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"That's enough now!": A prospective study of the effects of maternal control on children's snack intake

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Abstract

The aim of this study was to investigate maternal feeding strategies as prospective predictors of young children's snack intake. Participants were 252 mothers of children aged 3 – 11 years old who completed questionnaire measures of parent feeding strategies (Restriction and Covert Control) and reported on their child's healthy and unhealthy snack intake at two time points separated by three years. Longitudinal regression models showed no prediction of healthy snack food intake. However, Time 1 parental restrictive feeding predicted greater unhealthy snack intake at Time 2, while Time 1 covert feeding strategies predicted lower unhealthy snack intake at Time 2. Structural equation modeling showed that these associations were independent of known covariates that influence children's snack intake (child and parent weight, education level and SES). The results provide longitudinal evidence for the negative impact of restrictive parent feeding strategies on children's snack intake and highlight the importance of dissuading parents from using this type of feeding control. Instead, parents should be encouraged to use more covert feeding strategies that are associated with less unhealthy snack intake over the longer term.

Key words: feeding style; children; snack intake; restriction; covert control

Introduction

Childhood obesity has been well established as a public health concern. Obesity in children has been associated with adverse health (Russell-Mayhew et al., 2012) and social outcomes (Harrist et al., 2016). While childhood obesity may be influenced by many factors, one proposed contributing factor is the overconsumption of foods high in fat, salt and sugar, such as most snack foods (Larson & Story, 2013). Recent data show that young children are now eating three meals and three snacks per day (Piernas & Popkin, 2010), with large portion sizes of energy dense snack foods (Piernas & Popkin, 2011). Indeed, snack foods now represent over one third of young children's daily energy intake (ABS, 2017). Although parental influence on children's overall eating behaviours and weight status has been studied extensively (Vaughn, Tabak, Bryant & Ward, 2013; Vollmer, Mobley, 2013), less attention has been given to how parental feeding strategies may influence the snack intake of children (Blaine et al., 2017). Given the growing contribution of snack foods to children's dietary intake (Larson & Story, 2013), this study will focus on understanding the impact over time of two feeding practices that parents may use to manage children's snack consumption.

Parent feeding strategies are specific behaviours that parents employ to manage what, when and how much their child eats (Ventura & Birch, 2008). The vast majority of the existing research on parent feeding strategies has focused on parental restrictive feeding, most commonly measured by the Restriction scale of the Child Feeding Questionnaire (CFQ: Birch et al., 2001). This scale assesses parents' propensity to regulate the type and amount of food eaten by children. For example, a parent may forbid the child to eat sweets or may only allow the child to eat a certain amount of sweets or snacks, or use sweets and snacks as a reward for finishing

portions of other (healthier) food. In cross-sectional studies, Restriction has been associated with a number of negative outcomes including overall calorie consumption (Fisher & Birch, 1999a; Fisher & Birch 1999b, Jansen et al., 2007, Webber et al., 2010a, Corsini et al., 2017), eating in the absence of hunger (Birch & Fisher, 2000), negative self-evaluations in young girls (Fisher & Birch, 2000), poorer diet quality in terms of higher fat intake (Lee, Mitchell, Smiciklas-Wright & Birch, 2001), greater intake of unhealthy snacks (Boots, Tiggemann & Corsini, 2015) and greater child weight in some studies (Joyce & Zimmer-Beck 2009; Musher-Eizenman et al., 2009). Longitudinal studies have shown that parental restriction predicted child weight one year (Rodgers et al., 2013) and two years later (Faith et al., 2004) and eating in the absence of hunger two years (Fisher & Birch, 2002; Rollins et al., 2014; Rodgers et al., 2013) and four years later (Birch et al., 2003). In addition, parental restrictive feeding has been associated with children's food responsiveness and emotional overeating one year (Rodgers, Paxton, Massey, Campbell, Wertheim et al., 2013) and two years later (Steinbekk, Belsky, Wichstrom, 2016), as well as disordered eating and weight gain in adolescence (Balantekin, Birch & Savage, 2017). Reviews of the existing literature have concluded that restriction simultaneously increases children's preference for the restricted foods and promotes overeating when the restricted foods are made more freely available (Loth, 2016; Ventura & Birch, 2008).

