



## Research report

# Feeding beliefs and practices of Chinese immigrant mothers. Validation of a modified version of the Child Feeding Questionnaire <sup>☆</sup>

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## ABSTRACT

The Child Feeding Questionnaire (CFQ) developed by Birch et al. (2001) is a widely used tool for measuring parental feeding beliefs, attitudes and practices. However, the appropriateness of the CFQ for use with Chinese populations is unknown. This study tested the construct validity of a novel Chinese version of the CFQ using confirmatory factor analysis (CFA). Participants included a convenience sample of 254 Chinese-Australian mothers of children aged 1–4 years. Prior to testing, the questionnaire was translated into Chinese using a translation-back-translation method, one item was reworded to be culturally appropriate, a new item was added (*monitoring*), and five items that were not age-appropriate for the sample were removed. Based on previous literature, both a seven-factor and an eight-factor model were assessed via CFA. Results showed that the eight-factor model, which separated *restriction* and *use of food rewards*, improved the conceptual clarity of the constructs and provided a good fit to the data. Internal consistency of all eight factors was acceptable (Cronbach's  $\alpha$ : .60–.93). This modified eight-factor CFQ appears to be a linguistically and culturally appropriate instrument for assessing feeding beliefs and practices in Chinese-Australian mothers of young children.

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## Introduction

Obesity has been identified as an emerging health concern for immigrants who move from a developing country to a developed country. Prevalence rates in immigrant populations increase with longer duration of residence and across generations (Bates, Acevedo-Garcia, Alegria, & Krieger, 2008; Oza-Frank & Cunningham, 2010). With a rapid increase of relatively young and highly educated Chinese immigrants in the last decade, Chinese have become

the third largest group of international migrants in Australia (Australian Bureau of Statistics, 2009, 2013). However, there is currently little information available regarding the health status of these immigrants and their children.

An increasing body of evidence suggests that early life feeding experiences have important short- and long-term influences on the development of eating behaviors and dietary intake, and may consequently impact on children's weight status (Rodgers et al., 2013; Ventura & Birch, 2008). For example, Australian studies have demonstrated that children are exposed to nonnutritive, energy dense food from as young as 12 months of age (Chan, Magarey, & Daniels, 2010; Webb et al., 2006). Similarly, child feeding practices, such as restriction, monitoring and pressure to eat, are commonly used with very young children (e.g. 1–4 years old) (Chan et al., 2010; Rodgers et al., 2013) and are stable throughout young childhood (Farrow & Blissett, 2012). The Child Feeding Questionnaire (CFQ) (Birch et al., 2001) is one of the most frequently used instruments for assessing parental feeding attitudes, beliefs and practices postulated to be linked to childhood obesity risk. The 31-item CFQ was designed to examine seven constructs that broadly fall into two domains: (i) perceptions and concerns related to child feeding and weight status (i.e., *perceived general feeding responsibility, perceived parent weight status, perceived child weight status and concern about child overeating and becoming overweight*) that potentially motivate the use of feeding practices; (ii) practices related to child feeding (i.e., *pressuring to eat, monitoring and restriction*). These three

**Abbreviations:** BMI, Body mass index; BAZ, BMI-for-age Z-score; CFA, Confirmatory factor analysis; CFQ, Child Feeding Questionnaire.

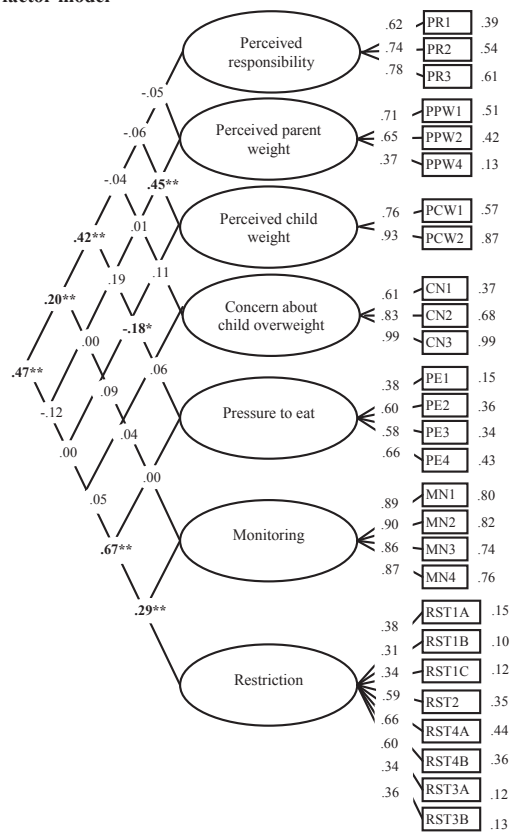
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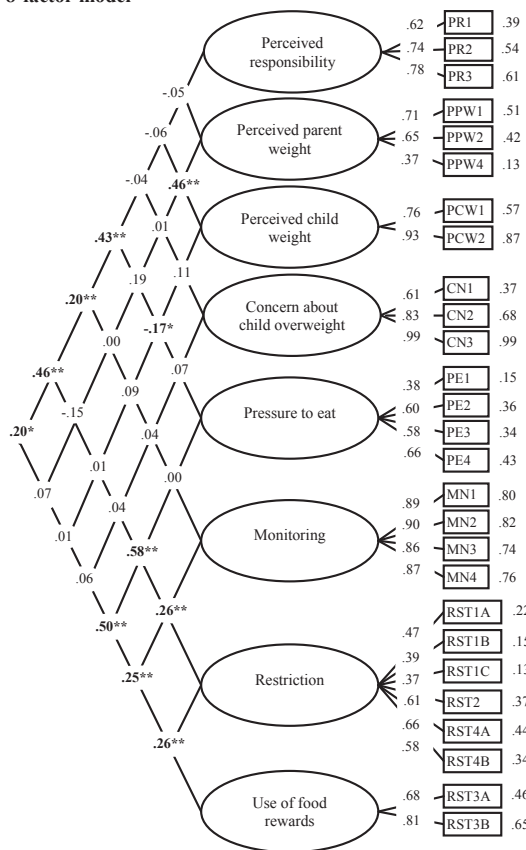
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7-factor model



