

Predicting Use of Ineffective Responsive, Structure and Control Vegetable Parenting Practices With the Model of Goal Directed Behavior

Tom Baranowski¹, Alicia Beltran¹, Tzu-An Chen¹, Debbie Thompson¹, Teresia O'Connor¹, Sheryl Hughes¹,
Cassandra Diep¹ & Janice C. Baranowski¹

¹ USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston TX, USA

Correspondence: Tom Baranowski, USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston TX, USA. E-mail: tbaranow@bcm.edu

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Abstract

This study reports the modeling of three categories of ineffective vegetable parenting practices (IVPP) separately (responsive, structure, and control vegetable parenting practices). An internet survey was employed for a cross sectional assessment of parenting practices and cognitive-emotional variables. Parents (n = 307) of preschool children (3-5 years old) were recruited through announcements and postings. Models were analyzed with block regression and backward deletion procedures using IVPP scales as the dependent variables. The independent variables included validated scales from a Model of Goal Directed Vegetable Parenting Practices (MGDVPP), including: intention, habit, perceived barriers, desire, competence, autonomy, relatedness, attitudes, norms, perceived behavioral control, and anticipated emotions. The available scales accounted for 26.5%, 16.7% and 44.6% of the variance in the IVPP responsive, structure and control subscales, respectively. Different sets of diverse variables predicted the three IVPP constructs. Intentions, Habits and Perceived Behavioral Control variables were strong predictors for each of the IVPP constructs, but the subscales were specific to each IVPP construct. Parent emotional responses, an infrequently investigated variable, was an important predictor of ineffective responsive vegetable parenting practices and ineffective structure vegetable parenting practices, but not ineffective control vegetable parenting practices. An Attitude subscale and a Norms subscale predicted ineffective responsive vegetable parenting practices alone. This was the first report of psychometrically tested scales to predict use of IVPP subscales. Further research is needed to verify these findings in larger longitudinal cohorts. Interventions to increase child vegetable intake may have to reduce IVPP.

Keywords: ineffective vegetable parenting practices, model of goal directed behavior, vegetable, responsive parenting practices, structure parenting practices, control parenting practices

1. Introduction

High vegetable intake appears to lower the risks of heart disease and stroke, probably several cancers(Boeing et al., 2012), and obesity in the adult years (Ledoux, Hingle, & Baranowski, 2011). It appears, however, that the preference for (Birch, 1998) and habit of vegetable intake are established as early as the preschool years (Kudlova & Schneidrova, 2012).

Research suggests parents are important influences on child dietary intake especially in the preschool years (O'Connor et al., 2010). Three categories of food related parenting practices (i.e. parent behaviors intended to influence child food intake) have been broadly conceptualized: structure, demandingness (control), and warmth (responsiveness), and as effective or ineffective practices across those categories (Hughes, O'Connor, & Power, 2008). Effective and ineffective practices loaded independently on separate structures; a three dimensional second level (structure, control and responsiveness) with single dimension first level structure were best fit for

each set of items (Baranowski, et al., 2013). This implies that understanding the influences on effective vegetable parenting practices (EVPP) does not inform the influences on ineffective vegetable parenting practices (IVPP); and knowledge of influences on composite IVPP may not inform influences on its subscales. Parenting change programs likely need to discourage use of IVPP, which may require separate intervention components to discourage use of each IVPP subscale.

Effective interventions are based on understanding influences on a targeted behavior (Baranowski, 2011). Diverse, mostly demographic, variables have been related to food parenting practices (McPhie, Skouteris, Daniels, & Jansen, 2012). Interventions have more commonly been based on cognitive-psychosocial models of behavior (Baranowski, 2011). The Model of Goal Directed Vegetable Parenting Practices (MGDVPP) (Figure 1) obtained high levels of predictiveness of a composite indicator of EVPP ($R^2 = 48.6\%$) (Diep et al., 2013) and of IVPP ($R^2 = 40.5\%$) (Baranowski et al., 2013b). The influences on EVPP were strongly related to habits, while the influences on IVPP were significantly positively associated with habit of controlling vegetable practices, and desire or intrinsic motivation; and significantly negatively correlated with perceived behavioral control of negative parenting practices, the habit of active child involvement in vegetable selection, anticipated negative emotional response to negative child behavior, parent perceived autonomy, attitude about negative effects of vegetables, and descriptive norms. Since the IVPP composite scale has three subscales (Baranowski et al., 2013), it is not clear whether the same set of MGDVPP variables predict each of the subscales, or differences exist across subscales. Differences in predictors might indicate that interventions need to be specific to the type of IVPP targeted. This manuscript reports the modeling of the three IVPP subscales (responsive, structure, control) using validated scales from a MGDVPP (Baranowski et al., 2013a).

