Parents under fire:
The role of parental stress and parenting involvement in children's media use, obesity and academic skills

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Abbreviations:
AAP – American Academy of Pediatrics
PSID – Panel Study of Income Dynamics
CDS-I – First Wave of Child Development Supplement
CDS-II – Second Wave of Child Development Supplement
BMI – Body Mass Index
WJ-R – Woodcock Johnson Revised Tests of Achievement.
FIML – Full information maximum likelihood estimation
WLSMV – Weighted least Square parameter estimates with robust standard errors and Mean-and Variance-adjusted chi-square statistics

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ABSTRACT

This study examined the question of whether the relationships among heavy TV viewing, childhood obesity and poor academic performance are in fact due to a common cause in the family system – namely diminished parental involvement. We examined a model positing that stress experienced by parents diminishes parental involvement, which in turn predicts childhood obesity, television use, and poor academic performance five years later utilizing longitudinal data from the Child Development Supplement (CDS-I; CDS-II). The model fits the data extremely well. Results are discussed in the context of assumptions that television viewing is causally linked to childhood obesity and intervention strategies aimed at reducing television viewing to reduce obesity.

INTRODUCTION

Children's media use, in particular television viewing, has long been a source of misgiving and concern among practitioners, parents and scholars alike(1). In both popular and scholarly circles, the time children spend viewing television is widely viewed as "wasted time" at best, and actively harmful at worst. Television viewing has been charged with playing a major (if not causal) role in a wide variety of social and developmental ills, including attention-deficit disorder(2), autism(3), aggression and violence(4), risky sexual behavior(5), initiation of alcohol(6) and tobacco use(7), sedentary behavior(8), sleep disturbances(9), poor nutrition and unhealthy eating habits(10), and childhood obesity(11).

Though some of these charges may be more deserved than others, time spent with television and other media has been particularly targeted as a major contributor to the now alarmingly high rates of obesity among US children and youth(12-15). This conviction has shaped prominent public health recommendations and policies. The American Academy of Pediatrics (AAP) recommends that viewing time and video game play should be limited to no more than 2 hours per day to prevent pediatric obesity(15). Reducing television viewing was listed as a national fitness goal for the first time In *Healthy People 2010*. In *Healthy People 2020*, behavioral interventions to reduce screen time are recommended to achieve the national goal of obesity prevention and control.

Yet, despite over 35 years worth of intensive intervention and prevention efforts aimed at childhood obesity, little progress has been made(16). Reviews of intervention programs designed to alter obesity rates among US children through reductions in

screen time indicate extremely modest results(17). Though most (not surprisingly) show reductions in children's screen-time, and some even show small reductions in weight status, the mechanisms linking screen-time and weight remain elusive(18-22). Some interventions show reductions in sedentary behavior (but not nutritional or physical activity changes), while others find nutritional changes (but not in sedentary behavior or physical activity). One study even showed reductions in weight status with reduced screen-time with ***no*** commensurate changes in either nutritional or activity factors(18).

It is certainly true that children spend an enormous amount of time viewing television, roughly 2-5 hours per day on average. Moreover, despite reports of the popularity of newer screen media and technologies among youth(23, 24), television remains (for the present at least) the single largest contributor to children's screen time(25). Thus, it is possible that screen-time reductions hold the key to solving the problem of childhood obesity, and we simply have not hit upon the way to effectively change this behavior.

However, given the general lack of headway in this area, we propose that alternate views of the connections between television viewing and obesity are necessary. From a developmental perspective, identifying covariation among phenomena related to health and well-being is vitally important. For children, academic skills and achievement are highly significant because they have consequences for development, health and well-being into adulthood. Literature examining developmental outcomes has documented negative relationships between heavy television viewing and children's academic skills and achievement(26-28). Interestingly, childhood obesity has

also been linked to decreased academic performance(29-31). Though the possible interconnections among these findings are intriguing, they have received little empirical attention.

From a family systems and ecological perspective, an important place to look for explanations of linkages among these phenomena would be in the family system itself (32). Studies from a variety of disciplines have demonstrated that certain aspects of parenting are related to television viewing, obesity and academic skills, respectively. Specifically, parental involvement and time spent with children is positively related to children's performance at school, negatively related to heavy television viewing, and negatively related to childhood obesity. Moreover, there is a large body of evidence indicating that parental stress diminishes a parent's ability to be involved and engaged with their child(32, 33).

