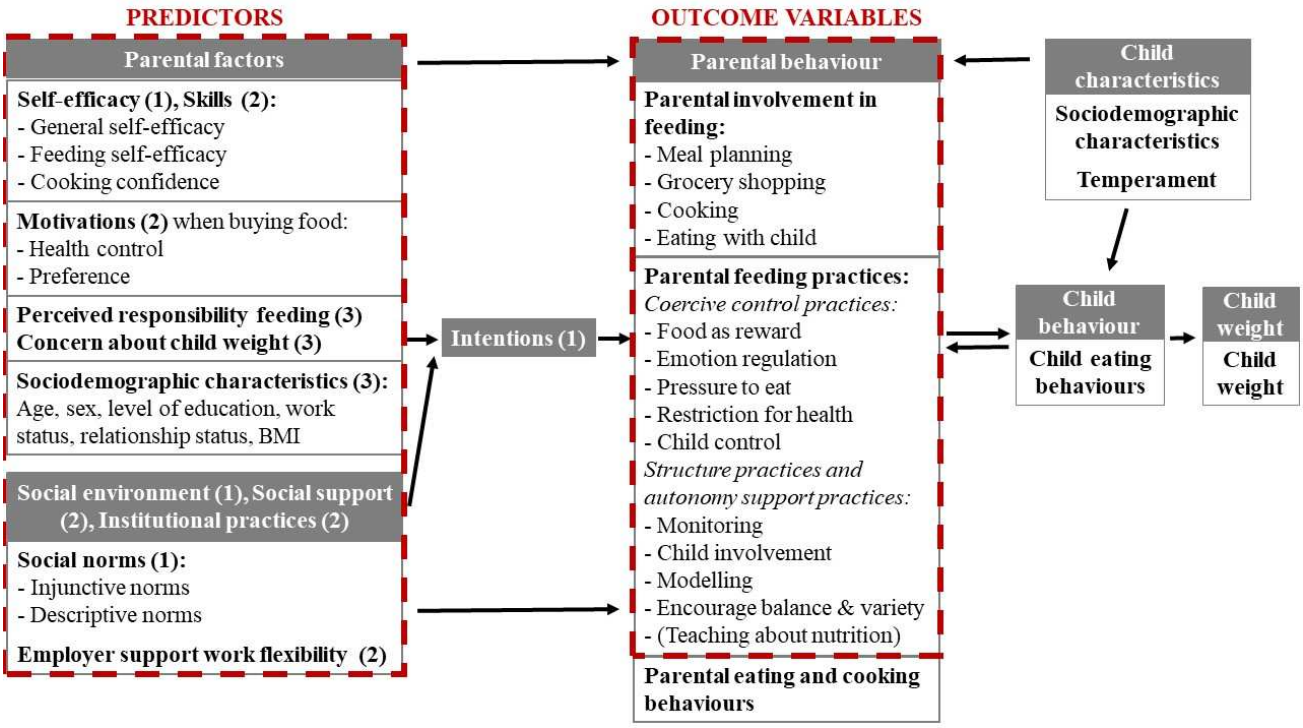

Figure 1. Conceptual model of the study. In the current study, the links between the variables in the red-dotted boxes are analysed and discussed: between parental factors/social environment/social support/institutional practices (predictors) and parental behaviour (outcome variables). (1): Elements included in the model based on the social cognitive theory of Bandura (1986). (2): Elements included in the model based on the four factor model of fathers' involvement (Lamb, 1987). (3): Elements included in the model based on previous empirical research.

The first theory of interest was the social cognitive theory of Bandura (1986) which states that people' self-efficacy, outcome expectations and social environment (e.g., social norms) give rise to intentions, which in turn lead to behaviour (i.e., parental involvement in child feeding and their feeding practices). In the context of child feeding, we assumed that parents' general self-efficacy but also their specific feeding self-efficacy and cooking self-efficacy/confidence could be possible predictors. Regarding social norms, a distinction can be made between injunctive and descriptive norms (Cialdini et al., 1991): injunctive norms refer to people's perceptions of others' attitudes about behaviours you should or should not engage in (do's and don'ts) while descriptive norms refer to people's perceptions of others' behaviours (what is commonly done by others). We hypothesized that a higher self-efficacy and stronger perception of norms of feeding would be associated with a higher involvement in feeding and the use of more favourable feeding practices (e.g., modelling, encourage balance and variety in eating).

The second theory used for selecting possible predictors was the four factor model of fathers' involvement (Lamb, 1987). This model states that fathers' involvement with their children is determined by four factors: their motivations, skills, social support and institutional practices. In short, fathers who are highly motivated, have adequate parenting skills, receive social support for

their parenting, and are not undermined by work and other institutional settings will likely be highly engaged with their children. For this study, two types of motivations were selected based on previous research (Rigal et al., 2012): the motivation for health control and the motivation for accommodating child preferences when buying food for the child. We hypothesized that parents who are highly motivated by health control would be more involved in child feeding and using more favourable feeding practices (Rigal et al., 2012, 2019). We also expected that mothers would be more motivated by health control than fathers (Cardon et al., 2019). Following the ideas of the four factor model of fathers' involvement, we also assumed that the degree to which parents feel supported by their employer to optimize work with family life (social support/ institutional setting in the theory) could be relevant for parental involvement in child feeding, and possibly also for feeding practices. Based on the theory, we hypothesized that a higher perceived support would be linked with a higher involvement in feeding and more favourable feeding practices.

The last set of predictors included in this study were parents' and children's sociodemographic characteristics, parents' perceived responsibility for feeding their child, and parents' concern for child weight. Based on the results of previous studies (e.g., Khandpur et al., 2016), we hypothesized that parents with a higher level of education will report using lower levels of coercive control practices (e.g., less pressure to eat, less restriction). We also hypothesized that parents with a higher perceived responsibility for feeding would be more involved in child feeding (Mallan et al., 2014) and that they would report using higher levels of favourable feeding practices but also higher levels of control practices (Musher-Eizenman & Holub, 2007). Here, we also expected that mothers would experience higher levels of perceived responsibility for feeding than fathers (Blissett et al., 2006). Finally, we expected that fathers as well as mothers with a higher concern for child weight would show higher levels of control practices (Costa et al., 2021; Mallan et al., 2014).

2. Methods

2.1 Recruitment and Ethics

An online questionnaire (via the online platform SurveyMonkey) was used to obtain data for this study. Mothers and fathers of children aged 3-6 years were recruited via an agency that has representative online panels of participants living all over Denmark. Prerequisites to participate were: being at least 18 years old and having at least one child aged 3-6 years. The questionnaire was anonymous and on the first page of the questionnaire, parents were required to tick a box indicating that they understood and accepted the study information and data protection policy. Participants were rewarded with points for their participation by the recruitment agency according to usual practice (determined by the average time taken to fill in the questionnaire). An ethical approval (n° 2020-99)

was granted for this study by Aarhus University's Research Ethics Committee. The Danish questionnaire was pretested with two mothers and a father, who provided feedback on the understanding of the information, questions, items, and response options, and the lay-out and length of the questionnaire. Subsequently, minor adjustments were made to optimise the questionnaire. The data of these parents were not used for the analyses of this study.

2.2 Measures

2.2.1 Sociodemographic characteristics parent and child

Parents were asked to describe the following characteristics about their child: age in years, sex, birth rank (first-born or not first-born), born at term or premature, and if the child has an illness or condition that possibly influences his/her eating (e.g., autism, swallowing difficulties). If parents had several children aged 3-6 years, they were instructed to select a child for whom they wanted to complete the questionnaire, and to always think of this child when answering the questionnaire. About themselves, parents were asked to describe their age in years, sex, level of education, work status, the number of children they have, relationship status (living with a partner/single parent/other), height, weight, and if they are pregnant or not (if pregnant, the body mass index of these parents would not be calculated). Parents were also asked to describe the work status of their partner, if applicable.

2.2.2 Involvement in feeding related tasks at home

Parents were asked to report the number of breakfasts, lunches, and dinners generally taken with their child per week (ranging from 0-7 for each meal). Taking a meal with the child was defined as either eating with the child or feeding the child. Parents were also asked to report who was the main person responsible for four feeding related tasks (i.e., planning meals, grocery shopping, cooking, and feeding/eating with child). The answer options were "Mainly me", "Mainly my partner", "Mainly someone else (e.g., another family member)", "Activity is shared at home", and "Not applicable" (Philippe et al., 2021). They were also asked to identify the best cook at home (Me/My partner/Someone else/We're equally good) and to indicate their frequency of grocery shopping (4-point scale ranging from "More than once per week" to "Less than once per week") and their frequency of cooking (5-point scale ranging from "Every day" to "Less than once per week").