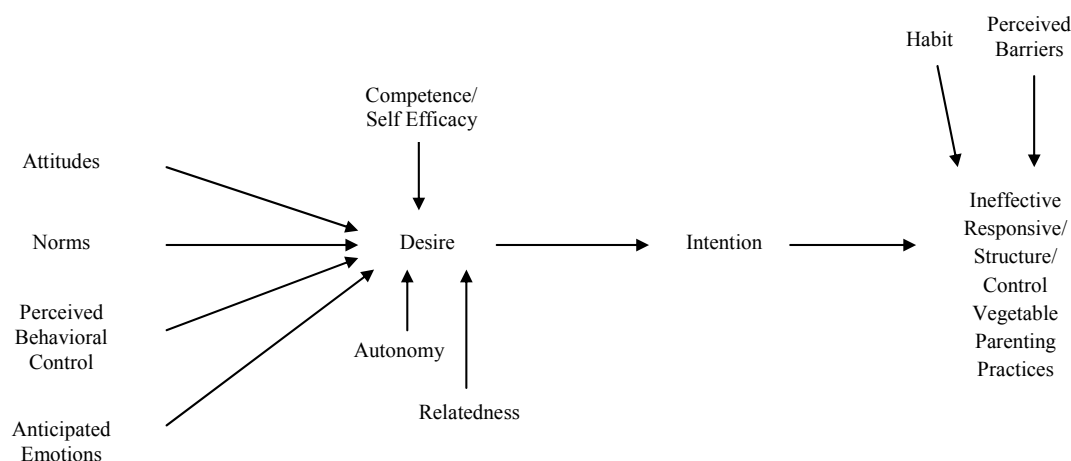


Figure 1. A model of goal directed vegetable parenting practices

2. Methods

2.1 Sample Recruitment

An internet survey was announced in a USDA/ARS Children's Nutrition Research Center (CNRC) newsletter distributed to 25,000 recipients; fliers were posted on participant volunteer billboards around the Texas Medical Center, public libraries and YMCA's in Houston; personal emails were sent to age appropriate members in the CNRC list of research volunteers; and the study was listed on the Baylor College of Medicine volunteer website.

2.2 Measures

An internet survey obtaining parent responses to the IVPP and MGDVPP items was generated using Survey Monkey (Survey Monkey, 2012). Predictor variable items were generated from intensive qualitative interviews using MGDVPP as a guide and verified with cognitive interviews with diverse parents of preschoolers (Hingle et al., 2012). The names, possible ranges, Cronbach's alphas, number of items, means and standard deviations for each scale and subscale ($n = 307$) appear in Table 1.

Table 1. Possible ranges, cronbach's alphas, number of items, means and standard deviations for all variables in the models predicting component ivpp using mgdvpp variables