8-factor model



- PR1 feeding at home
- PR2 deciding child's portion sizes
- PR3 deciding the right kind of foods
- PPW1 childhood (5 to 10 years old)
- PPW2 adolescence
- PPW4 at present
- PCW1 during the first year of life
- PCW2 as a toddler
- CN1 eating too much when parent not around
- CN2 having to diet to maintain a desirable weight
- CN3 becoming over weight
- PE1 should always eat all of the rice in the bowl
- PE2 making sure child eats enough
- PE3 trying to get the child to eat when not hungry
- PE4 child would eat much less without guidance/regulation
- MN1 sweets
- MN2 snack food
- MN3 high-fat foods
- MN4 cordial or soft drink
- RST1A making sure not eat too many sweets
- RST1B making sure not eat too many high-fat foods
- RST1C making sure not eat too many favorite foods
- RST2 keeping some foods out of reach
- RST3A offering sweets as reward for good behavior
- RST3B offering favorite foods for good behaviour
- RST4A child would eat too many junk foods without guidance/regulation
- RST4B child would eat too many favorite foods without guidance/regulation

Note: All factor-item loadings are significantly different from zero.  
\*  $p < .05$  \*\*  $p < .01$

Fig. 1. The seven- and eight-factor model of the modified Child Feeding Questionnaire (Birch et al., 2001) with standardized estimates fitted in a sample of Chinese immigrant mothers (N = 254).

practices are widely termed 'controlling feeding practices' (Birch et al., 2001). The restriction and pressure to eat subscales of the CFQ have been extensively used to investigate the relationships between parental feeding practices and children's eating behaviors, dietary intake, and weight status (Ventura & Birch, 2008).

It is well accepted that parental feeding beliefs and practices are influenced by culture (Sherry, Scanlon, Barden, & Kallio, 2008). A number of limitations have been identified in previous studies that specifically evaluated the factor structure and psychometric properties of the CFQ with culturally, ethnically and socioeconomically diverse populations, such as Hispanic American (Anderson, Hughes, Fisher, & Nicklas, 2005), African American (Anderson et al., 2005; Boles et al., 2010), Australian (Corsini, Danthiir, Kettler, & Wilson, 2008) and Japanese (Geng et al., 2009). The conceptualization and measurement of the restriction factor of the CFQ has been questioned in these studies. Several approaches have aimed to improve the stability of the restriction factor, such as through use of composite items (Birch et al., 2001) or removal of the less reliable items (Anderson et al., 2005; Geng et al., 2009). Yet another approach was taken in an Australian study (Corsini et al., 2008) with preschool children. Based on inspection of the individual items that composed the restriction factor it was argued that these may reflect more than one theoretically discrete construct (i.e. feeding practice). Six of the eight items refer to the restriction of foods or parental concerns about child self-regulation of intake, whereas the remaining two items (RST3A and RST3B<sup>1</sup>, see Fig. 1) refer to the use of food as

rewards for good behavior in children. Thus, Corsini et al. (2008) proposed an eight-factor solution that incorporated a new two-item factor 'food as rewards'. The authors argued that the eight-factor solution improved the stability and conceptual clarity of the restriction factor.

To date, two studies (Cheah & Van Hook, 2012; Huang et al., 2012) have used a subset of factors with Chinese-American parents of children aged 2–12 years, but neither of them assessed the construct validity of the CFQ using confirmatory factor analysis (CFA). Therefore, the first objective of the current study was to evaluate the psychometric properties and factor structure of a modified version of the CFQ with a sample of Chinese mothers of young children in Australia. Both the seven- (Birch et al., 2001) and eight-factor (Corsini et al., 2008) conceptual models of the CFQ were tested and compared in terms of overall model fit and individual item-factor loadings. In line with previous research (Birch et al., 2001; Corsini et al., 2008; Geng et al., 2009), the second objective was to examine the association between the CFQ factors in the 'best-fitting' model and children's weight status.

Methods

Participants

Chinese mothers living in Australia were the target group for this study. Additional eligibility criteria for these mothers were: (i) being born in mainland China, Hong Kong, Macau or Taiwan; (ii) having a child between 1–4 years of age who did not have a health condition that would affect his/her diet and growth, and (iii) having lived

<sup>1</sup> The label of each variable (item) in this study was adapted from those in the original CFQ to facilitate comparison with other studies.

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