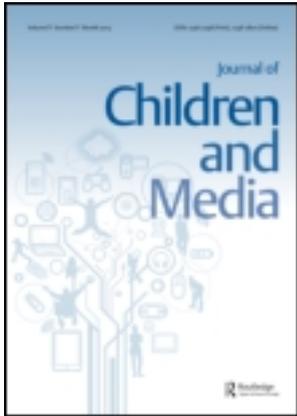


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PARENTS, TELEVISION AND CHILDREN'S WEIGHT STATUS

On lasting effects of parental television socialization in the Netherlands

Natascha Notten, Gerbert Kraaykamp and Jochem Tolsma

This study scrutinizes the long-term effects of parental television socialization activities on their children's weight status measured through body mass index (BMI-score). We address the question how parental television habits and parental television mediation in childhood relate to a person's weight status in adulthood. To analyze this issue we employed data from the 2009 Family Survey of the Dutch Population with extensive retrospective information on 1,377 Dutch respondents and their parents. Structural equation models were estimated and showed long-term effects of parental television role modeling and mediation on their children's weight status in adulthood. A parental example of frequent television viewing and social coviewing lastingly increases children's weight status through two distinct pathways: via weight status in young adulthood and via educational attainment and adult television habits. Parental instructional television mediation, however, is related to a lower-weight status of their children later in life.

KEYWORDS BMI-score; long-term effects; parental role modeling; parental television mediation; socialization process; television consumption; weight status

Introduction

Television habits in the family home seem to have substantial effects on children's well-being, both mentally and physically (e.g., Valkenburg, 2004). An often found negative consequence of excessive exposure to television is (childhood) obesity (Dietz & Gortmaker, 1985; Gable, Chang, & Krull, 2007; Veerman, Van Beeck, Barendregt, & Mackenbach, 2009). Television consumption is thought to affect a child's weight in various ways. For instance, watching television, which is a passive and sedentary activity, may replace more physically challenging activities, like playing outdoors and sporting (Lazarou & Soteriades, 2009). Television viewing may also expose children to advertisements for unhealthy and high-caloric foods. Such advertisements teach children to value fatty foods and sugary beverages, leading to snacking, an unhealthy diet, and ultimately to weight problems (Buijzen, Bomhof, & Schuurman, 2008; Zimmerman & Bell, 2010).

Incidence of obese and overweight children has increased alarmingly worldwide, and it is nowadays considered a major health threat. Many Western societies have introduced policy programs to stimulate healthy lifestyle choices, since childhood obesity is associated with bad health, premature death, and disability in adulthood (OECD, 2010; WHO, 2011). Parents can promote their children's health by providing a nutritious diet and enabling sports participation, but they may also guide their offspring's television consumption (Austin, 2001; Clark et al., 2007; Jordan & Robinson, 2008; Wardle & Carnell, 2007). Parents manage their

children's television viewing behavior through the example they set with their own viewing habits and by mediating their children's television viewing. For instance, they might discuss the content of programs with their children or restrict their offspring's television consumption (Nathanson, 1999; Valkenburg, Krmar, Peeters, & Marseille, 1999). Since parental media socialization practices are socially differentiated, not all children are equally guided to become moderate and critical television viewers (Notten & Kraaykamp, 2009). This might lead to social disparities in children's health behavior and weight status.

Although the relationship between a person's television viewing habits and weight status has been investigated for children and adults, few studies have examined the possible long-term consequences of parental television socialization activities for children's weight status in adulthood (e.g., Harris & Bargh, 2009). This is highly remarkable, since parents are children's major counseling agents and are influential in shaping children's lifestyles (Cullen et al., 2001; Kremers, Burg, & de Vries, 2003). The current study therefore investigates whether the example parents set with their own television viewing and the mediation they provide in their children's television consumption have enduring effects on their offspring's weight status later in life. After completing the period of parental socialization, a person's own characteristics and behaviors, such as, pre-adult weight status, educational attainment and television viewing habits, are likely to mediate the impact of parental television activities on current weight status. We therefore expect largely indirect effects of parental television socialization on a person's weight status. Our research question therefore reads: *To what extent do parental television socialization activities directly and indirectly affect a person's weight status in adulthood?*

