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## Research report

# A longitudinal study on the relationship between eating style and gestational weight gain <sup>☆</sup>



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## ABSTRACT

**Background:** Gaining too much weight in pregnancy poses health risks for mother and child. Eating style has been shown to be related to weight gain in general but the relation to maternal weight gain in pregnancy is unclear.

**Objectives:** To assess the influence of eating style and psycho social factors on maternal weight gain.

**Methods:** Healthy pregnant women (n = 161), filled in a questionnaire at 15 and 35 weeks of pregnancy. Eating style, social norm, self-efficacy and attitude with regard to weight gain and health during pregnancy were measured. Self-reported pre-pregnancy body mass index (BMI) was used to determine weight category and weight was objectively measured at 15 and 35 weeks of gestation. Linear regression was used to study the relationship between eating style, psychosocial factors and gestational weight gain, controlling for BMI and age. Hierarchical regression analyses were carried out where the effects of the other eating styles were partialled out. **Results:** During pregnancy, 66% of the women remained stable as far as individual eating style concerned. At 15 weeks of gestation, 11 (7%) women were classified as emotional eaters, 89 (55%) as external eaters and 61 (38%) as restrained eaters. At first sight being an emotional eater was associated with higher weight gain in pregnancy. In hierarchical regression analyses however none of the eating styles was associated with higher gestational weight gain. Of the psychosocial factors, a better healthy pregnancy attitude at 35 weeks of gestation was associated with less weight gain.

**Discussion:** In the long list of potential drivers of gestational weight gain, eating style does not seem to be of any significance. Healthy pregnancy attitude in late pregnancy was found to be related with less weight gain.

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## Introduction

In the Western world, a beautiful woman is supposed to be a slender one. In reality most women are not slender and many women struggle with their body image and weight (Swami et al., 2010).

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A woman's eating style and associated habits might hamper her strive for a slender body. Eating style during pregnancy might even be more important, because maternal weight gain within a certain range creates the best chances for a healthy pregnancy and a healthy baby (Rasmussen, Catalano, & Yaktine, 2009). Gaining too much weight during pregnancy increases the risk for serious complications for the mother and the child during pregnancy and delivery. When the mother gains too much during pregnancy this might also lead to postpartum weight retention and this poses a risk to become overweight. Too much weight gain in the mother might lead to large for gestational age babies and a higher chance of childhood obesity. Gaining too little body weight might result in small for gestational age babies with a higher risk of obesity and hypertension (Calkins & Devaskar, 2011).

Eating style is considered a stable trait (Kräuchi, Reich, & Wirz-Justice, 1997). In general, three types of eating styles can be identified: emotional eaters, external eaters, and restrained eaters

and in most people, one of the three styles is more dominant (Van Strien, Schippers, & Cox, 1995).

In emotional eaters food intake is triggered by emotion, with mainly negative emotion being associated with higher food intake (Kemp & Kopp, 2011; Timmerman & Acton, 2001).

Emotional eating is said to be a learned behaviour and is negatively correlated with the level of basic need satisfaction (D'Arrigo, 2007).

External eaters are stimulus bound in that their eating is triggered by cues in their environment (Van Strien, Schippers, & Cox, 1995). Their food intake is driven by food-related stimuli, such as parties or watching movies. Finally, restrained eaters restrict their dietary intake, or use other strategies for weight control to adhere to an ideal body image (Herman & Polivy, 1980; Elfhag & Morey, 2008; Anschutz, Van Strien, Van de Ven, & Engels, 2009).

Although eating style outside of pregnancy is related to weight and weight gain, the role of eating style for weight gain in pregnancy is virtually unstudied. Therefore, the aim of the current paper is to assess this role in pregnancy among a population of healthy pregnant women.

## Methods

For the purpose of this study, data were used from a randomized controlled trial on the New Life(style) intervention programme, which were collected between February 2005 and May 2006 (Althuisen, van Poppel, Seidell, van der Wijden, & van Mechelen, 2006) (ISRCTN85313483). The New Life(style) intervention consisted of five individual counselling sessions by one of the two trained counsellors with the specific aim to prevent excessive weight gain (Althuisen, van Poppel, Seidell, van der Wijden, & van Mechelen, 2006). Women were made aware that they could influence their weight gain through their eating behaviour as well as their level of physical activity, and were advised to gain weight according to the 1990 Institute of Medicine recommendations (Institute of Medicine (Subcommittees on Nutritional Status and Weight Gain During Pregnancy and Dietary Intake and Nutrient Supplements During Pregnancy, Committee on Nutritional Status During Pregnancy and Lactation, Food and Nutrition Board), 1990). Results of the intervention have been reported elsewhere, and in short, no effects of the intervention were found on any of the weight parameters in the total study group (Althuisen, van der Wijden, van Mechelen, Seidell, & van Poppel, 2013). The study was approved by the Medical Ethical Committee of the VU University Medical Centre, Amsterdam and all participants provided written informed consent.