Scales	Subscales	Possible Range	Cronbach's alpha	# of Items	Mean	SD
Vegetable Parenting Practices	Ineffective Responsiveness	5-12	0.55	5	10.64	1.30
	Ineffective Structure	5-12	0.50	5	9.16	1.48
	Ineffective Control	7-18	0.63	4	14.63	2.07
Intentions	Authoritative Parenting Intentions	11-18	0.83	6	17.50	1.31
	Active Child Involvement Intentions	6-18	0.84	6	16.05	2.41
	Controlling Parenting Intentions	5-15	0.71	5	9.54	2.59
	Permissive Parenting Intentions	2-6	0.61	2	3.66	1.28
Desire	Intrinsic Motivation	4-12	0.78	4	9.01	2.27
Perceived Barriers	Child Doesn't Like Vegetables	8-24	0.88	8	14.69	4.88
	Respondent Doesn't Like Vegetables	9-26	0.85	9	11.14	3.30
	Cost of Vegetables	5-15	0.67	5	7.53	2.34
Autonomy	Choice	4-9	0.31	3	7.92	1.06
Relatedness	Personal Values	4-12	0.81	4	7.72	2.16
	Child Wellness	3-9	0.61	3	8.26	1.15
Competence/ Self Efficacy	Advanced Competence/Self Efficacy	8-24	0.85	8	19.27	3.87
	Preliminary Competence/Self Efficacy	19-30	0.76	10	27.99	2.50
Habit	Habit of Active Child Involvement in Vegetable Selection	6-18	0.83	6	10.98	3.04
	Habit of Controlling Vegetable Practices	5-15	0.68	5	11.80	2.13
	Habit of Positive Vegetable Environment	3-8	0.67	3	3.59	0.95
	Habit of Positive Vegetable Communications	5-13	0.60	5	6.92	1.74
Anticipated Emotions	Positive Parent Emotional Response to Child Vegetable Refusal	8-23	0.92	8	9.69	2.84
	Negative Parent Emotional Response to Child Vegetable Acceptance	4-11	0.83	4	4.82	1.50
	Negative Parent Emotional Response to Child Vegetable Refusal	8-24	0.79	8	17.90	3.87
	Positive Parent Emotional Response to Child Vegetable Acceptance	4-12	0.66	4	11.38	1.17
Perceived Behavioral Control	Control of Positive Influences on Vegetable Consumption	17-39	0.85	13	34.46	4.37
	Control of Negative Influences on Vegetable Consumption	11-32	0.82	10	16.93	4.29
	Control of Negative Parenting Practices	4-12	0.54	3	7.55	1.80
Attitudes	Health Benefits of Vegetables	9-18	0.72	6	16.14	2.03
	Negative Effects of Vegetables	6-15	0.66	6	7.42	1.73
	Benefits of Vegetables other than Health	7-12	0.66	4	11.58	0.94
Norms	Descriptive Norms	2-6	0.13	3	3.86	0.83
	Normative Expectations	1-18	0.71	3	11.86	5.17

Seventeen of 32 Cronbach's alphas were > 0.7 . Scales with lower alphas tended to have few items (e.g. 2-5), but had acceptable item total correlations. Tests of construct validity indicated most scales were bivariately correlated with composite scales of either EVPP or IVPP (Baranowski et al., 2013a). Single dimensions did not acceptably fit the items for most scales (Baranowski et al., 2013a). IVPP (14 items) was submitted to

confirmatory factor analyses and shown to have acceptable model fit with three second order and one first order factors (Baranowski et al., 2013b). The three second order factors included ineffective responsive, structure, and control vegetable parenting practices (IVPP-Responsive, IVPP-Structure and IVPP-Control, respectively).

2.3 Analyses

Models were analyzed using block regression procedures with each of the three IVPP scales as the dependent variables, separately. Block regression modeling started with demographic characteristics, then the four intention scales, one desire/intrinsic motivation scale, three barriers scales, one autonomy scale, two relatedness and two competence/self efficacy scales, four habit scales, four anticipated emotion scales, three perceived behavioral control scales, three attitude scales, and two subjective norm scales in separate blocks. Backward deletion was employed at the end of each block entry for any subscales not related to the outcome of at least $p < 0.10$. Demographic variables were retained in all models, but in light of testing three models with the same variables, any other variables not related at $p < 0.0169$ (reflecting a Bonferroni correction) in the final model were deleted. Analyses were conducted using SAS 9.3 (SAS Institute Inc., 2011).

3. Results

Participants ($n = 406$) provided informed consent, entered our website and initiated our questionnaire. Since the demographic questions were at the end of the survey, we did not have the necessary data to compare the 83 participants who provided incomplete, with the 307 who provided complete, data. Almost 90% of respondents with complete data were female, but more of the children were male (53.1%) (Table 2).

Table 2. Sample demographic characteristics

	n	%
Total	307	100.0
Gender of Parent		
Male	33	10.7
Female	274	89.3
Gender of Child		
Male	163	53.1
Female	144	46.9
Race/Ethnicity of Parent		
Black/African American	60	19.5
White	114	37.1
Hispanic	31	10.1
Asian	43	14.0
Other	59	19.2
Household Highest Educational Attainment		
HS grad or less	30	9.7
Technical school	11	3.6
Some college	67	21.8
College graduate	96	31.3
Postgrad study	102	33.2
Missing	1	0.3
Annual Household Income (2009)		
< \$10K	11	3.6
\$10K - \$19K	16	5.2
\$20K - \$39K	56	18.2
\$40K - \$59K	58	18.9
≥ \$60K	166	54.1

Most respondents were white (37.1%), with representation from all major racial/ethnic groups in Houston (19.5% Black/African American, 10.1% Hispanic, 14.0% Asian, and 19.2% Other). Over half of the sample (64.5%) had at least a college degree or more. Over half the sample (54.1%) had an annual household income of

\$60,000 or higher.

