



# Parental Numeracy and Children's BMI

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## Introduction

- Numeracy is the ability to understand and use numbers in daily life
- Low numeracy skills have been associated with higher BMI in adult primary care patients (Huizinga, Beech, Cavanaugh, Elasy, & Rothman, 2008)
- Parents, as the nutritional gatekeeper, make decisions about their children's nutrition (Wansink, 2006)
- Weight-related information processing skills serve as basis for these decisions and require numerical abilities
- Weight related information processing skills examined in this study:
  - nutrition label comprehension
  - growth chart comprehension
  - portion size estimation

## Hypotheses

- Low parental numeracy will co-occur with children being either more under- or more overweight
- Weight-related information processing skills mediate the association between numeracy and BMI

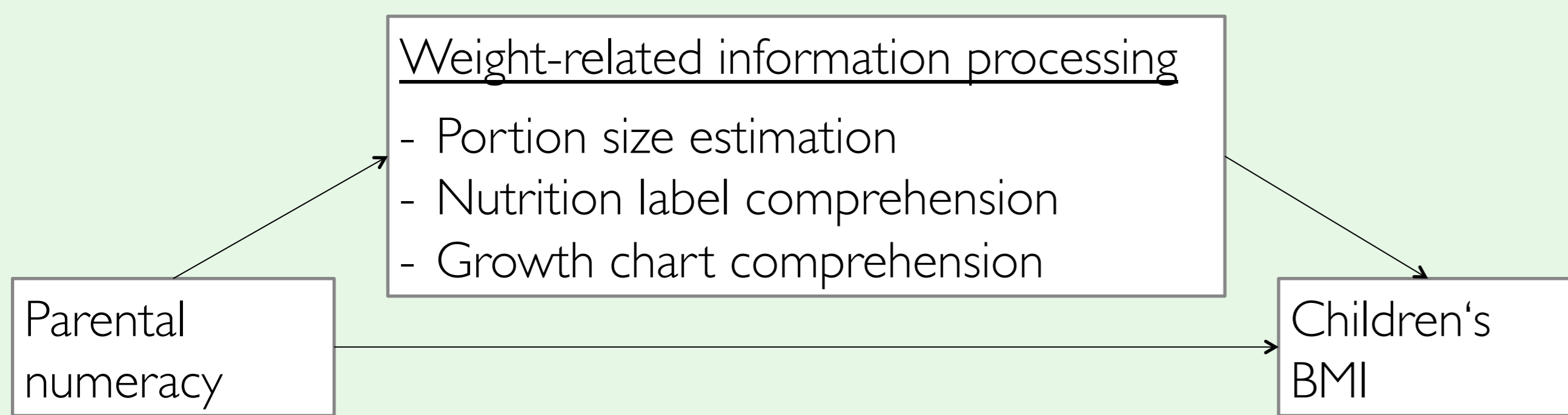


Fig.1 Mediation model of the link between numeracy and BMI

## Methods

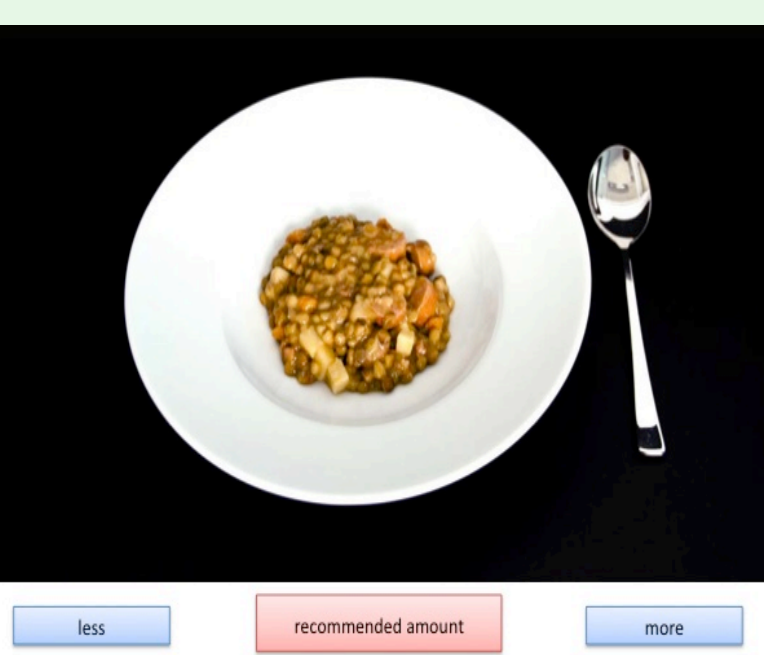
### Procedure

- Computer assisted face-to-face interview with 321 nutritional gatekeeper with at least one child between 6 and 12 years at home during interview