It has been suggested that the association between parental restrictive feeding and children's eating is likely bidirectional and influenced by multiple factors, such as parental concern for the child's weight (Bergmeier, Skouteris & Hetherington, 2015) and early child traits such as strong food responsiveness (Gregory, Paxton & Brozovic, 2010; Kral & Hetherington, 2015; Webber, Cooke, Hill & Wardle, 2010b). While twin studies have shown that both genetic and environmental influences may

77 contribute to the development of child eating traits (Carnell, Haworth, Plomin &
78 Wardle, 2008; Llewellyn et al., 2010), it is also acknowledged that without certain
79 environmental conditions, including parent feeding strategies, many genes that
80 potentially influence children's eating traits may not be expressed (Carnell & Wardle,
81 2008). Although bidirectional relationships have been investigated between parental
82 feeding strategies and child eating traits, the relationship between parental feeding and
83 children's naturalistic snack intake has not been examined in this way.
84 In expanding the concept of parental control over feeding, Ogden and Brown
85 (2006) conceptualised a different type of feeding strategy they termed 'Covert
86 Control'. Covert feeding strategies tap the ways in which parents promote the
87 consumption of healthy food by managing the child's environment. For example,
88 parents may simply not have unhealthy foods within the home environment and avoid
89 places that serve primarily unhealthy foods when eating out (Ogden, Reynolds &
90 Smith, 2006). A small number of cross-sectional studies have shown that covert
91 feeding strategies are associated with greater healthy snack intake and less unhealthy
92 snack intake in older children aged 9-13 years (Brown et al., 2008; Ogden et al., 2006;
93 Rodenberg et al., 2011) and in younger children aged 2-7 years (Boots, Tiggemann &
94 Corsini, 2017). To our knowledge, there has only been one longitudinal study of the
95 effects of parental covert control. Jarman et al. (2015) found that British mothers of
96 young children (mean age = 3.4 years) who used more covert control strategies had
97 children with better quality diets concurrently and two years later (although they did
98 not explicitly test whether covert feeding strategies were temporally antecedent to
99 child eating outcomes). In addition, mothers who increased their use of covert control
100 over the two-year period had children whose diet quality also improved over the two

years. Jarmen et al.'s (2015) focus group discussions identified unhealthy snack consumption as the most salient component of diet quality.

In sum, while there is a large body of literature on the influence of parent feeding strategies on children's eating behaviour, traits and weight, less is known about the influence of parent feeding on children's naturalistic snack food consumption, an increasingly important component of children's diet. As has been suggested in other contexts (Kral & Hetherington, 2015), while it is possible that parental feeding strategies determine children's intake of snack foods, the converse causal assumption is equally plausible. That is, children's eating may lead parents to adopt particular feeding strategies in response. A minimum requirement for causality is temporal precedence (Menard, 1991). Only a longitudinal design allows for testing whether a proposed cause (parent feeding strategy) is temporally antecedent to (occurs before) the proposed effect (child eating behaviours).

Thus the aim of the present study was to examine the effect of two different maternal feeding strategies on young children's snack intake using a longitudinal research design. Specifically, maternal use of restrictive and covert feeding strategies and young children's healthy and unhealthy snack consumption were examined at two time points separated by approximately three years. On the basis of previous literature with other eating outcomes, we predicted that restrictive feeding would be associated with children's greater unhealthy snack intake over time. In addition, we predicted that covert feeding strategies would be associated with children eating more healthy and less unhealthy snacks over time.

Method

Participants

Participants were 252 mothers of children (127 boys and 125 girls) recruited through social media, flyers distributed through child care centres, crèche facilities, preschools, advertisements in local papers and parenting magazines in Adelaide, South Australia. The mothers were a subset of a larger sample (n = 611; Boots et al., 2015) who were followed up approximately three years later. Interested participants were directed to a secure web link and completed the questionnaire online. Approval for the study protocol was obtained from the Social and Behavioural Research Ethics Committee at Flinders University, South Australia.

The participants came from diverse socioeconomic backgrounds (SES), ranging from low SES (decile 1) to high SES (decile 10), as designated by the Australia Bureau of Statistics (ABS: 2013), with fuller details of the sample at Time 1 previously reported (Boots et al., 2015). The retention rate at Time 2 was 43%. At Time 2, the mothers were aged 28-50 years old (M = 38.00 years, SD = 4.68). The average age of the child at Time 2 was 6.2 years old (SD = 1.49).