2.2.3 Parental feeding practices

The Comprehensive Feeding Practices Questionnaire (CFPQ, Musher-Eizenman & Holub, 2007) was used to measure parental use of feeding practices. The following dimensions were selected for the current study: food as reward (3 items, e.g., *I offer my child his/her favourite foods in exchange for good behaviour*), emotion regulation (3 items, e.g., *Do you give your child something to eat or*

drink if s/he is upset even if you think s/he is not hungry?), pressure to eat (4 items, e.g., *My child should always eat all of the food on his/her plate*), restriction for health (4 items, e.g., *If I did not guide or regulate my child's eating, he/she would eat too many junk foods*), child control (5 items, e.g., *Do you let your child eat whatever s/he wants?*), monitoring (4 items, *How much do you keep track of the sweets/snack foods/high-fat foods/sugary drinks that your child eats/drinks?*), involvement (3 items, e.g., *I allow my child to help prepare family meals)*, modelling (4 items, e.g., *I model healthy eating for my child by eating healthy foods myself*), encourage balance and variety (3 items, e.g., *I encourage my child to try new foods*), and teaching about nutrition (3 items, e.g., *I discuss with my child why it's important to eat healthy foods*). Two original dimensions of the CFPQ were not included for the purpose of this study because they either describe the child's food environment rather than parental actions (healthy environment), or because they are a less common practice at pre-school age (restriction for weight control) (Philippe et al., 2021). Parents were asked to rate their agreement with each item on a five-point scale ranging from "Strongly disagree" to "Strongly agree", or from "Never" to "Always". The psychometric properties of this questionnaire have been demonstrated in the US and other countries, and for the use with mothers and fathers (e.g., Musher-Eizenman & Holub, 2007; Musher-Eizenman et al., 2009). The original English questionnaire was translated to Danish by a research team in Copenhagen for the European project HabEat. These researchers performed a back-translation and a check-up with a native English speaker fluent in Danish (Karagiannaki, Ritz, Andreasen, et al., 2021; Karagiannaki, Ritz, Jensen, et al., 2021).

2.2.4 Other parental dimensions

General self-efficacy, feeding self-efficacy and cooking confidence

Four items of the General Self-efficacy Scale (Aschemann-Witzel et al., 2020; Schwarzer & Jerusalem, 1995) were used to measure parents' general self-efficacy (*e.g.*, *If I am in a challenging situation, I tend to find a way out*). Parents were asked to rate their agreement with each item on a five-point scale ranging from "Strongly disagree" to "Strongly agree".

Five items from the Feeding Self-Efficacy Questionnaire (Horodynski & Stommel, 2005; Koh et al., 2014) were used to measure parents' feeding self-efficacy (e.g., *I can get my child to try veggies*). Parents had to rate their confidence about these statements on a five-point scale ranging from "Not confident at all" to "Very confident".

One item (*I have knowledge and skills to prepare healthy meals for my family*) was used to measure parents' cooking confidence (Jarpe-Ratner et al., 2016). Normally, parents have to rate their agreement with this item on a four-point scale ranging from "Strongly disagree" to "Strongly agree",

but for this study it was transformed to a five-point scale (adding the option "Neutral" in the middle) to be more coherent with the rest of the questionnaire used for this study.

Injunctive and descriptive norms

Four items were developed to measure parents' perceptions of others' attitudes (injunctive norms; *My friends/partner/family/caregivers from my child's childcare think I should be actively involved in feeding my child*), and five items were developed to measure parents' perceptions of others' behaviours (descriptive norms; *My partner/female friends/male friends/female family members/male family members is/are actively involved in feeding our child*). The development of these items was based on items of Pedersen et al. (2015) that were used to measure injunctive and descriptive norms regarding the intake of fruits and vegetables. Parents were asked to rate their agreement with each item on a five-point scale ranging from "Totally disagree" to "Totally agree".

Motivations for buying food for child

The Questionnaire relating to Parental Motivations when buying food for children (Rigal et al., 2012) was used to capture to which extent parents are driven by health concern (3 items, e.g., *high in vitamins*) or by children's preference (e.g., *adapted to children's taste*) when buying food for their child. Parents were asked to rate their agreement with each item: e.g.,"For my child, I am careful to buy food which are… high in vitamins" on a five-point scale ranging from "Very wrong for me" to "Very true for me".

Employer support work flexibility

Three items were developed to measure to what degree parents feel supported by their employer to optimize work with family life (*To what degree do you feel supported by your employer to… Take parental leave/Optimize your working hours to combine work and family life/Work from home).* Parents were asked to respond on a five-point scale ranging from "Not at all supported" to "Very supported".

Concern about child weight and perceived responsibility for feeding

The Child Feeding Questionnaire (CFQ, Birch et al., 2001) was used to measure concern about child weight (3 items, e.g., *How concerned are you about your child becoming overweight*?) and perceived responsibility for feeding (3 items, e.g., *How often are you responsible for deciding what your child's portion sizes are?*). Parents were asked to rate their agreement with each item on a five-point scale ranging from "Unconcerned" to "Very concerned" for concern about child weight, and on a five-point scale ranging from "Never" to "Always" for perceived responsibility for feeding.

2.3 Statistical analyses

R version 3.6.1 (R Core Team, 2019) was used to clean and analyse the data. The significance level was set at $p < 0.05$ for all analyses.

2.3.1 Data cleaning

Data cleaning was performed on the data of 697 participants. Questionnaires of parents were excluded for subsequent analyses when parents did not provide their consent for participation (n=40) or when they did not complete the entire questionnaire (n=20). They were also excluded when their child was younger than 3 years or older than 6.9 years (n=48), when their child had an illness susceptible of influencing his/her eating behaviour (n=6; e.g., autism), or when their child was born very premature (< 33 weeks of gestation; n=1). This resulted in a cleaned sample of 582 questionnaires: 261 filled in by mothers and 321 filled in by fathers.

2.3.2 Preliminary analyses

Cronbach's alphas were calculated to verify the psychometric properties of the measures used for this study. They were calculated for the entire sample together, but also separately for mothers and fathers to ensure that the psychometric properties were good for both subsamples. When alphas were too low (< 0.60), confirmatory factor analyses (CFA) with a SEM approach (Bollen, 1989; Kaur et al., 2006) were performed to gain more insight into the factor structures. Acceptable Cronbach alphas were observed for all dimensions except for the feeding practice "teaching about nutrition" (α=0.36 for the entire sample; α=0.26 for mothers only sample; and α=0.47 for fathers only sample). CFA did not help to optimize the internal consistency of this dimension and it was therefore decided to not include this feeding practice in the subsequent analyses. A lower alpha (0.54) was also observed for the practice "child control" for mothers, but this value was acceptable for fathers (α=0.81) and for the entire sample (α=0.72). For all other dimensions, Cronbach's alphas ranged between 0.63 (involvement) and 0.91 (concern about child weight/injunctive norms) for mothers, and between 0.70 (encourage balance and variety/motivations) and 0.91 (concern about child weight) for fathers. All alphas are presented in Appendix 1.

2.3.3 Main analyses

Scores were calculated for all multi-item dimensions by averaging the scores of the corresponding items. Independent sample *t*-tests or Chi-squared tests were performed to identify significant differences between mothers and fathers. Then, Spearman correlations were calculated to determine the associations between the different dimensions considered in this study for mothers and fathers separately.

Next, regressions were used to search for the influential predictors of parental feeding practices and of parental involvement in child feeding (in separate regressions: one regression for each practice/type of involvement). A leaps and bounds algorithm (R package leaps) was used to select a parsimonious set of influential predictors; this predictor selection aims to choose a model that is not too small (underfit, biased model) nor too large (overfit, risk of inflation of the variance, unstable parameters) (Furnival & Wilson, 1974). For each size of the potential model, the best set of predictors was identified. Then, Mallows Cp was used to decide on the number of predictors to include in the model: the final set of predictors was obtained starting with the smallest possible model (one predictor), then gradually increasing the number of predictors, and stopping when Mallows Cp equals approximately the number of predictors + 1. The selection of predictors was conducted for each outcome variable, in other words for each parental feeding practice and each dimension of parental involvement, on the data of mothers and fathers together. After the selection of the best parsimonious set of predictors, interactions with parental sex were added, to verify if gender differences existed with regard to the most influential predictors. Only significant interaction effects were maintained in the final model. This resulted finally in a simplified model including the strongest significant predictors and the significant interaction effects with sex. Continuous predictors were centred to ensure a correct interpretation of all parameters. Finally, variance inflation factors were computed to ensure the parameters could be interpreted and would not suffer from instability linked with multicollinearity between predictors, with the unbalanced sample of mothers (45%) and fathers (55%), or with gender differences regarding the distributions of the predictors. The following variables were included as possible predictors: child demographics (age, sex, birth rank), parent demographics (age, education, work status, family situation, work flexibility) and parental dimensions (feeding/general self-efficacy, cooking confidence, descriptive/injunctive norms, motivation for buying food for child: health control/preference, concern about child weight, perceived responsibility for feeding). In the models predicting parental feeding practices, the total number of meals taken with the child per week was also included as a possible predictor. For the models predicting parental involvement in child feeding, only the data of parents who were living with a partner were used, as it was assumed that single parents would always be the main responsible person for the feeding related tasks.

In addition, partial least squares (PLS) regressions (R package pls) were performed to obtain a multidimensional overview of the relations between the set of predictors and the set of parental feeding practices while accounting for multicollinearity among predictors and among outcome variables. They provide visual results that help the interpretation of the relationship among the outcome variables, among the predictors, as well as between predictors and outcome variables. PLS

regression is a multivariate method between principal component analysis and multiple regression, used to predict a set of outcome variables from a set of predictors, by extracting from the predictors a set of orthogonal components with the best predictive power, that is to say, with the highest covariance with orthogonal linear combinations of outcome variables. For these analyses, all variables were standardized.

3. Results

3.1 Participants' demographics

The data of 261 mothers and 321 fathers of children aged 3-6 years (356 boys and 226 girls) were used for the analyses of this study. All parental demographics are presented in Table 1.