Previous studies on television viewing and weight status mostly used experimental designs and focused on specific groups of respondents, or only analyzed short-term effects (e.g., Lazarou & Soteriades, 2009; Nathanson, 1999; Veerman et al., 2009). Our research is innovative in that it considers parental television socialization practices during childhood and analyzes the *long-term* effects on (adult) children's weight status ($18.5 < \text{BMI} < 40$). Moreover, it studies the impact of the example set by parents—their personal viewing habits—as well as of parent-child interactions on television consumption (i.e., television mediation) during a person's youth. To answer our research question we employ representative cross-sectional data from the Family Survey of the Dutch Population (FSDP) (Kraaykamp, Wolbers, & Ruiters, 2009). The FSDP extensively describes the current situation in a respondents' life, but also retrospectively questions a respondents' life course, and various family and childhood characteristics. The FSDP-data therefore are highly suited to investigate the long-term effects of parental television socialization activities on a person's current weight status. To answer our research question we applied a structural equation modeling including parental television socialization activities, respondents' childhood television consumption, weight status at age 20, educational attainment and adult television habits. We control for parental socioeconomic background, family composition, as well as for respondents' gender and birth year.

Theoretical Background

Explanatory Mechanisms

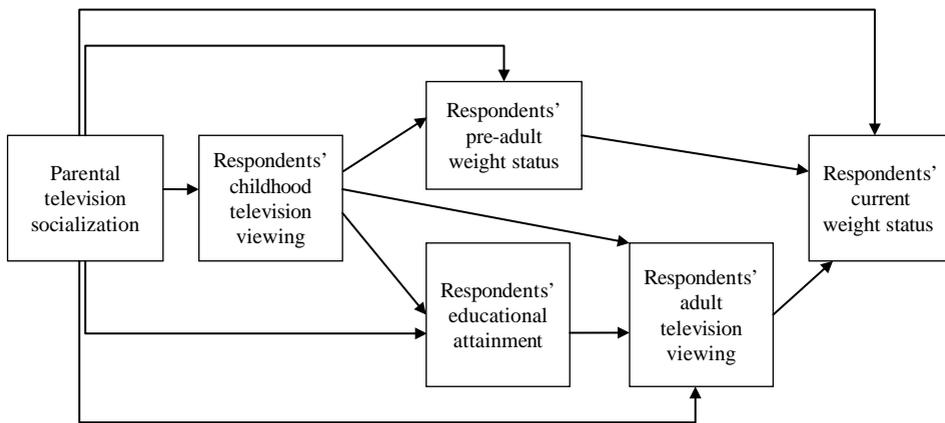
Although genetic factors play an important role in weight status, most research identifies excessive food consumption (i.e., high energy intake) and unhealthy lifestyles

(i.e., low physical activity and energy expenditure) as the major causes of overweight and obesity (Hill, Wyatt, Reed & Peters, 2003; Manios et al., 2009). Prior research underscored that lifestyle choices, such as healthy behaviors and food consumption, are strongly affected by environmental factors (Sund, Jones, & Midthjell, 2010). In early childhood, parents are the main socializing agents nurturing children towards a healthy lifestyle and preferable eating habits (Birch & Fisher, 2000; Clarke, Goyder, Bissell, Blank, & Peters, 2007; Snoek, 2009; Wardle & Carnell, 2007). Parents are the decision makers when it comes to what to serve as meals, and family rules on snacking (Kremers et al., 2003). Parental interventions found to be successful in limiting health risks, especially concerning overweight and obesity, are socialization activities to reduce sedentary activities such as television viewing (e.g., Dietz, 2001). For instance, parents may guide or restrict their children's television time by setting television rules (Buijzen, 2009; Valkenburg et al., 1999).

Numerous prior studies have revealed a causal relation between the time children spend watching television and being overweight or having an unhealthy diet (Dietz & Gortmaker, 1985; Matheson, Killen, Wang, Varady, & Robinson, 2004). Although some scholars are somewhat ambiguous about the exact role of television exposure in explaining weight problems (Robinson et al., 1993; Vandewater, Shim, & Caplovitz, 2004), there is general consensus that watching television causes overweight and obesity by at least one, or a combination of the following mechanisms. A first mechanism relates to the displacement of physical activities, as time spent viewing television, a sedentary and passive activity, replaces time that otherwise could be spent on more physically challenging activities (Lazarou & Soteriades, 2009; Vandewater et al., 2004). Second, many children eat or overeat while watching television resulting in the intake of high-caloric and unhealthy food ("snacking") (Manios et al., 2009; Matheson et al., 2004). Third, food advertising on television may stimulate children to develop an appetite for high-fat and high-sugar food products, which are generally most heavily advertised (Buijzen et al., 2008; Dixon et al., 2007; Veerman et al., 2009; Zimmerman & Bell, 2010). Fourth, although there is little additional empirical support, Klesges, Shelton, and Klesges (1993) found that watching television lowers the resting metabolism and that this partly explained the relation between weight status and television consumption. And finally, some authors report a reduced sleep period as a potential mediator of television effects on weight status (e.g., Taheri, 2009).