Measures

The mothers completed a questionnaire at Time 1 and again approximately three years later (Time 2). The questionnaire, entitled “Managing Kids Food”, contained measures of parent feeding strategies and children’s snack food intake as outlined below. Demographic information was also obtained.

Parental Restriction

The Restriction subscale of the Child Feeding Questionnaire (CFQ: Birch et al., 2001) contains 8 items addressing parents’ propensity to control child eating by limiting the amount and portion sizes of certain foods, using food as a reward and by monitoring children’s intake of certain foods. Exemplar items are, “I have to be sure that my child does not eat too many high-fat foods” and “If I did not guide or regulate

my child's eating s/he would eat too many junk foods." Responses are made on a 5-point Likert scale (1 = *disagree*, 5 = *agree*) and summed and averaged to produce a score ranging from 1 to 5, with higher scores indicating greater restrictive feeding. Birch et al. (2001) reported the internal reliability of the original Restriction scale was acceptable (α = 0.73). In the present sample, internal reliability of the Restriction scales was slightly lower at Time 1(α = 0.69), and acceptable at Time 2 (α = 0.79).

Covert Control

Covert control was measured by the Covert Control Scale developed by Odgen et al. (2006). This 5-item scale addresses strategies that parents use to control the child's consumption of energy dense food through limiting their exposure to these foods in the child's immediate environment. Items include "How often do you avoid taking your child to places that sell unhealthy food", and "How often do you avoid buying sweets, crisps, biscuits and cakes and bringing them into the home". Higher scores on the covert control measure indicate greater control of the child's environment. Ogden et al. (2006) reported the original measure had adequate internal reliability (α = 0.79). In the present sample, internal reliability at both Time 1 and Time 2 was acceptable (α = 0.72).

Child Snack Food Intake

Children's usual intake of healthy and unhealthy snack foods was measured with an 11-item food frequency questionnaire that was adapted from the Anti-Cancer Council Dietary Questionnaire (Giles & Ireland, 1996). Parents were asked to indicate how frequently their child consumes 11 different snack foods. Based on energy density classifications provided by the World Cancer Research Fund UK (WCRF-UK, 2007), four of these were subsequently categorized as healthy (low energy dense: < 150kcal/100g - fruit, vegetable, yoghurt, cheese) while seven were

considered unhealthy (high energy dense: 225-275kcal/100g - potato chips or other crisps, salty flavoured or cheesy crackers, sweet biscuits, cakes and pastries, chocolate and lollies, sugar sweetened drinks, hot fried snacks). The six response categories ranged from 'none' to 'more than once a day'. Snack intake was converted to equivalent daily frequencies, which were then summed together and were used to represent the number of healthy and unhealthy snacks consumed per day.

Covariates

A number of demographic variables previously found to be related to parent feeding strategies and children's snack intake (Boots et al., 2015) were collected. Mothers reported on their own age and the age and gender of their child. Residential postcode, employment status and educational attainment were also collected. The index of relative socioeconomic disadvantage (IRSD: ABS, 2013) was assigned based on postcode of residence using area-based deciles (1-10) with lower deciles indicating greater socioeconomic disadvantage. Parents were also asked to report on their own weight and their child's weight ("*How would you describe your weight at present?*" and "*How would you describe your child's weight at present?*" respectively). Response options were: very underweight, slightly underweight, normal weight, slightly overweight, very overweight.

Statistical analysis

Statistical analyses were conducted using SPSS v21 (SPSS Inc Chicago). An alpha level of .05 was used for all statistical tests. Correlational analyses were conducted to assess the bivariate cross-sectional and cross-lagged associations between the parental feeding strategies and children's snack intake at both time points.

Across time correlations do not of themselves indicate temporal precedence. Two hierarchical multiple regressions were undertaken to examine whether Time 1 parent feeding strategies temporally preceded children's snack intake three years later. In each regression, Time 1 child snack intake was entered in Step 1, with Time 1 parent feeding strategy (Restriction, Covert Control) entered in Step 2. Time 2 child snack intake was the outcome variable.