Table 1.
Demographics of parents.

	Mothers	**Fathers**
Number of participants	261	321
Age, mean (*SD*)[a]	36.52 (5.74)	38.25 (6.85)
BMI, mean (*SD*)[a]	24.61 (5.27)	25.18 (3.95)
Living with a partner/ single parent [ratios]	0.83 / 0.17	0.88 / 0.12
Number of children, mean[a]	1.82	1.52
Level of education (%):		
Lower secondary education ("Folkeskole")	1	12
Higher secondary education (student, HF, HH, HTX)	7	8
Vocational education (student-apprentice education)	16	11
Short higher studies (less than 2 years)	10	9
Mid-term higher studies (2-4 years)	39	31
Long higher studies (more than 4 years)	25	26
Ph.D	2	3
Work status (%):		
Working full-time	53	87
Working part-time	21	7
Unemployed, job seeker	7	2
Parent at home	6	1
Other (e.g., student)	13	4

[a]Note: There were 2 parents with a missing value for parent age and for number of children. There were also 19 mothers and 68 fathers with a missing value for BMI. If a mother was pregnant, her BMI score was not calculated (coded as a missing value).

3.2 Objective 1: differences between mothers and fathers?

3.2.1 Maternal vs. paternal feeding practices and other parental dimensions

Independent sample *t*-tests indicated that, on average, fathers reported higher levels of the use of emotion regulation, pressure to eat, food as reward, and restriction for health, but lower levels of the use of the practices monitoring, encourage balance and variety, and modelling than mothers (Table

2). *T*-tests also indicated that, on average, fathers reported a higher concern for their child's weight, they reported higher injunctive norms, and a higher work flexibility than mothers did. Mothers reported a higher perceived responsibility for feeding than fathers, they had higher feeding self-efficacy scores, cooking confidence scores and a higher health control motivation when buying food for their child.

Table 2.
Parental feeding practices and other parental dimensions: means, standard deviations, and significance levels of differences between mothers and fathers (Chi-squared tests or independent sample *t*-tests).

	Mothers			Fathers	
Parental feeding practices (scores between 1 and 5), mean (SD)[b]:					
Food as reward (food.reward)	2.46	(1.10)	***	3.05	(1.03)
Emotion regulation (emotion.regul)	2.30	(0.89)	***	2.82	(1.08)
Pressure to eat (pressure)	3.03	(0.98)	***	3.36	(0.83)
Restriction for health (restrict.health)	3.14	(1.04)	***	3.45	(0.85)
Child control (control)	3.21	(0.57)		3.21	(0.78)
Monitoring (monitoring)	3.88	(0.79)	*	3.75	(0.76)
Involvement (involvement)	3.43	(0.85)		3.47	(0.89)
Modelling (modelling)	4.11	(0.79)	***	3.79	(0.72)
Encourage balance and variety (encourage)	4.27	(0.64)	***	3.91	(0.67)
Other parental dimensions (scores between 1 and 5), mean (SD)[b]:					
Concern about child weight (concern)	1.78	(1.09)	***	2.61	(1.24)
Perceived responsibility for feeding (responsibility)	4.01	(0.70)	***	3.59	(0.70)
Injunctive norms (injunctiv.norm)	3.06	(1.10)	***	3.38	(0.87)
Descriptive norms (descriptive.norm)	3.67	(0.81)		3.78	(0.76)
Feeding self-efficacy (feed.efficacy)	4.07	(0.68)	***	3.89	(0.60)
General self-efficacy (self.efficacy)	3.87	(0.69)		3.80	(0.58)
Cooking confidence (cook.efficacy)	4.23		***	3.80	
Motivation for buying food for child: health control (motiv.health)	4.00	(0.58)	**	3.81	(0.66)
Motivation for buying food for child: child preference (motiv.preference)	3.72	(0.62)		3.63	(0.67)
Employer support work flexibility (work.flexibility)	3.38	(0.82)	**	3.59	(0.81)

[a]Chi-squared tests were used to determine if the differences between mothers and fathers were significant.
[b]Independent sample *t*-tests were used to determine if the differences between mothers and fathers were significant.
Significance levels: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$

3.2.2 Maternal vs. paternal involvement in feeding related tasks

The majority of mothers and fathers in this sample indicated that they were mainly responsible for planning, buying and cooking meals in their household and for eating with the child (Table 3). Chi-squared tests showed significant differences between mothers and fathers, because many more fathers than mothers indicated that their partner is the main responsible person for a feeding related task or the best cook at home. Chi-squared tests also showed that fathers reported taking significantly more lunches with their child than did mothers. No differences were found between mothers and fathers regarding the number of breakfasts and dinners taken with their pre-schooler.

Table 3.
Mothers and fathers describing who is mainly responsible for different feeding related tasks in their household, frequencies of buying and cooking food, number of meals taken with the child., and significance levels of differences between mothers and fathers (Chi-squared tests).

	Mothers		Fathers
Plan meals (%)[a]:		***	
Mainly me	69		51
Mainly my partner	8		26
Someone else	0		1
Shared responsibility	23		22
Buy meals (%)[a]:		***	
Mainly me	62		50
Mainly my partner	9		24
Someone else	0		2
Shared responsibility	29		3
Buying frequency (%):		*	
More than once per week	58		60
Once per week	36		30
1-3 times per month	5		10
Less than once per month	1		1
Cook meals (%)[a]:		***	
Mainly me	65		52
Mainly my partner	14		26
Someone else	0		2
Shared responsibility	20		20
Cooking frequency (%):		***	
Every day	62		38
4-6 times per week	31		40
1-3 times per week	6		17
1-3 times per month	2		4
Less than once per month	0		2
Best cook (%)[a]:		***	
Me	57		47
My partner	16		36
Someone else	0		0
Equally good	27		16
Eat with child (%)[a]:		***	
Mainly me	43		38
Mainly my partner	3		17
Someone else	1		2
Shared responsibility	53		43
Number of meals (0-7), mean (SD):			
Number of breakfasts per week	5.64 (1.98)		5.64 (1.86)
Number of lunches per week	3.33 (2.05)	***	4.65 (2.25)
Number of dinners per week	6.53 (1.50)		6.18 (1.38)

Significance levels Chi-squared tests: * $p < 0.05$; *** $p < 0.001$
[a]For plan meals, buy meals, cook meals, best cook and eat with child, the ratios are only calculated for those parents living with a partner (217 mothers and 282 fathers).

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3.2.3 Correlations between the different dimensions measured for parents

Figure 2 shows a graphic representation of the Spearman correlation matrixes in mothers and fathers separately. They show many significant correlations among parental feeding practices, among other parental variables, and between both sets of variables. Although they show similar patterns, differences exist between mothers and of fathers. For example, for fathers (F), the upper left corner of the matrix is coloured darker blue (indicating stronger positive correlations, e.g., between descriptive/injunctive norms and pressure to eat or restriction for health) than for mothers. For mothers (M), concern, emotion regulation, food as reward are negatively correlated with cooking confidence, feeding/ general self-efficacy, responsibility, monitoring, encourage and modelling (coloured orange) while both sets of variables show no correlation for fathers (coloured white).

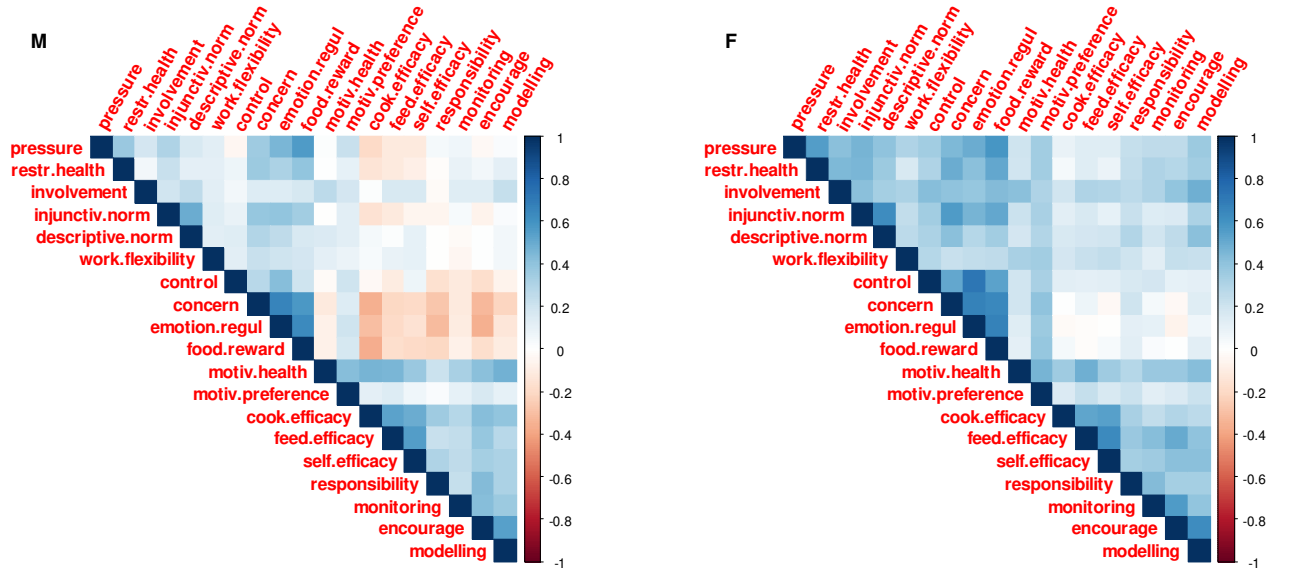

Figure 2. Graphical display of Spearman correlation matrixes for mothers (M) and fathers (F). Correlations range from dark blue (r = 1) to dark red (r = -1). The full names of the variables can be consulted in Table 2.