Empirical research predominantly corroborates the "eating-while-watching-notion" and the "food-advertising-exposure-notion" (Hancox, Milne, & Poulton, 2004; Harris & Bargh, 2009; Viner & Cole, 2005). Children have been found to eat a large proportions of their daily energy while watching television (Matheson et al., 2004), snacks are consumed particularly, and their intake of high-density food even seems to increase during television viewing (Blass et al., 2006). Hence, exposure to television and to food advertising, mutually highly correlated, are two major factors explaining the relation between television viewing and a person's weight status. This implies that in limiting children's health risks, parental television socialization activities addressing both exposure time and television content are important factors.

In our study we focus on long-term effects of television socialization in the childhood home on a person's current weight status. According to learning theories, cultural socialization and lifestyle theories, parents imbue their children with certain norms, behaviors and values, and this socialization is thought to start at birth and last into early adulthood (Bandura & Walters, 1963; Bourdieu, 1984). The current study therefore analyzes

**FIGURE 1**

Theoretical model of the pathways by which parental television socialization affects children's weight status in adulthood

whether parental television socialization practices, as a meaningful part of parents' cultural socialization, affect a person's adult weight status. We presume that parents irreversibly influence their children's television habits—and subsequently their weight status—by the example they set and by the television mediation activities they undertake.

Previous research has consistently related demographic and social background features of children and their families (e.g., age, educational level, family composition and family socioeconomic status) to (childhood) television habits as well as with overweight (Brown, Broom, Nicholson, & Bittman, 2010; Roe, 2000; Wardle, Waller, & Martin, 2002). We, however, do not exemplify these factors in our theoretical model. We control for their influence in our analyses to rigorously test our expectations on the long-term impact of parental television socialization activities, the focus of the present contribution. Figure 1 shows our theoretical model.

Parental Television Role Modeling

According to social learning theory (Bandura & Walters, 1963), children learn by observation and this imitation process is dominated by day-to-day behavior of influential persons in the direct environment. Children, hence, largely copy what their parents do. Via modeling, parents intentionally or unintentionally guide their children's preferences and habits. From this line of reasoning it follows that when parents set an example of frequent television viewing their children will become frequent television viewers as well. According to the mechanisms discussed earlier, excessive television viewing probably leads to less physical activity, more opportunity for eating while watching, and higher odds of exposure to advertisements for unhealthy foods. Accordingly, we expect that parents who watch television excessively affect their children's weight status, also in the long run.

Parental Television Mediation

Besides setting an example parents may guide their children's television habits with mediation strategies (Nathanson, 1999; Valkenburg et al., 1999). Effective and widespread

parental strategies to promote good television habits are setting television rules and critically discussing television content. By restricting or monitoring children's exposure to television, parents may stimulate their children to become physically active and reduce snacking opportunities. Moreover, by limiting children's television exposure parents reduce the number of contacts with food advertisements and their associated negative effects (Buijzen, 2009; Dietz, 2001; Dixon et al., 2007; Jordan & Robinson, 2008). We therefore expect that parental restrictive television mediation lowers a child's risk of becoming overweight, also in the long run.

Prior research indicates that restrictive parental mediation is most successful in limiting the television exposure of young children (from preschool up to age 7). Children younger than age seven generally lack the competencies to deal with discussions on television content. Instructive parental mediation, that is, explaining and critically discussing (possibly harmful) television content, therefore, seems most fruitful in educating (pre)adolescent children (Buijzen, 2009; Harris & Bargh, 2009). Although findings are somewhat equivocal (see e.g., Chernin, 2008), instructive parental television guidance likely stimulates older children to grow into critical television consumers, thereby reducing the impact of food advertisements. We therefore expect that parental instructive television mediation lowers a child's risk of becoming overweight, lasting into adulthood.

In general, scholars agree that parental social coviewing, that is, parents and children watching television together without any critical communication, does not limit children's television exposure, nor does it help children to deal with negative aspects of television exposure and content (Austin, 2001; Nathanson, 1999). Most likely, children perceive their parents' silent presence while TV-viewing as an approval of all—also negative—consumed television content (Nathanson, 2001). Hence, we expect that parental coviewing enlarges a child's risk becoming overweight, also in the long run.