In the final model, college graduates (standardized $\beta = 0.153$, $p = 0.013$) were significantly more likely than post graduates, and lower income (\$10-\$19,999/yr) parents significantly less likely than those making \$60,000+ (standardized $\beta = -0.156$, $p = 0.004$) to use IVPP-Responsive. In order of relationship strength, Attitude of Negative Effects of Vegetable (standardized $\beta = -0.244$, $p < 0.0001$), Perceived Behavioral Control of Negative Influences on Vegetable Consumption (standardized $\beta = -0.211$, $p < 0.001$), Negative Parent Emotional Response to Child Vegetable Refusal (standardized $\beta = -0.175$, $p = 0.001$), Habit of Positive Vegetable Communications (standardized $\beta = -0.143$, $p = 0.010$), and Normative Expectations (standardized $\beta = -0.141$, $p = 0.010$) were all negatively related to IVPP-Responsive. This model accounted for 25.5% of the variance in IVPP-Responsive (See Table 3).

Table 3. Predictive models of ineffective vegetable parenting practices subscales (i.e. responsiveness, structure and control) using subscales from the model of goal directed vegetable parenting practices

	Ineffective Responsiveness		Ineffective Structure		Ineffective Control	
	Parameter Estimates		Parameter Estimates		Parameter Estimates	
	Standardized Estimate	Standard Error	Standardized Estimate	Standard Error	Standardized Estimate	Standard Error
Child Age	0.055	0.082	-0.043	0.098	0.052	0.117
Child Gender	0.014	0.135	-0.037	0.160	0.016	0.189
Parent Gender	-0.042	0.212	0.015	0.254	-0.009	0.300
Education						
6th grade or less	-0.013	1.126	-0.058	1.358	0.009	1.614
Attended some high school	-0.030	1.157	-0.002	1.385	0.039	1.637
High school graduate or GED	0.083	0.274	0.016	0.321	-0.007	0.381
Technical school	-0.034	0.371	-0.153**	0.450	-0.066	0.524
Some college	0.105	0.197	-0.055	0.241	-0.113	0.280
College graduate	0.153*	0.168	-0.046	0.204	-0.074	0.241
Reference group: Postgraduate	--	--	--	--	--	--
Family Income						
< \$10K	0.022	0.367	0.000	0.434	0.033	0.506
\$10K - \$19K	-0.156**	0.309	0.102	0.376	0.041	0.447
\$20K - \$39K	-0.005	0.199	-0.127	0.244	0.068	0.282
\$40K - \$59K	-0.034	0.179	0.008	0.215	0.001	0.254
Reference group: $\geq$ \$60K	--	--	--	--	--	--
Ethnicity						
Black/African-American	0.130	0.197	-0.006	0.238	-0.001	0.283
Hispanic/Latino	0.079	0.242	-0.065	0.289	-0.021	0.345
Other	-0.067	0.165	-0.123	0.198	0.036	0.248
Reference group: White	--	--	--	--	--	--
Negative Effects of Vegetables(Attitude)	-0.244***	0.040	--	--	--	--
Perceived Behavioral Control of Negative Influences on Vegetable Consumption	-0.211***	0.016	--	--	--	--
Negative Parent Emotional Response to Child Vegetable Refusal	-0.175**	0.018	--	--	--	--
Habit of Positive Vegetable Communications	-0.143*	0.041	--	--	--	--
Normative Expectations	-0.141*	0.013	--	--	--	--

Perceived Behavioral Control of Negative Influences on Vegetable Consumption	--	--	-0.197***	0.020	--	--
Positive Parent Emotional Response to Child Vegetable Acceptance	--	--	-0.184**	0.070	--	--
Habit of Active Child Involvement in Vegetable Selection	--	--	-0.182**	0.028	--	--
Permissive Parenting Intentions	--	--	-0.145*	0.066	--	--
Habit of Controlling Vegetable Practices	--	--	--	--	0.541***	0.056
Controlling Parenting Intentions	--	--	--	--	-0.189**	0.050
Adj R-Sq	0.255		0.167		0.418	

Legend: * $p < 0.0169$. ** $p < 0.01$. *** $p < 0.001$.