In this paper, we examine the possibility that the linkages among television viewing, obesity and academic outcomes are common consequences of diminished parental involvement in the face of parental stress. This possibility is represented in the model presented in Figure 1. In this model, parental stress is expressed by the combination of depressed affect and feeling hassled by parenting. Parental stress predicts diminished parental involvement, in which parents disengage from various aspects of their child's life, including school life, school work, and spending one-on-one time with them. This diminished involvement, in turn, leads to poor academic performance, an increase in the risk of obesity, and high levels of television use, as children are left to fend for and make decisions for themselves.

METHOD

Sample

The data of this study come from the first wave and the second wave of the Panel Study of Income Dynamics (PSID) Child Development Supplement (CDS-I and CDS-II). The PSID is a longitudinal study of a representative sample of U.S. individuals and their families focusing primarily on the transfer of social and economic capital within families. In 1997, the PSID supplemented its main data collection with additional data pertinent to comprehensive information on parents' and children's education, health, cognitive and behavioral development and time use. CDS-I completed interviews with 2,394 families providing information on 3,563 children aged 0-12 years. The CDS-II re-interviewed 2,019 families, who remained active in the PSID panel as of 2001 and provided data on 2,907 children and adolescents ages between 5 and 18 years. For further detail regarding sampling and data collection procedures, see the CDS user guide at http://psidonline.isr.umich.edu/CDS/wavesdoc.html.

The present study utilized a sub-sample of CDS (n=1309) which focused on school aged children between 4 year-old and 13 year-old in wave 1 and completed at least one time diary (a weekday or a weekend) in wave 2. Fifty one percent of the sample were girls and 49 % were boys. Whites comprised 73% of the sample, Blacks 20%, Hispanics 3%, and other races 4%. The median income of families was $46,961. Fourteen percent of the parents had not graduated high-school, 33% had a high school diploma, 24% had some college, and 29% had attained a bachelors degree or higher.

Measures

The following sections describe measured variables for all covariates and each of the constructs in the model. Covariates and all parental variables were assessed at wave 1 (1997) and child outcome variables were all measured at wave 2 (2002). Means and standard deviations for all variables of interest are shown in Table 1. Values are weighted to yield nationally representative estimates.

Sociodemograhpic characteristics. Based on demonstrated relationships with parenting, child academic skills, childhood obesity, and child TV viewing, a number of sociodemographic characteristics from wave 1 were treated as covariates in the analyses. These included family income-to-need ratio, education of the household head, child gender, child age, and child race. *Family income-to-need ratio* was a proportion of each family's income divided by the poverty thresholds from the United States Census Bureau for the year 1996. Higher income-to-need ratio reflects more disposable income in a family; *Education of the household head* refers to the total number of years of education completed by the household head; *Child gender* was coded male as 1 and female as 0; *child age* was reported by parents in years and months; and *child race* as a series of dummy variables with White as the reference group (*Black*: 0=not Black, 1=Black; *Hispanic*: 0=not Hispanic, 1=Hispanic, and *Others*: 0=White, Black and Hispanic, 1= Asian and other races).

Parental stress. Indicators of parental stress including items assessing feeling hassled by parenting and depressed affect.

Hassled by parenting. Parents responded to 4 items focused on the target-child on a scale ranging from 1 "not at all true" to 5 "completely true.": (1) child seems to be

harder to care for than most children; (2) There are some things child does that really bother me a lot; (3) I find myself giving up more of my life to meet child's needs than I ever expected; and (4) I often feel angry with child (α = .68).

Parental depressed affect. Depressive symptoms were measured using the short form of the Composite International Diagnostic Interview (CIDI), a 10-item measure assessing the primary caregiver's depressive affect (Kessler & Mroczek, 1994). Parents were asked how often they felt nervous, hopeless, depressed, and so on, during the past 30 days. The scale ranged from 1 (none of the time) to 5 (all of the time), and an average was used as the final score (α = .89).

Diminished parenting. Diminished parenting was measured using indicators in four areas: parental limit setting, parent-child bonding activities, parental monitoring of school life, and parent-child school discussion.