3.3 Objective 2: predictors of parental feeding practices and involvement in child feeding

3.3.1 Predictors of parental feeding practices

Food as reward was significantly positively predicted by concern about child weight (strongest predictor; t = 12.97), motivation for child preference, and injunctive norms, and negatively predicted by child birth rank (lower in parents of younger siblings vs. first-born), work status (lower in parents working part-time vs. full-time), and feeding self-efficacy. No interaction effect with parent sex was observed. This model explained 48% of the variance (see Table 4 for all values).

Emotion regulation was significantly positively predicted by concern about child weight (strongest predictor; t = 12.16), motivation for child preference, injunctive norms, and work status (higher for middle education vs. lower education), and negatively predicted by parent BMI, perceived responsibility for feeding, child birth rank (lower in younger siblings vs. first born), feeding self-efficacy, and child sex (lower in parents of girls vs. boys). No interaction effect with parent sex was observed. This model explained 51% of the variance (see Table 4 for all values).

Pressure to eat was significantly positively predicted by injunctive norms (strongest predictor; t = 4.61), motivation for child preference, concern about child weight, perceived responsibility for feeding, and child age, and negatively by parent sex (lower in mothers vs. fathers) and parent BMI. An interaction effect with parent sex was observed for cooking confidence: it had a significant negative effect in mothers and no effect in fathers. This model explained 51% of the variance (see Table 4 for all values).

Restriction for health was significantly positively predicted by concern about child weight (strongest predictor; t = 9.33), perceived responsibility for feeding, and injunctive norms. No interaction effect with parent sex was observed. This model explained 23% of the variance (see Table 4 for all values).

Child control was significantly positively predicted by concern about child weight (strongest predictor; t = 8.09), parent sex (higher in mothers vs. fathers), general self-efficacy, motivation for child preference, and work flexibility, and negatively predicted by the child's birth rank (lower in parents of younger siblings vs. first-born). No interaction effect with parent sex was observed. This model explained 26% of the variance (see Table 4 for all values).

Table 4. Regressions to explain parental feeding practices (outcome variable: controlling feeding practices: food as reward, emotion regulation, pressure to eat, restriction for health, child control) by other parent and child dimensions (predictors).

	Estimate	Std. Error	*t*	*p*
Food as reward	(n=582, R^2=0.48)			
Intercept [full time, first born]	2.94	0.05	62.45	**<0.001**
work [part-time]	-0.32	0.10	-3.17	**0.002**
work [other]	-0.09	0.13	-0.67	0.500
work [no work]	-0.21	0.14	-1.52	0.130
rank [other]	-0.27	0.07	-3.58	**<0.001**
concern	0.43	0.03	12.97	**<0.001**
injunctiv.norm	0.13	0.04	3.32	**0.001**
feed.efficacy	-0.16	0.05	-3.06	**0.002**
motiv.preference	0.20	0.06	3.67	**<0.001**
Emotion regulation	(n=495, R^2=0.51)			
Intercept [low education, boy, first born]	2.55	0.07	35.28	**<0.001**
education [middle]	0.19	0.08	2.47	**0.014**
education [high]	0.05	0.09	0.56	0.576
BMI.p	-0.03	0.01	-4.78	**<0.001**
sex.child [girl]	-0.14	0.06	-2.19	**0.029**
rank [other]	-0.19	0.07	-2.80	**0.005**
concern	0.38	0.03	12.16	**<0.001**
responsibility	-0.15	0.04	-3.37	**0.001**
injunctiv.norm	0.11	0.03	3.11	**0.002**
feed.efficacy	-0.13	0.05	-2.57	**0.011**
motiv.preference	0.20	0.05	3.82	**<0.001**
Pressure to eat	(n=495, R^2=0.22)			
Intercept	3.29	0.05	60.66	**<0.001**
sex.p [mother]	-0.16	0.08	-2.00	**0.046**
BMI.p	-0.02	0.01	-1.99	**0.047**
age.c	0.08	0.04	2.25	**0.025**
concern	0.11	0.04	2.95	**0.003**
responsibility	0.14	0.06	2.54	**0.011**
injunctiv.norm	0.19	0.04	4.61	**<0.001**
motiv.preference	0.24	0.06	3.85	**<0.001**
sex.p*cook.efficacy[a]	-0.17	0.08	-2.03	**0.043**
cook.efficacy [mother]	-0.19	0.07	-2.93	**0.004**
cook.efficacy [father]	-0.02	0.06	-0.37	0.710
Restriction for health	(n=582, R^2=0.23)			
Intercept	3.31	0.03	96.00	**<0.001**
concern	0.30	0.03	9.33	**<0.001**
responsibility	0.12	0.05	2.50	**0.013**
injunctiv.norm	0.14	0.04	3.39	**0.001**
Child control	(n=582, R^2=0.26)			
Intercept [father, boy, first-born]	3.25	0.04	76.55	**<0.001**
sex.p [mother]	0.20	0.05	3.74	**<0.001**
sex.child [girl]	-0.11	0.05	-2.09	**0.037**
rank [other]	-0.24	0.06	-4.40	**<0.001**
concern	0.19	0.02	8.09	**<0.001**
self.efficacy	0.13	0.04	3.23	**0.001**
motiv.preference	0.13	0.04	3.03	**0.003**
work.flexibility	0.08	0.03	2.54	**0.011**

[a] Interaction parameter. The two lines below report the two slopes (for mothers and for fathers respectively).
Significant p-values (<0.05) are in bold. The full names of the dimensions can be found in Table 2.
Note. Number of participants (n) may differ due to missing values for parental BMI.

Monitoring was significantly positively predicted by motivation for health control (strongest predictor; t = 6.14), general self-efficacy, parent age, and work status (higher in parents without employment vs. full-time working parents). An interaction effect with parent sex was observed for perceived responsibility for feeding: it was a stronger predictor for explaining fathers' use of monitoring than for mothers' use, although it was significant for both. This model explained 24% of the variance (see Table 5 for all values).

Involvement was significantly positively predicted by motivation for health control (strongest predictor; t = 6.96), injunctive norms, general self-efficacy, and concern about child weight, and negatively predicted by parent age and parent BMI. An interaction effect with parent sex was observed for age child: it had a significant positive effect in mothers, and no effect in fathers. This model explained 22% of the variance (see Table 5 for all values).

Modelling was significantly positively predicted by general self-efficacy and perceived responsibility for feeding (two strongest predictors; both t = 3.81), by child birth rank (higher in parents of younger siblings vs. first-born), injunctive norms, and parent sex (higher in mothers vs. fathers), and negatively predicted by concern for child weight and child sex (lower in parents of girls vs. boys). An interaction effect with parent sex was observed for descriptive norms and for motivation for health control: descriptive norms had a significant positive effect in fathers and no effect in mothers; motivation for health control effect was stronger in mothers than in fathers, although it was significant for both. This model explained 38% of the variance (see Table 5 for all values).

Encourage balance and variety was significantly positively predicted by motivation for health control (strongest predictor; t = 6.12), feeding self-efficacy, parent BMI, and child sex (higher in parents of girls vs. boys), and negatively predicted by concern about child weight. An interaction effect with parent sex was observed for descriptive norms and for perceived responsibility for feeding: descriptive norms had a significant positive effect in fathers and no effect in mothers; perceived responsibility effect was stronger in mothers than in fathers, although it was significant for both. This model explained 40% of the variance (see Table 5 for all values).

Table 5. Regressions to explain parental feeding practices (outcome variable: structure and autonomy support practices: monitoring, involvement, modelling, encourage balance and variety) by other parent and child dimensions (predictors).