Previous research often presupposes that parental television behaviors guide the mediation activities they provide for their children (Livingstone, 2007; Nathanson, 2001; Notten & Kraaykamp, 2009; Van der Voort, Nikken, & Van Lil, 1992). In this study, we therefore expect that part of the effect of parental television example runs via parental television mediation.

Indirect Effects of Parental Television Socialization: Via What Pathways?

In a study of the long-term effects of parental television socialization activities on a person's current weight status we may hardly expect direct effects. Our argument is that parents set an example and that children copy their parents' viewing behavior. We also hypothesize that parental television mediation activities may affect children's viewing behavior. This means that we more or less implicitly assume that parental television socialization activities influence a person's current weight status via television consumption during childhood.

We here also recognize that the effects of parental television socialization activities and a child's television consumption on weight status in adulthood may run via alternative pathways. First, parental television socialization may have had its effect already on a person's weight status in young adulthood, which subsequently has a bearing on current weight status. Second, we expect parental television socialization activities to affect a person's weight status in adulthood via his/her attained level of education and adult

television viewing habits. After all, a person's educational attainment is significantly affected by parental media socialization activities (e.g., Notten & Kraaykamp, 2010) and appears to be a relevant factor in explaining television habits and weight status (Konig, Rebers, & Westerik, 2009; Sund et al., 2010). All in all, this study theorizes that parental television socialization activities may affect a person's (i.e., adult child's) current weight status via childhood television habits, young adult weight status, educational attainment and adult viewing habits.

We are aware of the fact that actual parental practices may change or fluctuate during a child's socialization period or formative years. For instance, parents may strengthen their television rules when a child's responses to commercials are worrisome or when school results decline. Alternatively parents may be encouraged by their offspring to watch television programs they like. However, previous research showed that parental values concerning cultural activities, such as reading or television viewing, and mediation activities are rather stable (e.g., Bandura & Walters, 1963; Bourdieu, 1984; Darling & Steinberg, 1993; Hoover-Dempsey & Sandler, 1997). In the rather static theoretical model underlying this study we thus presume that the reported socialization activities of parents exemplify the general pedagogical climate in the parental home during upbringing.

Data and Measurements

Data

To assess the effects of parental television socialization on a person's weight status in adulthood we make use of the FSDP 2009 (Kraaykamp et al., 2009).¹ The FSDP 2009 has a cross-sectional design and combines structured face-to-face interviews with a self-administrated questionnaire and is held among a nationally representative sample of the Dutch adult population. The FSDP holds information on various aspects of a respondents' life course. In this study, we employ retrospective respondent reports on childhood television experiences and the parental background, as well as information on a respondent's current individual characteristics as weight status, educational level and television consumption. A major advantage of the FSDP data is that it enables us to study long-term socialization effects for people from several birth cohorts (from 1955 till 1984). A well-known drawback of retrospective reports is its possible bias due to memory effects and social desirability. However, previous and additional studies using the FSDP data indicated no systematic error variance in retrospective measures of parental media and cultural socialization (De Graaf, De Graaf, & Kraaykamp, 2000; De Vries & De Graaf, 2008; Notten & Kraaykamp, 2010). Nonetheless, we acknowledge that retrospective reports have disadvantages and therefore like to mention that our findings have to be interpreted with care.

In the Netherlands, television was introduced around 1955. This means that for respondents born before 1955 questions on a television-related socialization are not really applicable. This also counts for respondents reporting that there was no television in the parental home in their childhood. We chose to leave these respondents out of the final sample (37.3 per cent of the total). To study long-term effects, obviously the period of parental socialization has to be completed. Hence, we removed respondents living with one or both of their parents (0.2 per cent). We also selected respondents aged 25 years and over (98.8 per cent) to ensure that educational careers were largely completed. Finally,

respondents with current or pre-adult (severe) underweight (BMI < 18.5) (respectively, 1.1 per cent and 11.1 per cent), and severe obesity (BMI \geq 40) (respectively, 1.1 per cent and 0.2 per cent) are omitted from our analyses. Probably in these cases other than social explanatory mechanisms play a dominant role (e.g., chronic disease, eating disorders). The reported selections resulted in a final sample of 1,377 respondents between the ages of 25 and 54 years.

Measurements

Respondents reported their weight and length both at age 20 and at their current age. BMIs were calculated dividing weight in kilograms by squared height in meters. The variable *respondents' current weight status* indicates respondents' BMI score at the time of interview (range 18.5–40). The variable *pre-adult weight status* reflects respondents' BMI score at age 20 (range 18.5–36). Prior research suggests that self-reported BMI measures may be underestimated (lower weight, higher length) (e.g., Gorber, Tremblay, Moher, & Gorber, 2007). In our study this would imply possible underestimations of the effects of parental television socialization activities on a respondents' weight status. Consequently, our study constitutes a relatively strong test of the parental socialization hypotheses.