### Participants

Pregnant women from eight midwifery practices in The Netherlands were invited by the midwives to participate. Women were eligible if less than 14 weeks pregnant (first ongoing pregnancy) and fluent in Dutch. A total of 258 women were included. Exclusion criteria for the current analyses were if pre-pregnancy BMI or objectively measured pregnancy weight gain could not be established ( $n = 49$ ), or if women had  $\geq 2$  items per scale missing in the DEBQ or  $\geq 3$  items per scale missing in the other questionnaires ( $n = 48$ ).

### Measurements

Participants received questionnaires for self completion by regular mail 1 week before their scheduled appointment at 15 and 35 weeks of pregnancy and were asked to hand in the filled in questionnaires during the subsequent appointment. On both occasions body height and body weight were measured objectively.

### Body mass index

Each woman's pre-pregnancy body mass index (BMI) was calculated based on self-reported pre-pregnancy weight and objectively measured height. Based on their pre-pregnancy BMI, women were divided into three categories (underweight (BMI < 18.5), normal weight (BMI 18.5–25), and overweight or obese (BMI  $\geq 25$ ). *Weight gain* was defined as the objectively measured weight at 35 weeks of pregnancy minus the objectively measured weight at 15 weeks of pregnancy.

### Eating style

Eating style and habits were assessed at 15 and 35 weeks of gestation by the Dutch version of the "Dutch Eating Behaviour Questionnaire (DEBQ)" (Van Strien et al., 1986). The DEBQ is a validated questionnaire and has a high test–retest reliability (Cronbach's alpha 0.90 for emotional eating, 0.94 for restrained eating and 0.96 for external eating) (Bozan, Bas, & Asci, 2011).

Based on the DEBQ, participants were classified as emotional, external or restrained eaters. Emotional eating was measured with 13 items; four items measuring diffuse emotions, and nine assessing specific emotions. External and restrained eating were measured by 10 items each. Women were classified to a specific eating style based on their DEBQ-score at 15 weeks of pregnancy, and again at 35 weeks to determine if they had changed. If their highest score was tied between two eating styles ( $n = 14$ ) at either 15 or 35 weeks of pregnancy, the woman's eating style at the other time point was taken into consideration when grouping her into an eating style. For one woman the score was tied between two eating styles at both time points.

### Psychological factors

Self-efficacy and attitude were assessed by scales constructed by Kendall, Olson, and Frongillo (2001), who drew items from existing validated scales. These scales were translated into Dutch (Kendall, Olson and Frongillo, 2001).

The self-efficacy construct was measured with eight items on confidence about returning to pre-pregnancy weight and body shape, on the control of food intake, on confidence about getting regular exercise after pregnancy, and on food intake (Kendall, Olson and Frongillo, 2001).

Attitude was split in "weight gain attitude" and "healthy pregnancy attitude". The attitude women hold towards weight gain during pregnancy was assessed with a 13 item questionnaire (Kendall, Olson and Frongillo, 2001). Weight gain attitude was only measured at 15 weeks of gestation, and not at 35 weeks. "Healthy pregnancy attitude" describes the attitude of pregnant women towards regular exercise, a healthy diet, and healthy weight gain in favour of a healthy pregnancy. This was measured with nine items (e.g. how important do you find being physically active/eating healthy/gaining weight within recommendations). All questions were answered on a five point scale (e.g. very unimportant/unimportant/neutral/important/very important) (Althuisen, van Poppel, Seidell, van der Wijden, & van Mechelen, 2006). Social norm, as described by assessing one's belief that significant others e.g. spouse, family or friends want one to engage in a certain behaviour, was assessed with a nine item questionnaire (Althuisen, van Poppel, Seidell, van der Wijden, & van Mechelen, 2006; Symons Downs & Hausenblas, 2004).

### Statistical analyses

In a first analysis, women were classified according to their most dominant eating style and differences in weight gain. Subsequently, hierarchical linear regression analyses were performed, in which the scores on all three eating styles were included sequentially, thereby taking the interrelatedness of the eating styles into

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