Structural equation modelling (AMOS, version 23) was then used to test an integrated model that simultaneously tested the relationships between all the variables at both time points while controlling for covariates **(**child age, child weight category, parent age, parent weight category, parent education level and SES**)**. The adequacy of model fit was assessed by four commonly recommended fit indices: the comparative fit index (CFI), the Tuker-Lewis Index (TLI), the root square error of approximation (RSMEA) and the standardised root mean square residual (SRMR). Good fit is indicated by CFI and TLI values of .95 or higher, RSMEA of .06 or lower and SRMR of .08 or lower (Hu & Bentler, 1999). Acceptable fit is indicated by values of .90 - .94 for CFI and TLI, .7 - .10 for RMSEA and .09 - .10 for SRMR (Marsh & Hau, 1996).

Results

Changes over time

Table 1 displays the means for parent feeding strategies and child snack intake at Time 1 and Time 2. It can be seen that there was no significant change over time in parental restrictive feeding or parental covert control. In regards to snack intake, children's healthy snack intake significantly increased over time, $t(232) = 6.20$, $p < .001$, while there was no significant change in children's unhealthy snack intake. All correlations between respective Time 1 and Time 2 variables were moderate.

Associations between parent feeding and child snack intake

Table 2 displays the correlations between restrictive and covert feeding strategies and children's healthy snack and unhealthy intake. Within Time 1, more frequent use of restrictive feeding was associated with children's greater unhealthy snack intake, while covert feeding strategies were associated with more healthy snack intake. Within Time 2, parental restrictive feeding strategies were again associated with greater unhealthy snack intake, while covert feeding strategies were associated with less unhealthy snack intake by children.

Table 2 also shows cross-lagged (across time) correlations. Time 1 parent feeding strategies were not associated with children's healthy snack intake at Time 2. However, restrictive feeding at Time 1 was positively associated, and covert control was negatively associated, with children's unhealthy snack intake at Time 2.

Longitudinal tests of parent feeding and child snack intake

Table 3 displays the results for Step 2 of the individual regression analyses, predicting Time 2 child snack intake from Time 1 parent feeding strategies. As can be seen, neither restrictive feeding nor convert control significantly predicted increased healthy snack intake at Time 2. However, Time 1 parental restrictive feeding ($\beta = .18$, $p = .004$) predicted increased unhealthy snack intake in children at Time 2, R^2_{change} (1,232) = .03, $p = .004$, and Time 1 parental covert feeding ($\beta = -.31$, $p = .000$) predicted decreased unhealthy snack intake at Time 2, R^2_{change} (1, 232) = .09, $p < .001$.

To examine the reverse relationships, that is whether children's eating predicts parental feeding strategies, two further hierarchical regressions were conducted. Time 1 parent feeding strategy (Restriction, Covert Control) was entered in Step 1. Time 1 child snack intake was entered in Step 2, with Time 2 parent feeding strategy

(Restriction, Covert Control) as the outcome variable. Neither healthy nor unhealthy child snack intake at Time 1 significantly predicted the subsequent use of restrictive (healthy: R^2_{change} (1, 232) = .01, p = .178; unhealthy: R^2_{change} (1, 232) = .00, p = .879) or covert feeding strategies (healthy: R^2_{change} (1, 232) = .03, p = .443; unhealthy: R^2_{change} (1, 232) = .00, p = .819).

Integrated Model

In order to integrate all of the elements investigated, a structural equation model with reciprocal pathways across time was constructed. In addition, the covariates of child and parent weight category, child and parent age, parental education level and SES were controlled. The final model produced an acceptable-to-good fit: χ^2 [231] = 35.40, p <.05; TLI = .906 (acceptable); CFI = .954 (good); RMSEA =.059 (good); SRMR =.05 (good). As can be seen in Table 4, which presents the standardised pathway coefficients for all pathways in the structural equation model, parent-feeding strategies showed no relationship over time with children's healthy snack intake, but did show associations with unhealthy snack intake. In addition, in no case did child snack intake significantly predict parent-feeding strategies.

The significant pathways are represented graphically in Figure 1. For clarity the pathways to healthy and unhealthy snack intake have been presented separately. Figure 1(a) illustrates that parent feeding strategies did not significantly predict children's healthy snack intake. In contrast, Figure 1(b) shows that both restrictive and covert parental feeding strategies independently predicted children's subsequent intake of unhealthy snacks.

