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Measurement invariance of the Feeding Practices and Structure Questionnaire-28 among a community of socioeconomically disadvantaged mothers and fathers

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ABSTRACT

Objective: Determine whether feeding practices across mothers and fathers are interpreted and measured with equivalent accuracy (measurement invariance) using the Feeding Practices and Structure Questionnaire-28 (FPSQ-28).
Design: Cross-sectional hard-copy and online survey design; Setting: Socioeconomically disadvantaged community in Queensland, Australia.
Participants: Mothers (n = 279) and fathers (n = 225) of 2- to 5-year old children.
Variables measured: Parental feeding practices were measured using the 7 multi-item factors from the FPSQ-28.
Analysis: Confirmatory factor analysis (CFA) was applied to evaluate the factor structure of the FPSQ-28 among mothers and fathers from a socioeconomically disadvantaged community. Measurement invariance between mothers and fathers was examined using hierarchical multi-group CFAs.
Results: The 7-factor FPSQ-28 model showed good fit and was invariant across parent gender.
Conclusions and implications: The FPSQ-28 subscales appear to be interpreted equivalently, and thus to measure the same constructs, irrespective of the gender of the parents. The questionnaire can be used to measure or compare mothers' and fathers' self-reported feeding practices and examine influence on child health outcomes. In the current sample of mothers and fathers recruited from a socioeconomically disadvantaged community, mothers used more 'covert restriction' than fathers.

1. Introduction

Childhood obesity is a health risk that is likely to persist into adulthood (Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008) with attendant adverse health outcomes and increased health care costs. One third of Australian children living in socioeconomically disadvantaged areas are classified as overweight or obese, compared to one fifth of children living in advantaged areas (Department of Health and Ageing, 2007). In addition to increased risk of overweight and obesity, children from socioeconomically disadvantaged families are at risk of developing poor eating habits (Weatherspoon, Venkatesh, Horodynski, Stommel, & Brophy-Herb, 2013) which track into adulthood (Mikkilä, Räsänen, Raitakari, Pietinen, & Viikari, 2005) and contribute to the well–established associations between social disadvantage and greater chronic disease burden later in life (Pereira, van Veldhoven, Li, & Power, 2016).

Parents play a critical role in shaping a child's early eating environment by using 'feeding practices'. These include both feeding strategies intended to shape or respond to child eating or other behaviours and structuring mealtimes. 'Nonresponsive' feeding practices, such as pressuring, restricting and using food rewards, are postulated to undermine the child's nascent capacity

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to self-regulate intake (Black & Aboud, 2011) and have been associated with poor child weight outcomes (Campbell et al., 2010), food preferences (Vollmer & Baietto, 2017) and dietary intake (Galloway, Fiorito, Francis, & Birch, 2006; Gregory, Paxton, & Brozovic, 2011). However, this relationship is two-way. Recent evidence from bidirectional models indicates children's characteristics, such as weight (Jansen, Tharner, 2014; Jansen, Mallan, , 2014) and eating behaviours (Jansen et al., 2017) influence parental nonresponsive feeding practices. On the other hand, parents establishing structured and predictable mealtimes is thought to facilitate a child's ability to self-regulate food intake (Eneli, Crum, & Tylka, 2008; DiSantis, Hodges, Johnson, & Fisher, 2011). In addition, providing consistent family meals and sitting down at the table is associated with lower child fussy eating and greater enjoyment of food (Finnane et al., 2017). The Feeding Practices and Structure Questionnaire-28 (FPSQ-28) has been developed to capture both feeding practices and mealtime structure (Jansen, Williams, Mallan, Nicholson, & Daniels, 2016) and has been initially validated in a highly educated sample of Australian mothers of children aged 2-years old (Jansen et al., 2014b). The FPSQ-28 has shown good reliability and validity, including longitudinal measurement invariance of highly educated mothers of children between the age of 2 and 5 years (Jansen, Mallan, & Daniels, 2015). Full validation of the FPSQ-28 in a large sample of mothers and fathers and extension into low-income communities is required to understand the extent of applicability. This is the focus of this study.