	Estimate	Std. Error	*t*	*p*
Monitoring	(n=580, R^2=0.24)			
Intercept [father, full time]	3.74	0.05	69.07	**<0.001**
motiv.health	0.31	0.05	6.14	**<0.001**
sex.p [mother]	0.08	0.06	1.17	0.241
self.efficacy	0.15	0.05	2.93	**0.004**
age.p	0.01	0.00	2.48	**0.014**
work [part-time]	0.08	0.09	0.88	0.379
work [other]	0.15	0.11	1.30	0.194
work [no work]	0.37	0.12	3.16	**0.002**
sex.p*responsibility[a]	0.21	0.08	2.56	**0.011**
responsibility [mother]	0.14	0.06	2.19	**0.029**
responsibility [father]	0.35	0.06	6.10	**<0.001**
Involvement	(n=494, R^2=0.22)			
Intercept [father]	3.45	0.05	71.18	**<0.001**
sex.p [mother]	0.01	0.07	0.12	0.904
age.p	-0.02	0.01	-2.62	**0.009**
BMI.p	-0.02	0.01	-2.56	**0.011**
concern	0.08	0.03	2.39	**0.017**
injunctiv.norm	0.13	0.04	3.48	**0.001**
self.efficacy	0.15	0.06	2.47	**0.014**
motiv.health	0.43	0.06	6.96	**<0.001**
sex.p*age.c[a]	0.18	0.07	2.67	**0.008**
age.c [mother]	0.18	0.05	3.66	**<0.001**
age.c [father]	-0.00	0.05	-0.03	0.975
Modelling	(n=582, R^2=0.38)			
Intercept [father, boy, first-born]	3.85	0.04	86.23	**<0.001**
sex.p [mother]	0.16	0.06	2.78	**0.006**
sex.child [girl]	-0.15	0.05	-2.81	**0.005**
rank [other]	0.17	0.06	2.95	**0.003**
concern	-0.08	0.03	-3.18	**0.002**
responsibility	0.15	0.04	3.81	**<0.001**
injunctiv.norm	0.10	0.03	2.87	**0.004**
self.efficacy	0.17	0.05	3.81	**<0.001**
sex.p*descriptive.norm[a]	-0.31	0.07	-4.68	**<0.001**
descriptive.norm [mother]	-0.03	0.05	-0.65	0.52
descriptive.norm [father]	0.28	0.05	5.32	**<0.001**
sex.p*motiv.health[a]	0.22	0.09	2.56	**0.011**
motiv.health [mother]	0.53	0.07	7.65	**<0.001**
motiv.health [father]	0.31	0.06	5.58	**<0.001**
Encourage balance and variety	(n=495, R^2=0.40)			
Intercept [father, boy]	3.97	0.04	97.45	**<0.001**
sex.p [mother]	0.09	0.05	1.68	0.094
BMI.p	0.01	0.01	2.54	**0.011**
sex.child [girl]	0.12	0.05	2.37	**0.018**
concern	-0.10	0.02	-4.32	**<0.001**
feed.efficacy	0.21	0.04	4.76	**<0.001**
motiv.health	0.28	0.05	6.12	**<0.001**
sex.p*descriptive.norm[a]	-0.17	0.06	-2.74	**0.006**
descriptive.norm [mother]	0.02	0.04	0.53	0.59
descriptive.norm [father]	0.19	0.05	4.20	**<0.001**
sex.p*responsibility[a]	0.15	0.07	2.17	**0.030**
responsibility [mother]	0.26	0.05	5.15	**<0.001**
responsibility [father]	0.11	0.05	2.14	**0.033**

[a] Interaction parameter. The two lines below report the two slopes (for mothers and for fathers respectively).
Significant p-values (<0.05) are in bold. The full names of the dimensions can be found in Table 2.
Note. Number of participants (n) may differ due to missing values for parental age and BMI.

The partial least squares regression (Figure 3) showed which parental feeding practices (in red) cluster together, which predictors (in black) cluster together, and which predictors relate to which feeding practices. This can be observed in the figure by the proximity of these variables to each other (at least for those which are far from the barycentre) which reflects a visualization of the loadings on the first and second component. The results showed that the first component (horizontal axis in Figure 3) is an opposition between emotion regulation (36% of the variance explained) and food as reward (30% of the variance explained) (and to a lesser extent: restriction for health, pressure to eat, and child control; < 20% of the variance explained) on the negative (left) side, and encourage balance and variety (23% of the variance explained) (and to a lesser extent: monitoring and modelling; < 20% of the variance explained) on the positive (right) side. So, positive values on the first component are linked with a low use of emotion regulation and food as reward, and a high use of encourage balance and variety. Such positive values are linked with low concern for child weight (strongest predictor, loading = -0.52; see Table 6) and high cooking confidence, feeding and general self-efficacy and high perceived responsibility for child feeding (loadings = 0.34, 0.32, 0.26, 0.30, respectively).

Low values on the second component (vertical axis in Figure 3) were linked with a high use of involvement (20% of the variance explained) and, to a lesser extent, with a high use of modelling (16% of the variance explained), and predicted by high levels of motivation for health control (loading = -0.46) but also high values for all other dimensions.

Regarding parent and child sociodemographic characteristics, the first component (horizontal axis in Figure 3) shows a higher use of encouragement for balance and variety and a lower use of food as reward and emotion regulation in mothers compared to fathers, but also for younger siblings compared to the first-born.

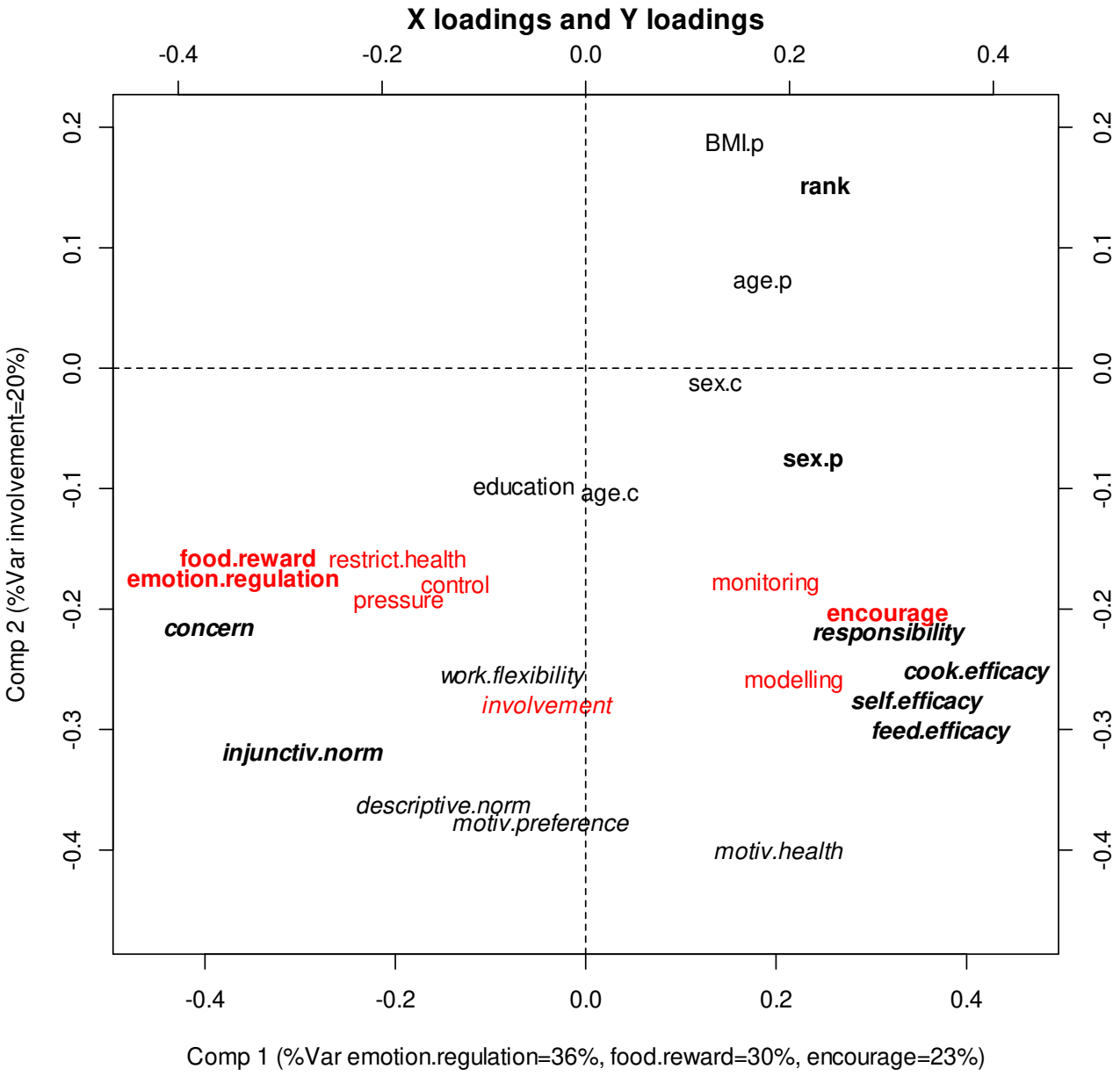

Figure 3. PLS regression to explain parental feeding practices (Y, outcome variables; in red) by a set of predictors (X, in black). Projection on the first and second component. Outcome variables of which the percentage of variance explained is higher than 0.20 on the first (resp. second) component are in bold (resp. italic). Predictors with a loading weight higher than 0.20 on the first (resp. second) component are also in bold (resp. italic). The loadings of predictors and full names of the dimensions can be found in Table 6.

Table 6. Loadings of predictors for Component 1 (horizontal axis of Figure 3) and for Component 2 (vertical axis of Figure 3).

Predictor	Loading on Component 1	Loading on Component 2
Age parent (age.p)	0.15	0.06
Sex parent (sex.p)	**0.23**	-0.08
Level of education (education)	-0.07	-0.07
Body mass index parent (BMI.p)	0.19	0.18
Sex child (sex.child)	0.13	-0.00
Age child (age.c)	-0.04	-0.11
Birth order (rank)	**0.24**	0.11
Concern about child weight (concern)	**-0.52**	**-0.24**
Perceived responsibility for feeding (responsibility)	**0.30**	**-0.26**
Injunctive norms (injunctiv.norm)	**-0.29**	**-0.32**
Descriptive norms (descriptive.norm)	-0.11	**-0.32**
Feeding self-efficacy (feed.efficacy)	**0.32**	**-0.26**
General self-efficacy (self.efficacy)	**0.26**	**-0.28**
Motivation for health (motiv.health)	0.19	**-0.46**
Motivation for preference (motiv.preference)	-0.14	**-0.38**
Work flexibility (work.flexibility)	-0.13	**-0.24**
Cooking confidence (cook.efficacy)	**0.34**	**-0.21**

Note. Loadings higher than |0.20| are in bold.