Discussion

To our knowledge the present study is the first to examine prospectively the influence of both restrictive and covert parental feeding strategies on young children's snack intake. Further, our sample was socioeconomically diverse. The major findings from the study are clear. As predicted, we found that greater initial use of restrictive feeding by parents predicted increased unhealthy snack intake in children three years later. In addition, we found that greater initial parental covert control predicted decreased unhealthy snack intake three years later. There was no evidence for reverse causation, with no significant prediction of parent feeding strategies from child snack intake.

Our results showed that while parental feeding strategies were relatively stable over time, there was a differential influence of feeding strategies on child snack consumption. Here, consistent with our postulated model we found that restrictive parental feeding strategies at approximately age 3 were associated with relatively greater unhealthy snack intake at approximately age 6 years. The relationship was evident even after adjusting for the relationships between all variables and accounting for covariates known to affect child eating outcomes, such as child weight, parent weight, parent education and socioeconomic status. Our longitudinal finding adds to the results of previous cross-sectional (Fisher & Birch, 1999a; Fisher & Birch, 1999b; Gregory et al., 2010; Webber et al., 2010a), longitudinal (Bergmeier et al., 2015; Rodgers et al., 2013) and laboratory studies (Fisher & Birch, 2002; Jansen et al., 2007; Rollins et al., 2014) that show that parental restrictive feeding has a detrimental effect on a range of children's eating outcomes and extends these findings to children's naturalistic snack intake. Here we show that while well-meaning parents may use restrictive feeding to limit the consumption of unhealthy snacks in their youngsters, over time children actually consume relatively more of these very foods.

Our findings are consistent with the suggestion that such parental control over feeding actively inhibits children's learning to self-regulate their own eating, while simultaneously increasing the desirability of and preference for the restricted foods (Rollins et al., 2016). As a consequence, we might expect the effects to become larger as children get older and become more responsible for their own dietary intake.

An alternative strategy to restrictive feeding is provided by covert control. When parents manage the child's environment by providing primarily healthy foods, they do not need to make any direct comment or fuss around the child's eating. In contrast to more overt forms of control such as restrictive feeding, this approach may allow room for the child to develop the necessary self-regulatory skills in order to appropriately deal with exposure to unhealthy snack foods, resulting in the child consuming relatively less of these foods. In addition, the limited availability of energy dense snack foods in the home likely has a direct impact on children's consumption of these foods. Here we have extended the previous literature on short term beneficial outcomes of covert control (Boots et al., 2015; Ogden et al., 2006; Rodenberg et al., 2011) to show that these benefits extend over the longer term. Our finding is consistent with the one previous longitudinal study that found greater covert control to be associated with children's improved diet quality over a two-year period (Jarmen et al., 2015). Our result shows this association for specifically snack food consumption. Together, the studies provide convincing evidence for the longer-term benefits of parents using covert control strategies to shape their young child's eating through shaping their environment.

One strength of the present study is that our research design allowed parental feeding strategies to be examined together in a single model that showed that they offered unique prediction of children's snack intake. Importantly, we were able to

explicitly rule out the reverse temporal direction. Our findings showed that children's snack intake at this age did not predict parental feeding. Thus the observed link between parent feeding strategies and child eating at this time comes about because the strategies parents use affect children's eating, and not because children's unhealthy snack consumption causes alarm for parents, who react by applying restrictions. In our study parents are not responding to children's eating behaviours, but rather are shaping them. This disentangling of the temporality of the relationship between parent feeding strategies and child eating would not have been possible without a longitudinal research design. It is important to note, however, that longitudinal studies are always limited to the portion of the life span examined, and thus relationships may not hold at other time points. For example, it is possible that maternal feeding strategies prior to Time 1 (age 3) are shaped by children's eating behaviours.

The findings from the present study have some important practical implications. In an environment saturated with unhealthy snack food cues and varied options, a challenge for conscientious parents of young children is to establish healthy eating patterns in their child. The findings presented here can inform advice given to parents about the most effective feeding strategies to use for managing their young child's snack intake. While intuitively it may make sense for parents to tell their child not to eat certain foods and when to stop, our findings show that this type of (restrictive) parenting around food is counterproductive in the longer term. Thus, this is a strategy that parents should be dissuaded from using. Fortunately, the present study offers an alternative strategy in the form of covert control, which is about limiting children's unhealthy snack consumption by managing the child's immediate environment. The present study indicates that covert feeding is something that parents

can confidently engage in, knowing that this strategy has longer term benefits for children's eating. One difficulty that needs to be acknowledged is that the use of covert control techniques may require a level of planning and preparation on the part of parents. Hence existing parenting programs could usefully include education about feeding strategies for promoting healthy eating in children, including teaching parents appropriate responses to specific (and often difficult) snack situations that they may face on an everyday basis (Boots et al., 2016). This type of parental feeding strategy may constitute a particular form of proactive parenting, which has been shown to facilitate child learning in other domains (Chang et al., 2015).