Parental limit setting was measured by five items assessing how parents set rules about a number of items such as watching TV, staying up late, eating sweets, control time after school or daycare, and doing homework. The scale ranged from 1 (very often) to 5 (never), and the mean of the items was used as the final score with higher scores indicating less parental limit setting (α=.69).

Parent-child bonding activities included four items about things parents and child did together in the past month measured on the 5-point scale ranged from 1 (every day) to 5 (not in the past month). The items were the following: (1) talked to child about your family; (2) done arts and crafts together; (3) played sports or did outdoor activities together; and (4) worked or played on a computer or played video games with child. The

mean score was calculated and higher scores referred to less engaging parent-child bonding activities. Cronbach alpha was .56.

Parental monitoring of school life was measured using five items rated on a 3-point scale with 1 = mote than once, 2 = once, and 3 = not in the current school year. Parents were asked how often you have participated in any of the following activities at child's school during the current school year: (1) conference with child's teacher; (2) informal conversation with child's teacher; (3) observed child's classroom; (4) attended a school event in which child participated such as a play, sporting event or concert; and (5) attended a school event in which child did not participate. The mean score was generated as a final score with higher scores denoting less parental monitoring of school life. Cronbach alpha was .71.

Parent-child school discussion measured the frequency and nature of communication between parent and child about school consisting of 5 items: how often parents discussed school activities or events of particular interest to child, how often parents discussed things child has studied in class, and how often parents discussed child's experience in school. Each item was rated on a 4-point scale with 1 = regularly, 4 = never. The mean score was calculated with higher scores presenting less parent-child school discussion. The reliability for parent-child school discussion was .77.

Child outcomes. Academic performance, child obesity, and TV use and access were included as the child outcomes, which would be related to parental involvement.

Academic performance was assessed for each child over 2 years old with reading and math sections of the Woodcock Johnson Revised (WJ-R) Tests of Achievement (34). The WJ-R Tests of Achievement included three sections such as

Letter-Word Identification, applied problems, and passage comprehension. The standardized test scores for each three sub-scales were used in the analyses.

Child obesity In order to create child obesity indicator several steps were included. First, individual children's height and weight obtained by interviewers. If the child refused to be measured, the interviewer asked them or the parents to report height and weight. In the second step body mass index (BMI) was calculated from height and weight using the formula from the National Center for Chronic Disease Prevention and Health Promotion (Weight [1lb] ÷ Height [in] ÷ Height [in] x 703). Because children's body fatness changes over time as they grow, and boys and girls differ in their body fitness as they develop, BMI z score taken in to account age and gender was created for subjects aged 2 to 20 years, which used the centers for Disease Control and Prevention's BMI growth reference.

The definition of overweight among children was a statistical definition based on the 2000 Centers for Disease Control and Prevention growth reference for the United States (35). Children at or above the 95^{th} percentile of BMI-for-age defined as obese group. Children at or above the 85^{th} percentile but less than 95^{th} percentile, of BMI-for-age defined at risk of overweight group. Children including less than 85^{th} percentile of BMI-for-age named normal group. Fifty-eight percent of the sample were normal weight, 15% were overweight, and 20% were obese. In the analyses the obese group and at risk of overweight group coded 0 and normal group coded 1.

TV use and access at home Indicators of child's TV use and access were included amount of children's television viewing and household TV. *Amount of children's television viewing* was assessed via two 24-hour time use diaries on one

randomly chosen weekday and on randomly chosen weekend day. Children aged 10 years and older were encouraged to complete their own time diaries while younger children were aided by parents. The measure was created by summing the total minutes children spent watching television as a primary and secondary on a weekday and a weekend day. The sum was then divided by 60 in order to represent total amount of television viewing in hours. Parents indicated the extent of *household TV* in their home by answering the following question: "if you have a working TV in your house, how many hours is the TV on in your home each day?" Range for the number of hours per day was 0-24.

Analysis Plan

We employed structural equation modeling techniques to assess the connections among parental stress, parental involvement and children's academic skills, obesity, and TV use and access at home. Models were estimated using the missing data facility in Mplus 4.2. Missing values on variables were handled by full information maximum likelihood estimation (FIML) which produces unbiased parameter estimates and robust standard errors. The WLSMV (**w**eighted **l**east **s**quare parameter estimates with robust standard errors and **m**ean-and **v**ariance-adjusted chi-square statistics) was employed due to its robustness and power when analyzing both continuous and categorical outcomes (e.g., a dichotomous indicator of whether a child is obese or not) in SEM (36). Mplus also handled non-independence due to the existence of sibling pairs in the data, and weighted estimates to represent national population.