### Measures

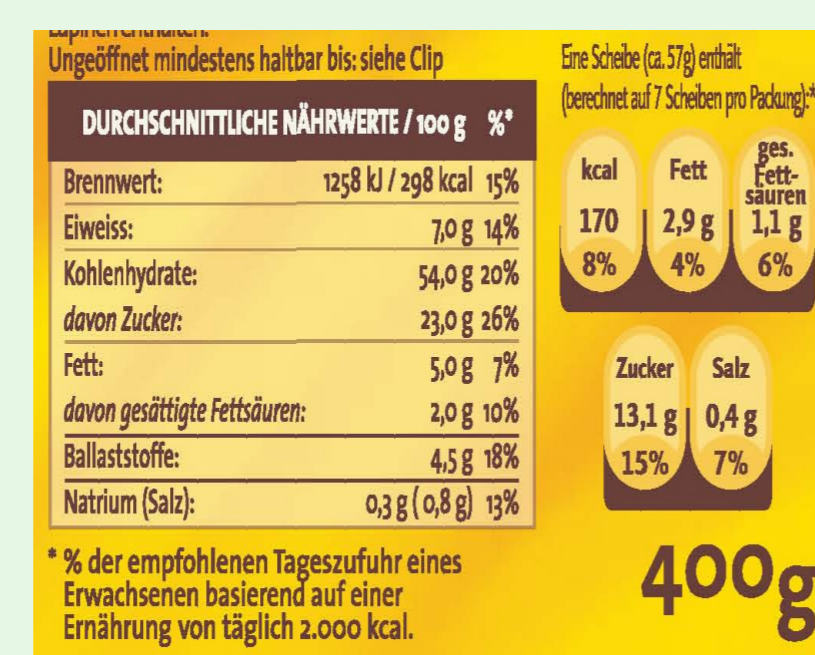
**Body weight** of parent and child was measured

### Portion size estimation



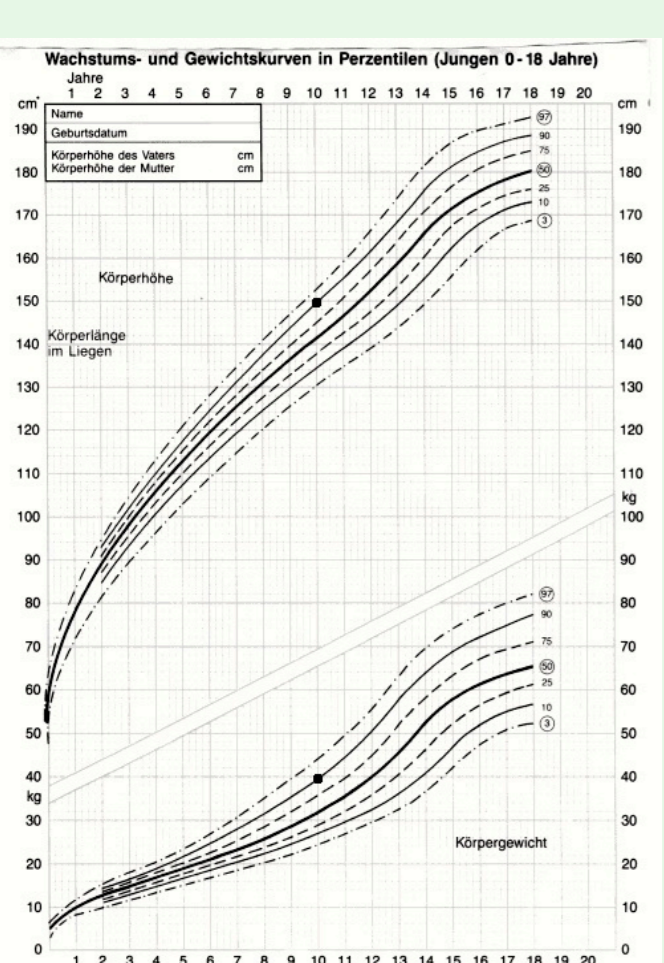
Estimating recommended amount of food with food pictures

### Nutrition label comprehension



5 items of Nutrition Label Survey (NLS, Rothman, 2008)