As with all research, the current study contains some limitations that need to be acknowledged. First, the participants were all mothers, and not fathers or other salient care givers, who volunteered to participate and as such may have had some particular interest in healthy child diet, resulting in a degree of self-selection bias. In addition, we did not gather data from other settings where children may spend time, such as with grandparents, or early childhood educators. Second, participation was via a parental self-report questionnaire, which is open to some degree of social desirability bias. Observational methods would provide a more accurate assessment of parent feeding practices, as some previous research has shown that maternal reports may not always reflect the practices actually used (Bergmeier et al., 2015). Relatedly, because the questionnaire was completed online, participant and child weight could not be objectively measured. Previous research has shown that a substantial proportion of parents perceive their overweight children as normal weight (Robinson & Sutin, 2016; Lundahl, Kidwell & Nelson, 2014). Therefore, future studies should investigate measured child BMI, as well as gaining more objective measures of children's snack consumption. Third, we used only two well established measures of

parental feeding. Future research might include a greater range of parental feeding measures, for example, the Comprehensive Feeding Practices Questionnaire (CFPQ: Musher-Eizenman & Holub, 2007), which differentiates between restriction for weight control and restriction for health. In our study, we were able to predict unhealthy but not healthy snack intake. It is possible that other feeding strategies might offer better prediction of healthy snack consumption. Finally, our study focused on children's snack intake as the outcome, and did not examine any potential linking mechanisms such as child eating traits or appetite.

Despite the above limitations, the current study has contributed to our understanding of the role of parental restrictive feeding and covert control strategies in children's snack food intake over time. The findings clearly show that the strategies parents use to manage their young children's eating do matter over the longer term.

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Table 1. Means (*SDs*), *t*, and correlations for parental feeding strategies and child snack intake at Time 1 and Time 2

	Time 1	Time 2	*t*	Correlation
Parent Feeding Strategies				
Restriction	3.40 (.68)	3.34 (.80)	1.36	.53**
Covert Control	3.30 (.67)	3.29 (.66)	0.24	.46**
Child Snack Intake				
Healthy	4.70 (1.48)	5.25 (1.15)	6.20**	.42*
Unhealthy	1.36 (.93)	1.01 (.73)	1.11	.48*

* $p < .05$ ** $p < .001$

Table 2. Cross-sectional and cross-lagged correlations between parent feeding strategies and child snack intake

		Time 1		Time 2	
		Healthy	Unhealthy	Healthy	Unhealthy
Time 1					
	Restriction	-.12	.12*	-.01	.19**
	Covert Control	.14*	-.09	.09	-.26**
Time 2					
	Restriction	.01	-.05	-.04	.17**
	Covert Control	.15*	-.02	.09	-.35**

* p <.05 ** p <.001

Table 3. Regression results predicting Time 2 child snack intake from Time 1 parent feeding strategies

Variable	B	SE	β	ΔR^2	ΔF
Healthy Snack Intake T2					
Restriction T1	.05	.10	.03	.00	.20
Covert Control T1	-.02	.15	-.01	.00	.01
Unhealthy Snack Intake T2					
Restriction T1	.19	.07	.18	.04	8.34*
Covert Control T1	-.34	.10	-.31	.09	12.45**