RESULTS

The bivariate correlations among all variables used in testing the theoretical model are presented in Table 2 and the factor loadings for the measurement model are presented in Table 3. Standardized path coefficients from all covariates to constructs in the model are given in Table 4. With the exception of the covariate path coefficients, the structural model results, including path coefficients and proportion of variance accounted for in the constructs (R^2s), are presented in Figure 2. As shown in Figure 2, the model fit was consistent with the proposed conceptual model. Parental stress at wave 1 was positively related to diminished parenting in wave 1. In turn, diminished parental involvement at wave 1 was related to child outcomes in wave 2 as expected: disengaged parenting was negatively associated with academic performance, positively related to child obesity, and positively linked to children's TV use and access at home. The overall model showed good fit on the basis of a variety of fit indices (χ^2 = 95.68, df = 44, p < .001, CFI = .93, TLI = .91, 1 – RMSEA = .97).

Discussion and Implications

In this paper, we examined the notion that the relationships among children's television viewing, academic performance and obesity are situated in the family, specifically diminished parenting. Our findings strongly supported this notion. The model fit the data quite well, the structural path coefficients were not only significant but fairly hefty, and the proportion of variance explained was quite high. In fact, the model explained 27% of the variance in academic skills, 10% of the variance in childhood obesity, and 45% of the variance in television use. It is particularly noteworthy that the linkages between diminished parental involvement and child outcomes were separated

by a five year period. That is, earlier diminished parental involvement predicted poor academic performance, childhood obesity and television viewing five years later. It is also noteworthy that these relationships held in the face of a variety of covariates.

These findings illustrate the utility of viewing the television-childhood obesity connection from perspectives, which attend to contextual influences. They suggest that it is important, even crucial, to carefully attend to covariation among developmental outcomes, and to incorporate characteristics of ecological contexts, such as the family, in attempts to examine and explain the relationships among children's media use, childhood obesity, and academic performance. These findings indicate that models failing to include family context measures may produce misleading results as to the true nature of the relationship among important phenomena in children's lives. Thus, we suggest that examining family systems influences on obesity is essential to "unpacking" the relationship between television viewing and obesity and arriving at a more nuanced understanding of these relationships, in order to design more effective intervention strategies

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Table 1. Means and Standard Deviations for All Variables

	Mean	*Standard Deviation*
Sociodemographic characteristics		
Family Income to Needs Ratio	3.05	3.03
Household Head's Education Level	12.94	2.30
White	.51	.50
Black	.45	.50
Hispanic	.01	.11
Other Race	.03	.18
Gender [a]	.48	.50
Chile Age	9.24	2.26
Parental Stress		
Overwhelmed by child		
Harder than most children	1.49	.97
Bothersome	2.29	1.27
Giving up more of life	1.94	1.35
Feel angry	1.71	.97
Parental Depression	1.61	.57
Diminished Parenting		
Less Parental Limit Setting	1.97	.64
Less Parent-Child Bonding Activities	3.45	.76
Less Parental Monitoring of School Life	2.00	.58
Less Parent-Child School Discussions	1.27	.44
Child outcomes		
Academic skills		
Letter word identification	102.68	20.69
Passage comprehension	100.88	16.49
Applied problem solving	101.39	16.25
Child Obesity [b]	.21	.41
TV us and access at home		
Total hours of TV On per day in a household	7.06	5.20
Total hours of TV Viewing [c]	5.74	3.85

[a] Gender (Female = 0; Male = 1)
[b] The amount of time spent viewing on one weekday and one weekend day
[c] Obesity (Overweight at risk & Obese = 0; Normal = 1)