3.3.2 Predictors of parental involvement in child feeding

Little variance was explained by the models predicting different aspects of parental involvement in child feeding (R^2 ranging between 2% and 12%), except for the models explaining plan meals (R^2=17%) and cooking frequency (R^2=21%). Therefore, only the results of these last models will be described here; the results of the other models can be found in Appendix 2.

Plan meals was significantly positively predicted by concern about child weight (strongest predictor; t = 4.83; see Table 7), perceived responsibility for feeding, parent sex (higher in mothers vs. fathers). An interaction effect with parent sex was observed for child sex: in fathers, having a girl negatively predicted involvement in planning meals while there was no effect of child sex in mothers.

Cooking frequency was significantly positively predicted by parent sex (higher in mothers vs. fathers; see Table 7). An interaction effect with parent sex was observed for perceived responsibility for feeding, motivation for health control, and work status: perceived responsibility for feeding had a significant positive effect in fathers and no effect in mothers; motivation for health control had a significant positive effect in mothers and no effect in fathers. Not working significantly positively predicted cooking frequency in mothers (compared to mothers working full-time) while not working significantly negatively predicted cooking frequency in fathers (compared to fathers working full-time).

Table 7. Regressions to explain parental involvement in child feeding (outcome variable: plan meals, cooking frequency) by other parent and child dimensions (predictors).

	Estimate	Std. Error	*t*	*p*
Plan meals	(*n*=498, R^2=0.17)			
Intercept [father]	2.32	0.06	42.08	**<0.001**
concern	0.14	0.03	4.83	**<0.001**
responsibility	0.16	0.05	2.97	**0.003**
cook.efficacy	0.08	0.04	1.99	**0.047**
sex.p [mother]	0.28	0.09	2.93	**0.004**
sex.p*sex.c[a]	0.40	0.14	2.84	**0.005**
sex.c [mother]	0.06	0.10	0.60	0.550
sex.c [father]	-0.34	0.10	-3.43	**0.001**
Cooking frequency	(*n*=498, R^2=0.21)			
Intercept [father, full time]	4.10	0.05	82.58	**<0.001**
sex.p [mother]	0.33	0.09	3.67	**<0.001**
sex.p*responsibility[a]	-0.39	0.11	-3.38	**0.001**
responsibility [mother]	0.13	0.09	1.48	0.140
responsibility [father]	0.51	0.08	6.83	**<0.001**
sex.p*motiv.health[a]	0.26	0.12	2.14	**0.033**
motiv.health [mother]	0.29	0.09	3.02	**0.003**
motiv.health [father]	0.03	0.08	0.34	0.731
sex.p* no work[a]	1.33	0.43	3.09	**0.002**
no work [mother]	0.40	0.17	2.31	**0.021**
no work [father]	-0.93	0.39	-2.35	**0.019**

[a] Interaction parameter. The two lines below report the two slopes (for mothers and for fathers respectively).
Significant *p*-values (<0.05) are in bold.
Note. Only participants living with a partner are included in these analyses.

4. Discussion

This study aimed to study Danish parents' feeding practices, their involvement in feeding related tasks, and possible predictors of these practices and parental involvement.

First, the results showed that many mothers and fathers in Denmark declare to be highly involved in feeding their child. One-fourth of fathers reported that their partner is primarily responsible for most feeding related tasks, but otherwise both the majority of mothers and fathers living with a partner declared to be mainly responsible at home for planning meals, buying meals and cooking meals, and that they are the best cook at home. For eating with the child, the majority either say that they are mainly responsible or that the responsibility is equally shared. Even though mothers and fathers in this sample are unrelated and it is known that Danish men are often involved in household tasks (Craig & Mullan, 2010; Eurofound, 2018), these findings are remarkable. We would expect to observe more complementary findings between mothers and fathers (e.g., if the majority of mothers indicate they are mainly responsible for a task, we would also expect the majority of fathers to indicate that their partner is mainly responsible for this task or vice versa). To illustrate, a recent study with couples in France found that mothers were mainly responsible for cooking in most households, while it was often a shared responsibility to buy food and especially to eat with the child

(Philippe et al., 2021). In this study, mothers and fathers showed a high agreement rate (compatible answers) about the division of responsibilities. Nevertheless, the observed phenomenon in the current study in Denmark is not uncommon either. A survey by Gullup about the division of household tasks in the US also demonstrated that interviewed men and women were each more likely to say that they personally perform an equal or larger share of the work than their partner does (Brenan, 2020). This discrepancy may possibly be explained by the "better-than-average-effect" (Folkes & Kiesler, 1991; Myers & Ridl, 1979); parents may perceive that they do more or better than their partner. This hypothesis has also been put forward about Danish parents' contrasting perceptions about their green consumer behaviour at home (Grønhøj & Ölander, 2007). Alternatively, it is also possible that those fathers who are highly involved in feeding their child are overrepresented in the study sample.

Furthermore, it was also surprising that fathers took significantly more lunches with their child than mothers. Different hypotheses may be put forward to explain this results. Again, a sample bias may play a role, but also the COVID-19 pandemic that took place during the data collection may have influenced our results: fathers may have worked from home more often, which can be supported by the observation that fathers in this sample reported greater work flexibility than mothers. Another possible explanation could be that fathers answered this specific question less carefully than mothers and did not take into account that their child eats at school on weekdays.

Second, the comparative analyses showed that fathers used significantly higher levels of so-called coercive control practices (emotion regulation, pressure to eat, restriction for health, food as reward) than mothers and lower levels of so-called structure practices (monitoring, modelling) and autonomy support practices (encourage balance and variety). Coercive control practices are feeding practices that are rather parent-centred, serving parents' goals and desires, and these practices have mainly been linked to less favourable outcomes in the child, both in mothers and fathers (Philippe et al., 2021, reviews by Litchford et al., 2020; Vaughn et al., 2016). In contrast, structure practices and autonomy support practices offer structure and encouragement to children and facilitate their competences and independence (Vaughn et al., 2016). Previous research has already shown that fathers use higher levels of coercive control practices (review by Khandpur et al., 2014; Philippe et al., 2021), the current results now also extend this to the setting of Denmark. It is interesting, however, to point out that the differences were quite small in absolute numbers: in the region of 0.5 on a scale from 0 to 5. Nevertheless, they indicate that it may be important to help fathers in limiting the use of these coercive practices in favour of the use of more supportive feeding practices in order to create a positive, structured feeding environment for the child that stimulates their autonomy and healthy eating.

This study also identified some variables that predict the use of these parental feeding practices. In the regressions, motivation for health control was the strongest predictor for all structure and autonomy support. Concern for child weight and motivation for child preference were the strongest predictors for the coercive control practices. Additionally, the PLS regressions indicated that a low concern for child weight and a high parental cooking confidence, feeding self-efficacy, general self-efficacy and perceived responsibility for feeding were linked with a higher use of encourage balance and variety and a lower use of emotion regulation and food as reward. In short, a higher concern for child weight and motivation for child preference were linked to less favourable feeding practices while a higher motivation for health control, confidence/self-efficacy and perceived responsibility for feeding were linked to more favourable feeding practices.

Mallan et al. (2014) have previously also shown that a higher concern for child weight was linked with a higher use of pressure and restriction. It would be interesting to study why certain parents are more concerned by their child's weight than others, especially knowing that most pre-schoolers (still) have a healthy weight before the adiposity rebound around age 6 years (Rolland-Cachera et al., 2006), and how to reduce this concern. Contrary to our expectation, we also observed that fathers in this study showed a higher concern than mothers. This could possibly be explained by a bias of sampling; fathers participating in a study on eating behaviours may be particularly concerned by children's eating. Alternatively, it should be checked whether there are other aspects that can explain the observed relationship between parental concern and parental coercive control practices.

Further, the comparative tests showed that mothers reported higher levels of cooking confidence and feeding self-efficacy than fathers, intervention studies could examine whether increasing these in both mothers and fathers could also stimulate a higher involvement in feeding and the use of more favourable feeding practices. This idea can be supported by the results of a qualitative study of Jansen et al. (2020). They found that Australian fathers' perceived incompetence in cooking and meal planning acted as a barrier for their involvement in family meals and food labour.

Finally, changing parental motivations/attitudes when buying food for the child could also be a window of opportunity to promote the use of more favourable practices. Parents who are more concerned by child preferences are likely to be focusing on satisfying the child in the short-term (e.g., by using foods to reward children or to regulate their emotions at that moment), while more health-centred parents are likely more focused on long-term benefits for the child (Rigal et al., 2019). Thus, in line with the ideas of Bandura's social cognitive theory (1986), our results seem to indicate that parental motivations may play an important role in their behaviour (feeding practices).

In addition, it is also interesting to point out that a stronger perception of injunctive norms in mothers and fathers predicted a higher use of both – less favourable – coercive control practices and

– more favourable – structure and autonomy support practices. This may suggest that perceiving expectations to be highly involved in child feeding (high injunctive norms scores) does not necessarily stimulate these parents to use "the right" types of feeding practices. Parents generally have good intentions when using feeding practices and they may not be aware that the use of coercive control practices can have counterproductive effects on the child. Thus, they may need some guidance in their choice of appropriate practices. Furthermore, it is also interesting that a stronger perception of descriptive norms predicted a higher use of modelling and encourage balance and variety, but only in fathers. Seeing other parents being involved in child feeding may thus also possibly help fathers to use appropriate practices.