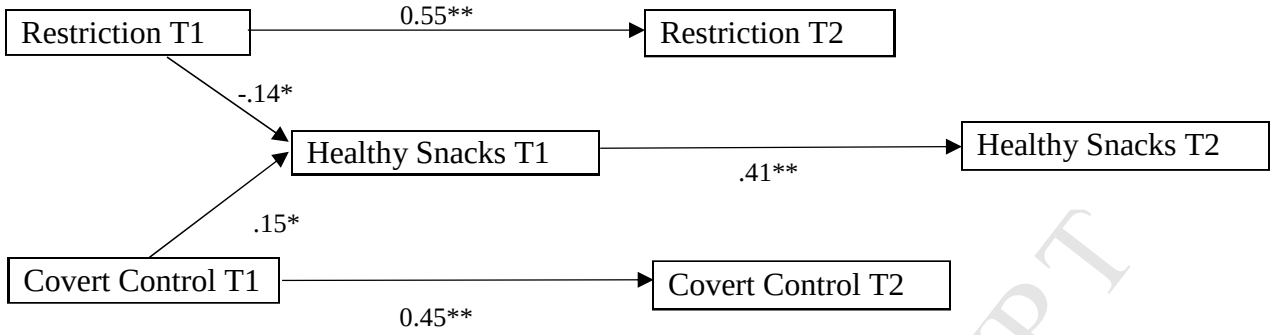
* p <.05 ** p <.001

Table 4. Standardised path coefficients (β) for all pathways in the structural equation model.

	β	*p* value
Within Time Pathways		
T1 Restriction → T1 Healthy	-.14	.030
T1 Restriction → T1 Unhealthy	.13	.038
T1 Covert Control → T1 Healthy	.15	.016
T1 Covert Control → T1 Unhealthy	-.11	.094
T2 Restriction → T2 Healthy	-.09	.204
T2 Restriction → T2 Unhealthy	.16	.014
T2 Covert Control → T2 Healthy	.04	.558
T2 Covert Control → T2 Unhealthy	-.33	.000
Between Time Pathways		
T1 Restriction → T2 Restriction	.55	.000
T1 Covert Control → T2 Covert Control	.45	.000
T1 Healthy → T2 Healthy	.41	.000
T1 Unhealthy → T2 Unhealthy	.07	.216
T1 Parent Feeding to T2 Child Snack Intake Pathways		
T1 Restriction → T2 Healthy	.08	.296
T1 Restriction → T2 Unhealthy	.14	.030
T1 Covert Control → T2 Healthy	.01	.826
T1 Covert Control → T2 Unhealthy	-.12	.041
T1 Child Snack Intake to T2 Parent Feeding Pathways		
T1 Healthy → T2 Restriction	.05	.316
T1 Healthy → T2 Covert Control	.10	.081
T1 Unhealthy → T2 Restriction	-.10	.069
T1 Unhealthy → T2 Covert Control	.03	.568

Note: T1 = Time 1, T2 = Time 2

(a)



(b)

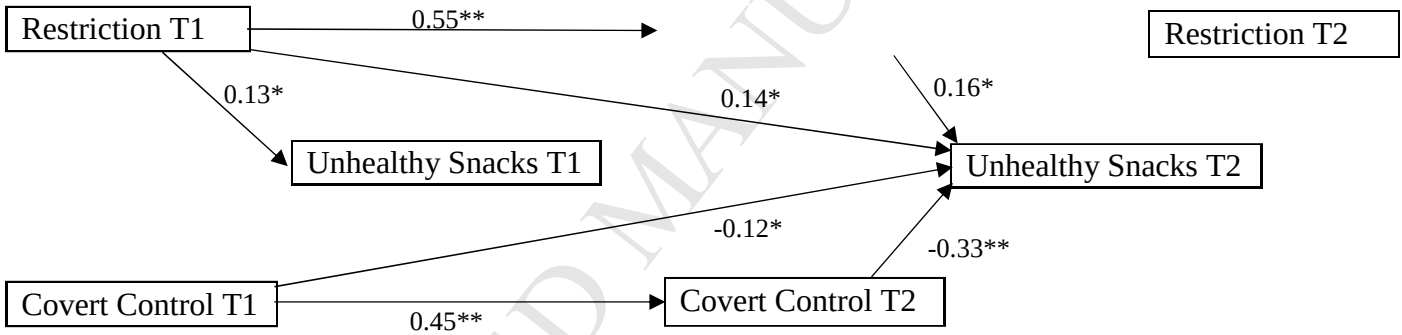


Fig. 1. Significant prospective paths (β) predicting child snack intake, adjusted for child age, child weight category, parent age, parent weight category, parent education and SES for (a) healthy snack intake, and (b) unhealthy snack intake.
Note: * p <.05, ** p <.001