Table 2. Correlations among All Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Male	1											
2. Black	.18	1										
3. Hispanic	-.11	-.09	1									
4. Other Race	.03	-.10	-.04	1								
5. Education of Household Head	-.01	-.25	-.10	-.06	1							
6. Family Income to Needs Ratio	-.05	-.28	-.06	-.08	.46	1						
7. Child Age	-.02	-.03	.05	-.03	.04	.05	1					
8. Parental Depression	.00	.13**	-.00	-.02	-.12***	-.12**	.05	1				
9. Letter Word Identification	-.06	-.30	-.08	-.02	.27	.29	.05	-.10**	1			
10. Passage Comprehension	-.04	-.29	-.09	-.04	.30	.26	-.04	-.09**	.69	1		
11. Applied Problem Solving	.11	-.31	-.13	-.04	.34	.28	-.10	-.15**	.60	.70	1	
12. Harder than most children	.08	-.04	.06	.04	-.03	-.04	-.02	.12**	-.07	-.11	-.06	1
13. Bothersome	.04	-.06	.03	.02	-.00	.01	.09	.15***	.01	-.01	-.02	.55
14. Giving up more of life	.04	.06	.01	.02	-.03	.02	-.02	.13***	.03	.01	-.02	.41
15. Feel angry	.01	-.08	.04	.02	-.01	.00	.10	.24***	.00	-.06	-.07	.49
16. Less Parental Limit setting	-.12	-.05	.08	-.07	-.08	.00	.18	.13***	-.02	-.06	-.06	.01
17. Less Parent-child bonding activities	-.02	.12	.11	.01	-.07	-.10	.26	.05	-.07	-.12	-.14	.05
18. Less Parental monitoring of school life	-.00	.16	.12	-.01	-.24	-.14	.14	.11**	-.08	-.11	-.11	.08
19. Less Parent-child school discussions	.03	.19	.11	.07	-.27	-.15	.05	.18***	-.17	-.18	-.22	.05
20. Household TV	-.01	.22	-.02	.02	-.26	-.18	.02	-.02	-.11	-.13	-.19	.03
21. Amount of children's TV viewing	.09	.16	-.08	-.04	-.06	-.08	-.06	.03	-.08	-.07	-.09	.05
22. Child Obesity	.06	.13	-.05	.01	-.04	-.07	-.03	-.07*	-.05	-.07	-.07	.08

(*continued*)

	13	14	15	16	17	18	19	20	21	22
1. Male										
2. Black										
3. Hispanic										
4. Other Race										
5. Education of Household Head										
6. Family Income to Needs Ratio										
7. Child Age										
8. Parental Depression										
9. Letter Word Identification										
10. Passage Comprehension										
11. Applied Problem Solving										
12. Harder than most children										
13. Bothersome	1									
14. Giving up more of life	.45	1								
15. Feel angry	.57	.39	1							
16. Less Parental Limit setting	.08	-.01	.03	1						
17. Less Parent-child bonding activities	.09	-.06	.10	.16	1					
18. Less Parental monitoring of school life	.11	.10	.17	.17	.26	1				
19. Less Parent-child school discussions	.03	.02	.08	.21	.23	.22	1			
20. Household TV	.09	.04	.10	.16	.09	.23	.19	1		
21. Amount of children's TV Viewing	-.02	.06	.04	-.00	.03	.09	.02	.19	1	
22. Child Obesity	.16	.10	.07	.05	.02	.15	.06	.17	0.14	1

*p<.05. **p<.01. ***p<.001.

Table 3. Factor Loadings for Measurement Model

Latent Construct and Observed Indicator	*Factor Loading*
Parental stress	
Harder than most children	.69
Bothersome	.76
Giving up more of life	.54
Feel angry	.76
Parental depression	.30
Diminished parenting	
Parental limit setting	.41
Parent-child bonding activities	.45
Parent monitoring of school life	.53
Parent-child school discussions	.43
Academic performance	
Letter Word Identification	.77
Passage Comprehension	.87
Applied Problem Solving	.82
TV use and Access at Home	
Household TV	.65
Amount of Children's TV viewing	.31

Table 4. Standardized Path Coefficients from Covariates to Constructs in the models

	Covariates						
Latent Endogenous Constructs	Male	Black	Hispanic	Other Race	Education	Income	Age
Diminished parenting	-.04	.23**	.23*	.06	-.28**	-.05	.36***
Academic performance	.03	-.26***	-.08	-.05	.19***	.10**	-.01
Child obesity	-.05	.04	.06	-.02	.02	-.06	.21**
TV use and access at home	.00	.14	-.22*	-.03	-.09	-.07	-.19**

*p<.05. **p<.01. ***p<.001.