The regression analyses further showed that little variance was explained by the models predicting different aspects of parental involvement in child feeding. Based on the social cognitive theory of Bandura (1986) and the four factor model of fathers' involvement (Lamb, 1987), it was, however, expected that especially social support variables and institutional practices (injunctive and descriptive social norms, employer's support for work flexibility, work status), and parental skills/self-efficacy would significantly contribute to their involvement. Only cooking frequency was found to be significantly predicted by parents' work status, in line with the results of Etilé and Plessz (2018). Instead, perceived responsibility for feeding and concern about child weight were the most common significant predictors for parental involvement. Like in the study of Mallan et al. (2014), we observed that, especially in fathers, a higher perceived responsibility for feeding was positively related to parents' involvement in feeding related tasks. Qualitative studies with parents could be useful to explore in more depth which factors contribute to parents' and especially fathers' involvement in child feeding. These results could also contribute to the development of new theories or the adaptation of existing theories with a specific focus on the setting of child feeding. They can in turn provide a framework that can support and stimulate future research.

5. Strengths and limitations

Some limitations must be noted for this study. First, the data-collection took place during the COVID-19 pandemic in spring 2021. Despite the fact that parents were asked to describe whether and how their answers in this questionnaire deviated due to the COVID-19 restrictions in Denmark, it is difficult to estimate to what extent this situation really gives a distorted picture of parents' habitual practices and especially their involvement in child feeding. Deviating work and school situations in particular may have contributed to this. It is therefore important to keep this context in mind when interpreting the results. By contrast, it is likely that the pandemic will have a lasting impact on certain (food) habits and work situations (e.g., working from home more often), further

research is required to clarify this in the future. A second limitation may be the slightly unbalanced sample of mothers (N=261, 45%) and fathers (N=321, 55%), which should be limited when comparing groups. However, precautions were taken during the analyses to ensure this was not an issue. Third, as mentioned previously, it is possible that those parents who are generally interested in feeding and are involved at home are overrepresented in this study (selection bias), especially for fathers, even though the characteristics of the parents were quite diverse in this study. Fourth, all data used for this study was self-reported by parents. It is therefore possible that they do not reflect their actual involvement, feeding practices and weight, but their perceptions. Their answers may also be influenced by social desirability. Fifth, even though the financial benefits were low, participants were rewarded for questionnaire completion with points by the recruitment agency. No extensive analyses were conducted to identify possible "fake answers". Though some data cleaning was performed, we cannot exclude that some participants did not carefully answer all questions. Last, the cross-sectional design of this study does not allow to make statements about causality. Longitudinal research is necessary for this.

This study also presents several strengths. First, despite the slightly unbalanced sample, the large sample size of mothers and especially fathers is certainly a strength of this study. Studies with fathers about child feeding are rather rare and have often been performed with small sample sizes (Khandpur et al., 2014; Litchford et al., 2020). Moreover, the current study is one of the few studies that provides insight into parent-related predictors of fathers' feeding practices. It also provides insight into feeding practices used by parents in Denmark and their involvement in feeding related tasks, which has been little researched to date.

6. Perspectives

To overcome the limitations presented above, a few suggestions for future research are presented here. First, it would be interesting to replicate this study with a large and diverse sample at a time point when the COVID-19 pandemic is stabilized, and parents and children have stable work/school habits again. This will allow to compare and evaluate the impact of the pandemic on the current results, especially on parental involvement in feeding related tasks and the number of meals taken with the child. Moreover, it would be interesting to combine self-reported measures with observational measures to more properly collect data on parents' actual involvement and practices, and to further validate the questionnaires. It would also be preferable if the involved researchers weigh and measure participants in a standardized way, to be able to obtain correct BMI values and to avoid missing data (which was the case for 87 participants in this study). Second, including mother-father dyads could be an interesting method to compare mothers' and fathers' reports about their

involvement in child feeding and their practices. This could also counter the possibility that differences in practices between mothers and fathers observed in this study are not necessarily linked to gender differences but could be due to reports on different children with different eating temperaments/behaviours that influence parental feeding practices. Third, if opted for self-report measures, the use of careful data screening techniques is recommended. Last, it could be interesting to conduct cluster analyses to explore if different 'types' of fathers and mothers exist that use higher or lower levels of certain feeding practices. This could allow to target certain groups of mothers and fathers who may benefit of guidance to stimulate more favourable feeding practices at home.

7. Conclusions

Using a large sample of mothers and fathers, this study identified gender differences in parental feeding practices in Denmark and predictors of parental feeding practices and parental involvement in child feeding. Fathers tend to use higher levels of coercive control practices, while mothers use higher levels of structure and autonomy support practices. In order to help parents in limiting the use of coercive practices and stimulate the use of structure and autonomy support practices, it may be of interest to focus on limiting parents' concern about child weight (or to study where this concern originates from), to enhance parents' self-efficacy (cooking/feeding/general) and to stimulate a health-centred motivation when buying food for the child instead of accommodating the child's preferences. Since this study used an explorative approach, additional research is required to confirm the predictors of parental involvement in feeding and parental feeding practices identified in this study. This is needed to be able to develop possible targeted guidance and interventions for mothers and fathers.

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Authors Contributions

KP, SI, SM-P, AG, JA-W conceptualized the study. KP and CC conducted all analyses. KP drafted a first version of the manuscript, all authors thereafter contributed to editing the manuscript. All authors read and approved the final version of the manuscript.

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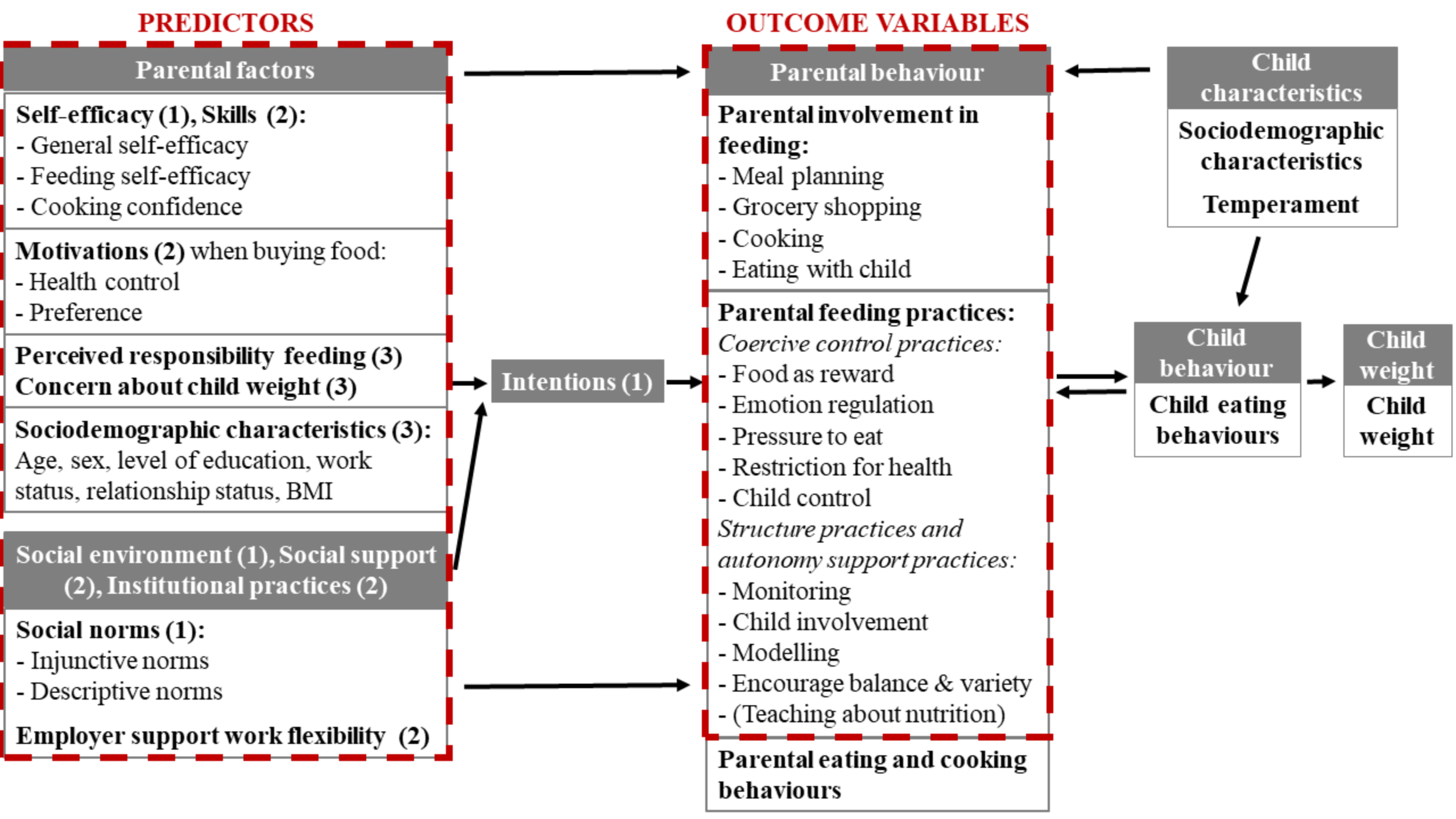
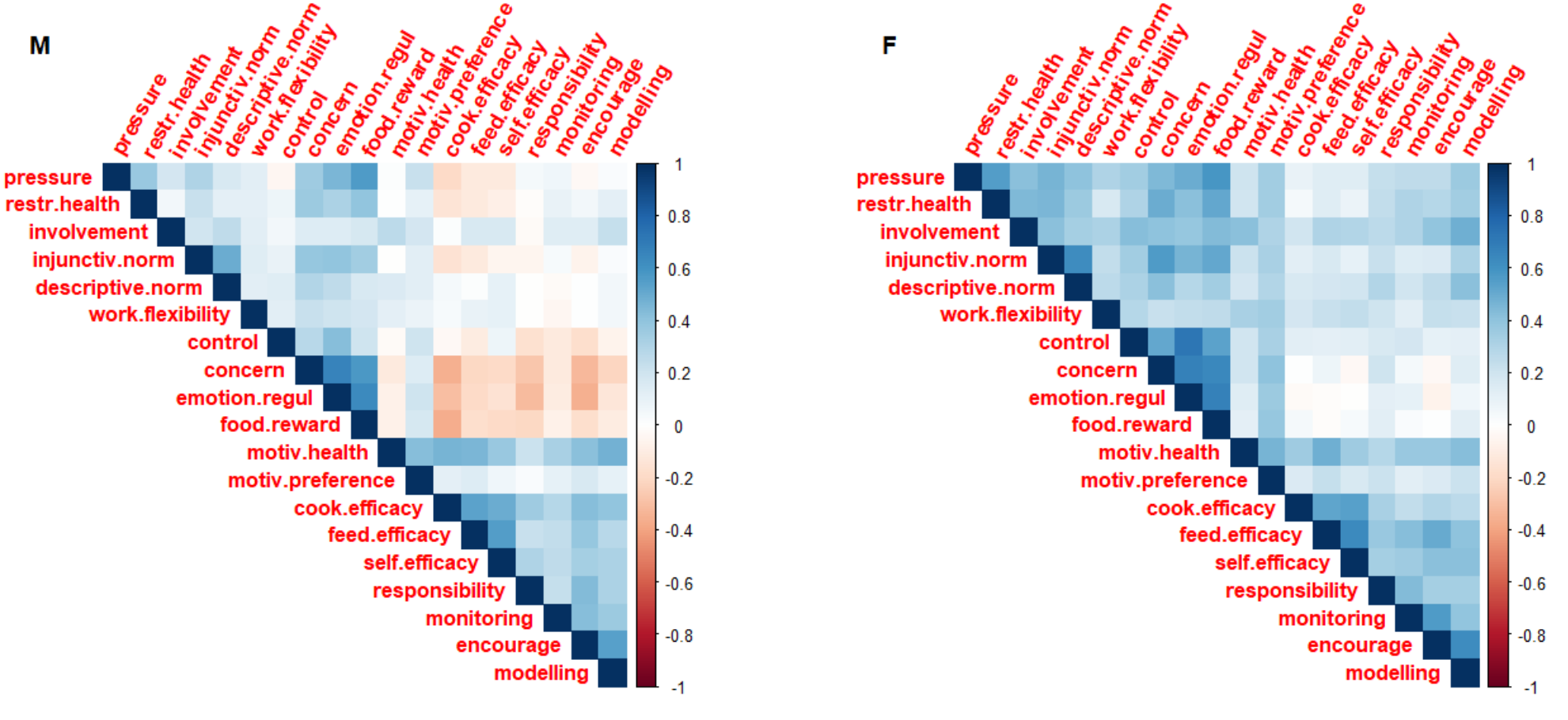