Parents with Technical School as their highest level of education were significantly less likely than post graduates (standardized $\beta = -0.153$, $p = 0.009$) to use IVPP-Structure. Variables significantly negatively related to IVPP-Structure in order of relationship strength included Perceived Behavioral Control of Negative Influences on Vegetable Consumption (standardized $\beta = -0.197$, $p < 0.001$), Positive Parent Emotional Response to Child Vegetable Acceptance (standardized $\beta = -0.184$, $p < 0.01$), Habit of Active Child Involvement in Vegetable Selection (standardized $\beta = -0.182$, $p = 0.002$), and Permissive Parenting Intention (standardized $\beta = -0.145$, $p = 0.014$). This model accounted for 16.7% of the variance in IVPP-Structure.

None of the demographic characteristics were significantly related to IVPP-Control. The variable significantly positively related to IVPP-Control was Habit of Controlling VPP (standardized $\beta = 0.541$, $p < 0.0001$). The variable significantly negatively related to IVPP-Control was Controlling Parenting Intentions (standardized $\beta = -0.189$, $p = 0.003$). The last model accounted for 41.8% of the variance in use of IVPP-Control.

4. Discussion

This was the first report of psychometrically tested scales to predict use of specific IVPP subscales. The available scales accounted for 25.5%, 16.7% and 41.8% of the variance in the responsive, structure and controlling IVPP, respectively, suggesting the models tapped constructs important in IVPP use. Of particular note, with minor exceptions the predictors were largely specific to the type of IVPP, and were not identical with a model predicting a composite IVPP scale (Baranowski et al., 2013b). Thus, understanding the influences on one IVPP subscale would not enhance understanding of the others.

IVPP-Responsive included items such as “I give my child something to eat or drink if they are bored” “I give my child something to eat or drink if they are upset;” and “I get too busy to notice when my child talks about food.” A diverse set of variables predicted IVPP-Responsive. College graduates were more likely and those with incomes from \$10,000-\$19,999 were less likely to use IVPP-Responsive, suggesting an SES gradient, similar to another study (Saxton, Carnell, van Jaarsveld, & Wardle, 2009). The psychosocial variables were all negatively related to IVPP-Responsive, suggesting use of IVPP-Responsive was fairly high with each factor decreasing the generally high use. The mean value of 10.6 out of a possible 12 (Table 1) supports the generally high level of IVPP-Responsive. Parents who believed in more negative outcomes from eating vegetables (an attitude) were least likely to engage in IVPP-Responsive, which may reflect that they did not want their child to eat vegetables and used food (not vegetables) to regulate their child’s emotions, or ignored their child’s food related issues. Parents who believed it was easy (perceived behavioral control) to use negative influences were also less likely to use IVPP-Responsive, suggesting that these parents were more likely to use the negative than the responsive influences. Parents who negatively emotionally responded to their child refusing vegetables, were less likely to use IVPP-Responsive, perhaps suggesting they used fewer parenting practices in general. Parents with a habit (i.e. an automatically performed behavior) of positively communicating about vegetables to their child, were less likely to use IVPP-Responsive, suggesting parents with good communication habits were less likely to use IVPP-Responsive. Finally, parents reporting higher expectations of significant others (and wanting to please them) to have their child eat vegetables reported lower use of IVPP-Responsive, suggesting the significant others did not encourage use of these particular IVPP-Responsive. Accounting for 26.5% of the variance in

IVPP-Responsive (a behavior) is generally considered respectable for this type of research. The habit of positively communicating about vegetables was strongly positively related to effective responsive vegetable parenting practices (Diep et al., 2013) suggesting that positive (effective) communicators used effective and avoided ineffective vegetable parenting practices. Parents should be trained to use positive parenting communication.