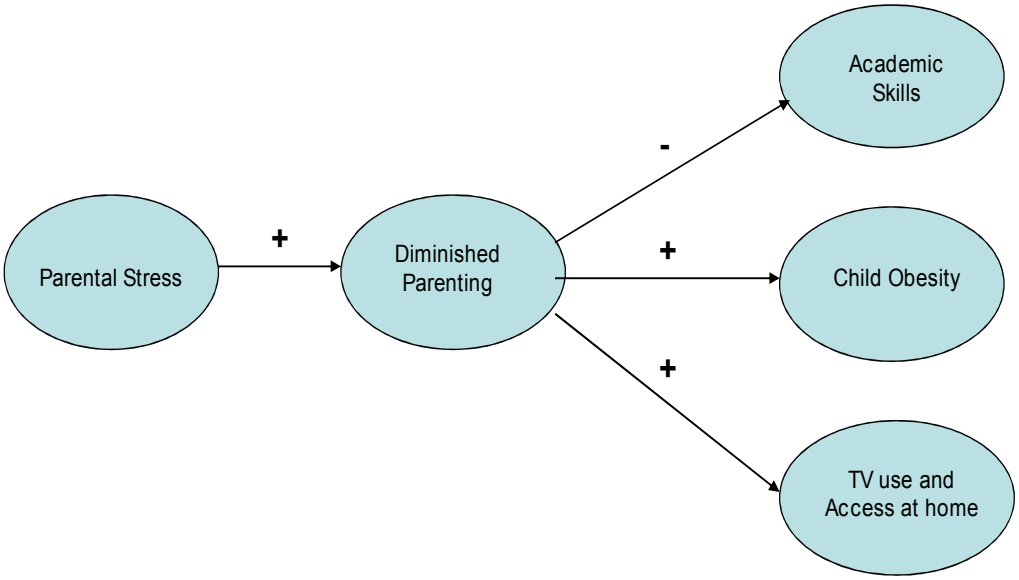

Figure 1. Proposed Common Cause Model Model

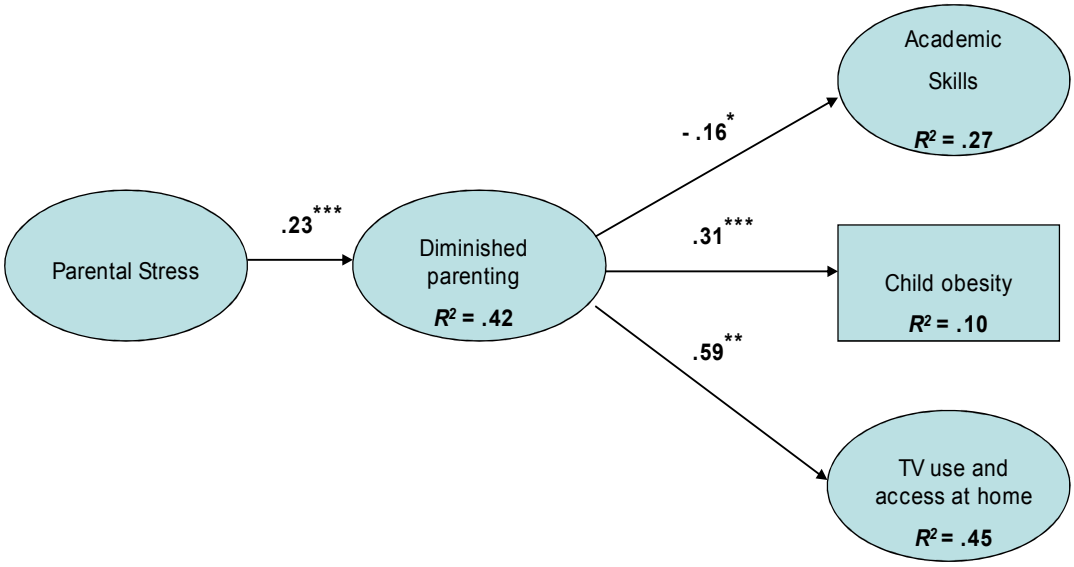

Figure 2. Structure Model Results