### Growth charts comprehension



7 items from growth chart survey (Ben-Joseph, 2011)

### Numeracy

*If the chance of getting a disease is 20 out of 100, this would be the same as having a \_\_\_\_\_ % chance of getting the disease.*

8-item objective numeracy scale (Weller et al., 2012)

## Results

### Hypothesis 1: Link between parents' numeracy and children's BMI

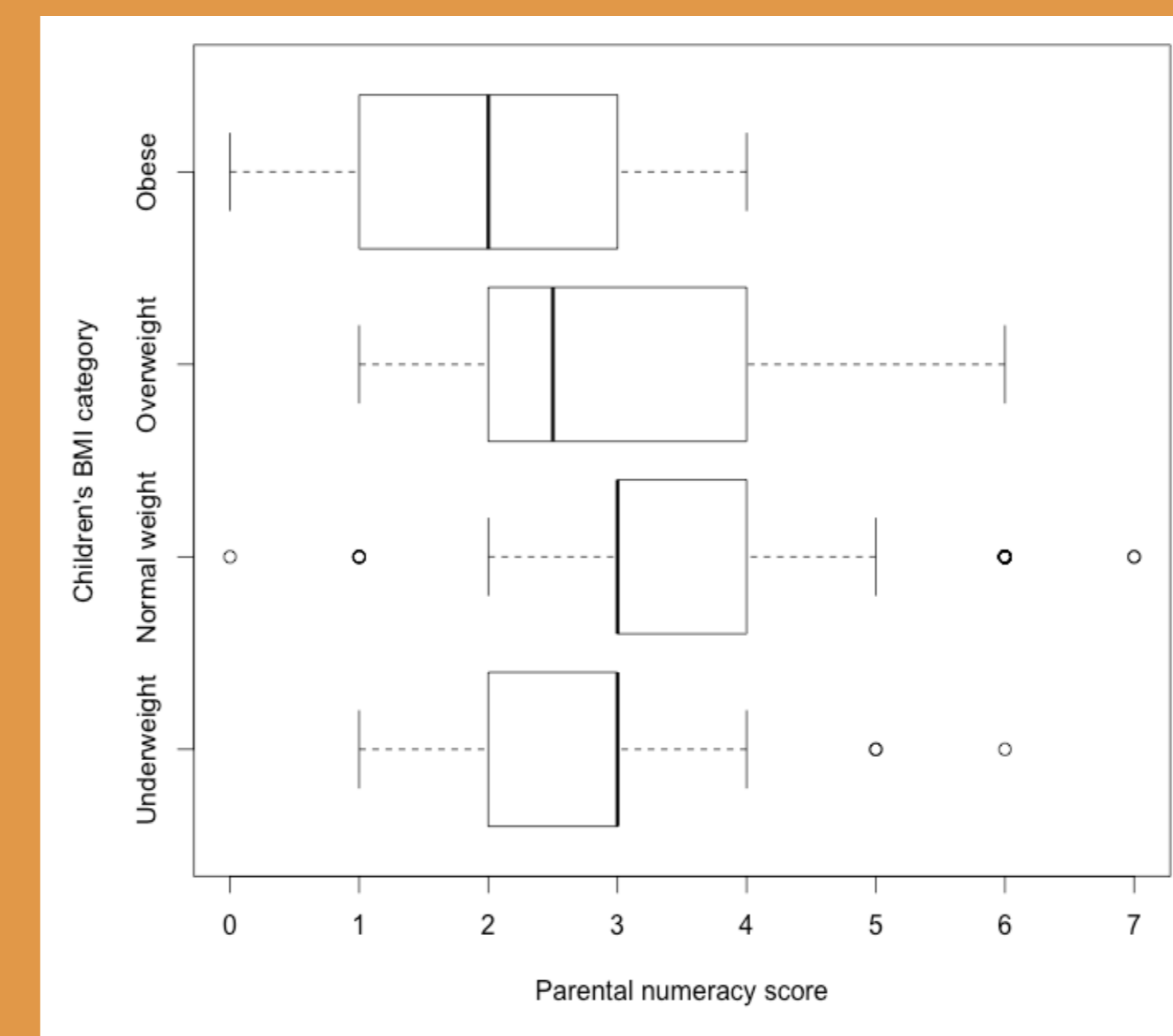


Fig.2 Distribution of parental numeracy scores, separately for children's BMI

#### Children with z-BMI ≤ normal weight

- $\beta = 0.126, P = 0.048$
- lower parental numeracy predicts lower z-BMI in these children