PREDICTORS
OUTCOME VARIABLES
Parental factors
Self-efficacy (1), Skills (2):
- General self-efficacy
- Feeding self-efficacy
- Cooking confidence
Motivations (2) when buying food:
- Health control
- Preference
Perceived responsibility feeding (3)
Concern about child weight (3)
Sociodemographic characteristics (3):
Age, sex, level of education, work status, relationship status, BMI
Social environment (1), Social support (2), Institutional practices (2)
Social norms (1):
- Injunctive norms
- Descriptive norms
Employer support work flexibility (2)
Intentions (1)
Parental behaviour
Parental involvement in feeding:
- Meal planning
- Grocery shopping
- Cooking
- Eating with child
Parental feeding practices:
Coercive control practices:
- Food as reward
- Emotion regulation
- Pressure to eat
- Restriction for health
- Child control
Structure practices and autonomy support practices:
- Monitoring
- Child involvement
- Modelling
- Encourage balance & variety
- (Teaching about nutrition)
Parental eating and cooking behaviours
Child characteristics
Sociodemographic characteristics
Temperament
Child behaviour
Child eating behaviours
Child weight
Child weight


M
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pressure
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involvement
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work.flexibility
control
concern
emotion.regul
food.reward
motiv.health
motiv.preference
cook.efficacy
feed.efficacy
self.efficacy
responsibility
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encourage
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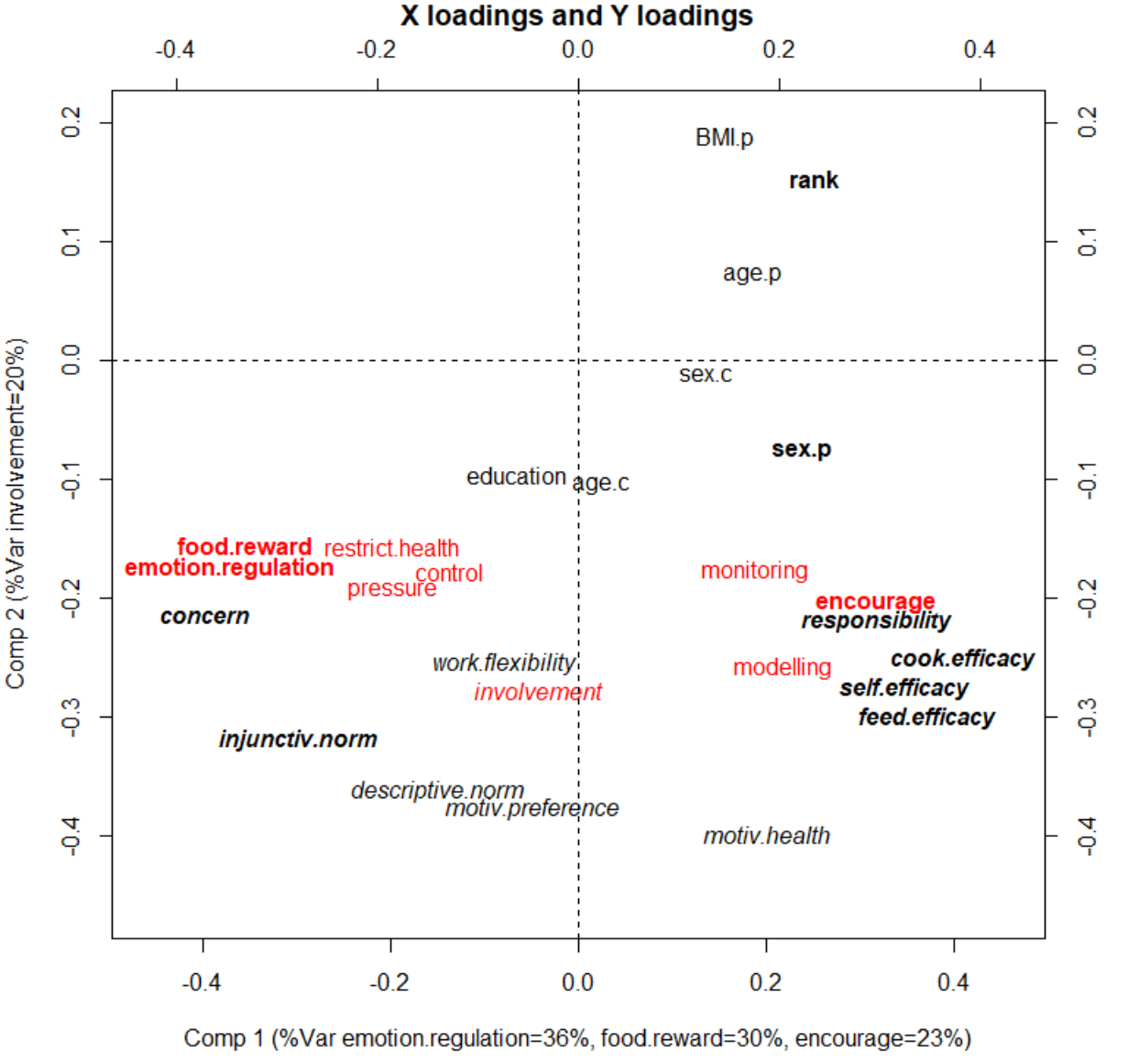
X loadings and Y loadings
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0.0
0.2
0.4
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
Comp 2 (%Var involvement=20%)
BMI.p
rank
age.p
sex.c
sex.p
education
age.c
food.reward
restrict.health
emotion.regulation
control
pressure
monitoring
encourage
concern
responsibility
work.flexibility
modelling
cook.efficacy
involvement
self.efficacy
feed.efficacy
injunctiv.norm
descriptive.norm
motiv.preference
motiv.health
Comp 1 (%Var emotion.regulation=36%, food.reward=30%, encourage=23%)