Evaluating feeding practices within socioeconomically disadvantaged families is critical to inform development of effective interventions that can address health inequities and influence public health policy. Studies have found that indicators of socioeconomic status, such as parent education, are inversely associated with nonresponsive feeding practices (Blissett & Haycraft, 2008; Musher-Eizenman, de Lauzon-Guillain, Holub, Leporc, & Charles, 2009). For instance, in households where economic resources are limited (i.e. food-insecure households), mothers reported more pressure to eat and restriction with infants compared to food-secure mothers (Gross, Mendelsohn, Fierman, Racine, & Messito, 2012). However, parental feeding questionnaires have typically been developed in samples of highly educated or high-income families, and in most studies the majority of participants have predominantly been mothers rather than fathers (Vaughn, Tabak, Bryant, & Ward, 2013). Although some attention has been paid to validating parent feeding questionnaires in a variety of ethnic/cultural groups (Anderson, Hughes, Fisher, & Nicklas, 2005; Corsini, Danthiir, Kettler, & Wilson, 2008; Geng et al., 2009; Liu, Mallan, Mihrshahi, & Daniels, 2014; Wood et al., 2016), to date there is little validation evidence for feeding instruments among mothers and fathers from socioeconomically disadvantaged families (Boles et al., 2010; Kong, Vijayasiri, Fitzgibbon, Schiffer, & Campbell, 2015).

Although most child feeding studies only consider mothers' feeding practices, mothers' and fathers' feeding practices have differential impacts on child health outcomes, such as BMI (Tschann et al., 2015). One previous randomised control trial with overweight/obese Australian fathers (N = 93) of primary school aged children (5- to 12- years old), which addressed health behaviours including eating and physical activity, reported significant changes in both fathers' weight status and children's adiposity (Morgan et al., 2014). Previous studies suggest that fathers are more likely to use nonresponsive feeding practices compared to mothers (Cerniglia, Cimino, & Ballarotto, 2014; Lloyd, Lubans, Plotnikoff, Collins, & Morgan, 2014; Pulley, Galloway, Webb, & Payne, 2014), although other studies have reported no difference (Adamson & Blight, 2014; Blissett, Meyer, & Haycraft, 2006). Differences in parental feeding practices within families have implications for child weight outcomes. A longitudinal study of Mexican-American parents of (N = 182) children aged 8- to 10-years old suggests (Tschann et al., 2015) that fathers' but not mothers' 'positive involvement' with boys' food was associated with higher subsequent height to waist ratio. Parents contribute both uniquely and in combination to the feeding role. How potentially different parent feeding practices interact and impact on child weight status and eating behaviours is unknown.

Comparing differences or synergistic effects of feeding practices between mothers and fathers within a family requires establishing 'measurement invariance' on a psychometric tool across mothers and fathers. Measurement invariance testing examines the degree to which the underlying construct has the same meaning across 'qualitatively distinctive' groups (Widaman et al., 1997). An instrument measuring constructs related to feeding practices and mealtime structure has not been validated for use between mothers and fathers. However, one study by Powell and colleagues (Powell, Frankel, Umemura, & Hazen, 2017) used three nonresponsive feeding constructs ('persuasive feeding', 'reward for behaviour' and 'reward for eating') from the FPSQ-28, which were combined into a latent variable (persuasive-controlling) and shown to be fully invariant across mothers (n = 181) and fathers (n = 84) from a middle class sample in the US. In the same study, the authors reported that fathers were more persuasive-controlling than mothers. However, combining constructs loses information on the individual factors of the FPSQ-28, and the measurement invariance of structure-related feeding practices between mothers and fathers is unknown. Without explicit validation of these feeding questionnaires in disadvantaged mothers and fathers, it is unclear whether feeding constructs are interpreted consistently by both parents within the family. Understanding how parents structure and respond to meal interactions in socioeconomically disadvantaged families is essential to developing meaningful interventions to reduce or prevent childhood obesity in this high risk group.

The purpose of the current study is to determine whether feeding practices measured by the FPSQ-28 across mothers and fathers are interpreted and measured equivalently (i.e. are invariant) in a sample of families from a socioeconomically disadvantaged community using multi-group confirmatory factor analysis. Establishing measurement invariance in this sample allows comparison of mothers' and fathers' feeding practices using the FPSQ-28. Therefore, a secondary aim of the paper was to compare mothers' and fathers' feeding practices.

2. Methods

2.1. Participants and recruitment

The *Mums and Dads (MAD) for Mealtimes* study aimed to recruit mother-father pairs from a socioeconomically disadvantaged community. Integration of 2011 Australian Census and 2012 Australian Early Development Census (AEDC) data show a strong relationship between the socioeconomic status of an area where a child resides and their likelihood of being developmentally vulnerable (Brinkman et al., 2012). The AEDC is a national public data set that measures children's development at the time of commencement of their first year of school (at 5-years old) (AEDC, 2014). To target socioeconomically disadvantaged Australian families, the 2012 data was used to select a geographical area which has a high proportion of children with a developmental vulnerability. The geographical area was selected based on a cut-off of >30% of children (1-in-3) who were classified as developmentally vulnerable. At the time of recruitment, the AEDC data indicated that the Logan City (Queensland) had 33% of children who were developmentally vulnerable, compared to the national average of 22% (AEDC, 2014). Therefore, the Logan community was targeted for