#### Children with z-BMI ≥ normal weight

- $\beta = -0.299, P < 0.001$
- lower parental numeracy predicts higher z-BMI in these children

#### Absolute deviation from normal weight

- $\beta = -0.370, P < 0.001$
- lower numeracy predicts greater deviation from normal weight in all children

### Hypothesis 2: Mediating role of weight-related information processing

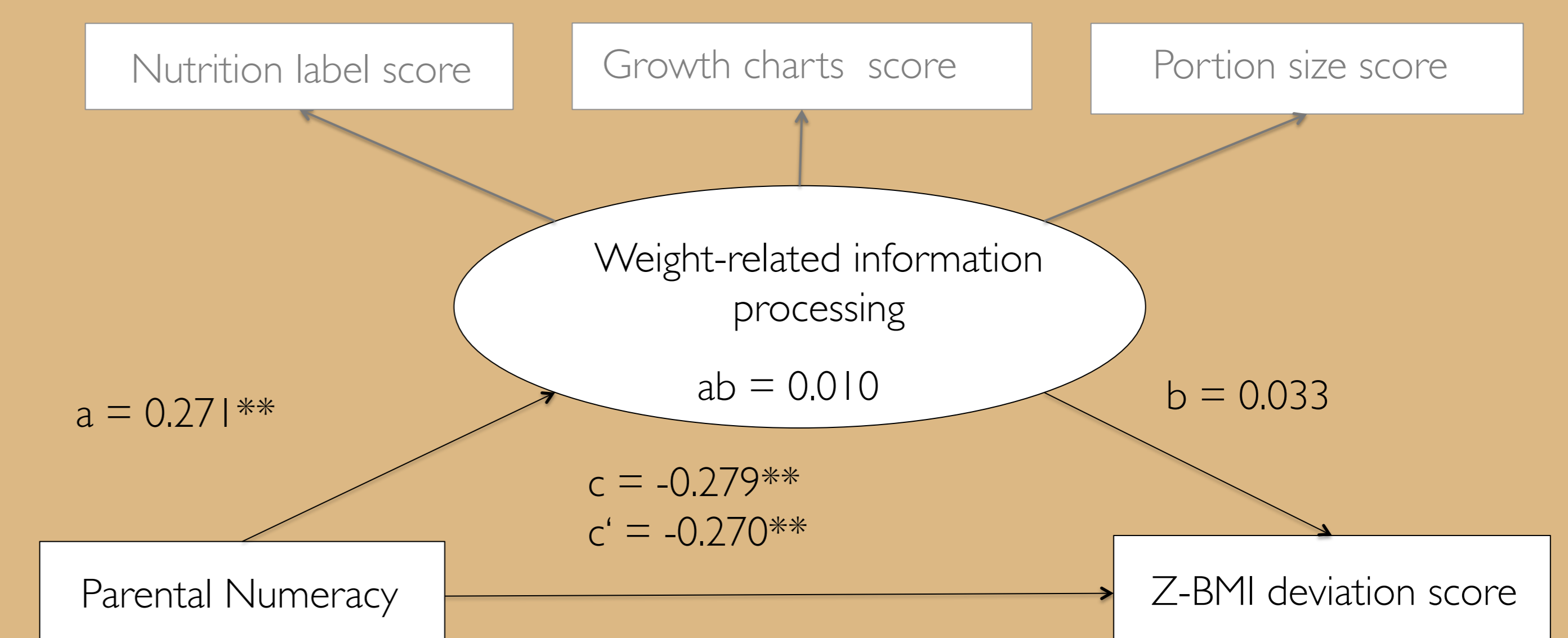


Fig.3 Mediation model with weight-related information processing as latent mediator

### Significant associations between higher numeracy and...

- better nutrition label comprehension ( $r = 0.26, P < 0.001$ )
- better growth charts comprehension ( $r = 0.33, P < 0.001$ )
- better portion size estimation skills ( $r = -0.08, P = 0.023$ )

No significant mediation effect

## Discussion

- This is the first study identifying low parental numeracy as a risk factor for over- and underweight in children
- Numerical abilities are important to process weight-related numerical information, such as estimate portion sizes, comprehension of nutrition label and growth charts
- The role of parental numeracy should be taken into account when developing strategies to prevent and treat malnutrition, as well as over- and underweight in children
- Future research should investigate possible mechanisms of the link between numeracy and BMI

### Contact

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