IVPP-Structure included items such as “I let my child watch TV at meals” “I allow my child to drink sweet drinks” “I keep a lot of snack foods in our house;” and “I let my child wander around during a meal.” A completely different set of variables predicted IVPP-Structure than IVPP-Responsive, but they were also all negatively related to the parenting subscale. A mean of 9.16 out of a possible 12 also suggests common use of IVPP-Structure, but not as high as IVPP-Responsive. Compared with parents with a post graduate degree, parents with highest education of technical school were least likely to use IVPP-Structure, which may reflect these lower educated families especially understood the ineffectiveness of these practices. The pattern of significant psychosocial predictors, here, also suggested that this sample of generally well educated parents appreciated that these practices were likely to be ineffective. Parents who perceived it easy to use (perceived behavioral control) negative influences were less likely to use IVPP-Structure, suggesting either they did not see structural practices easy to use or they used the negative influences, and didn’t need to use the structured influences. Parents who responded positively emotionally to their child eating a vegetable were also less likely to use IVPP-Structure, as were parents who had a habit of actively involving their child in vegetable selection. Parents who intended to treat their child permissively were less likely to employ IVPP-Structure, suggesting they did not see IVPP-Structure as being permissive. Accounting for only 16.7% of the variance in IVPP-Structure is a limitation of this model, suggesting either substantial random error in the independent or dependent variables (making it difficult to detect any relationships), or important other predictor variables have yet to be identified. None of these variables predictive of IVPP-Structure were included in the most predictive model of the IVPP composite scale (Baranowski et al., 2013b), suggesting knowing the influences on the composite scale or on EVPP-Structure would not inform the influences on the ineffective structure subscale.

IVPP-Control included items such as “I promise my child something other than food if they finish their vegetables;” “I keep my child from going to play if they don’t eat their vegetables;” and “I reward my child with sweets if they eat their vegetables.” None of the variables predictive of IVPP-Control overlapped with predictors of the other IVPP subscales, and no demographic characteristic was significantly associated with IVPP-Control. Habit of Controlling Vegetable Practices was significantly positively related to IVPP-Control, suggesting that parents performed these practices automatically. Controlling Parenting Intentions was negatively related to IVPP-Control, suggesting that parents intended to use less IVPP-Control in the future. Accounting for 41.8% of the variance in IVPP-Control suggests this model tapped two important influences. The Habit of Controlling Vegetable Practices was also a significant predictor of the IVPP composite scale, indicating the very high predictiveness of the subscale accounted for predictiveness of the composite scale. Parents high in Controlling Parenting Intentions were more likely to use EVPP-Control and less likely to use IVPP-Control, indicating that intentions were important in predicting VPP-Control, but not the other IVPP subscales. A recent meta-analysis revealed only a weak relationship between intentions and behavior (Rhodes & Dickau, 2012) indicating intentions may not be as important as once thought.

When the dependent variable is an undesirable behavior (i.e. IVPP), mental gymnastics are needed to clearly state and understand the nature of especially inverse relationships (double negatives). Since respondents considered only single items at a time, they should have been uninfluenced by these mental gymnastics. The likelihood that many parents will not be able to distinguish between effective and ineffective VPP imposes limitations on a predictive cognitive model. Future research would benefit from a knowledge variable assessing the extent to which parents can accurately distinguish effective from ineffective practices.

Most of the predictive variables were generated from Theory of Planned Behavior constructs, a currently highly predictive social cognitive theory (McEachan, Conner, Taylor, & Louton, 2011). Although much of the Theory of Planned Behavior research uses single scale indicators of these constructs, the analyses of this data set indicated single dimensional variables did not fit the data (Baranowski et al., 2013). This suggests that IVPP present a complex set of behaviors requiring differentiated multi component predictors. None of the self determination theory scales or subscales (autonomy, relatedness, competence, intrinsic motivation/desire) predicted any of the IVPP subscales. Alternatively, the innovative anticipated emotion scales predicted both IVPP-Responsive and IVPP-Structure. These findings suggest the many relatively innovative variables related to IVPP would require innovative approaches to reducing IVPP (Baranowski et al., 2013b), which could be tailored to the individual IVPP components. However, further research needs to be conducted using these scales and subscales to better

understand which are the most important influences in which target groups, and assess the effect of moderators, e.g. age of child, sequential position of target child in the family (McEachan et al., 2011).

The strengths of this research include use of a broad theoretical framework and validated indicators of the independent and dependent variables. Limitations include the cross-sectional design, the self-reported nature of all variables, and the mostly higher socioeconomic status of families in the sample. Further research needs to verify the predictiveness of child dietary intake by these IVPP subscales in longitudinal samples; their utility in identifying and targeting components for reducing component IVPP in interventions; and in assessing impact of IVPP intervention programs. Innovative interventions targeting the MGDVPP constructs offer hope of reducing use of IVPP, hopefully thereby leading to increased lifelong child vegetable intake.

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