All of the parental television socialization measures refer to the time when a respondent was between the ages 5 and 15 years. *Parental television viewing example* measures the example set by the parents with respect to time spent viewing television. Respondents were asked to indicate how much time their parents watched television on a four-point scale, ranging from (0) "never" to (3) "more than three hours a day". We standardized this variable between 0 and 1 using a ranking procedure ($M = 0.50$). We measured parental television mediation strategies employing nine items about parental television guidance in the respondents' childhood (between 5 and 12 years old). A confirmatory factor analysis revealed that these indicators represent the three conventional forms of parental television mediation activities: restrictive mediation, instructive mediation and covieing (Austin, 2001; Nathanson, 1999; Valkenburg et al., 1999). Three items refer to *parental restrictive mediation*: (i) "my parents limited the hours I was allowed to watch TV", (ii) "my parents decided what I could watch on TV" (iii) "my parents had a specific TV timetable for the children" ($\alpha = 0.77$). *Parental instructive mediation* is measured by the following items: (i) "my parents discussed with me why something seen on television was wrong", (ii) "in our family television programs were often discussed" and (iii) "my parents helped me understand what I saw on television" ($\alpha = 0.79$). *Parental covieing* is represented by (i) "I often watched together with my parents a television show we both liked", (ii) "with my parents I could laugh about something on TV", (iii) "I often watched together with my parents television programs we were both interested in" ($\alpha = 0.80$). Answers were given on a four-point scale ranging from (0) "entirely untrue" to (3) "entirely true". Scales were created taking average scores. All scales were standardized between 0 and 1 employing a ranking procedure ($M = 0.50$).

Respondents were asked to indicate how much they nowadays watched television on weekdays and weekend days with answers ranging from (0) "never" to (3) "more than three hours a day." A scale was constructed taking the sum of the weekday score multiplied by 5 and the weekend score multiplied by 2, divided by 7, resulting in the variable *respondents' adult television viewing*. Respondents were also asked to report how much they watched television at age 15. *Respondents' childhood television viewing* ranges from (0) "never" to

(5) "more than three hours a day." By a ranking procedure both variables on respondents' television viewing were standardized between 0 and 1 ($M = 0.50$).

Respondents' educational level is represented by final educational attainment of the respondent in 10 categories. We applied a standard recoding procedure to obtain an interval scale using the minimum number of years necessary to reach the educational level concerned: primary education (6 years), lower vocational training (LBO) (9 years), lower general education (MAVO) (10 years), intermediate general education (HAVO) (11 years), secondary vocational training (MBO) (12 years), pre-university education (VWO) (13 years), higher vocational education (HBO) (15 years), university (WO) (17 years) and postgraduate (PhD) (21 years).

We control for parental social background including parental educational level and parental occupational status. *Parental educational level* is measured as the highest educational level of father or mother, represented by the number of years necessary to achieve the educational level concerned and ranging from 6 years (primary school) to 21 years (PhD). We constructed the variable *parental occupational status* taking the maximum score of the father or mother according to the International Socio-Economic Index of Occupational Status (Ganzeboom, De Graaf, & Treiman, 1992) at the time the respondent was aged 15.

In our study, we take into account respondents' family composition during childhood using three measures. The FSDP 2009 holds information on whether parents divorced, and if so, in what year. We constructed the variable *parental divorce*, indicating whether parents were divorced in a respondent's formative years between the ages 0–12, with categories (0) "no parental divorce" and (1) "parental divorce". *Mother's age at childbirth* indicates the age of the mother in a respondent's birth year. To account for influential cases, we rounded exceptionally young mothers up to the age of 16 (12 cases), topping down unusually old mothers to the age of 45 (18 cases). To indicate whether a respondent had a *working mother* two questions were used, namely (i) "was your mother employed for at least one year while you were in preschool" and (ii) "was your mother employed for at least one year while you were in primary school". We constructed a variable indicating whether the mother was either (0) "non-working" or (1) "working during a respondent's childhood".

We also controlled for respondents' gender and birth cohort. *Respondents' sex* indicates the respondent being a (0) man or (1) woman. *Respondents' birth year* is a continuous variable ranging from 1955 to 1984. We replaced missing scores with mean values (4.7 per cent). Our final dataset contains 1,377 individuals. Table 1 presents a description of the variables.

Methods and Models

To test the hypotheses on direct and indirect effects of parental television socialization practices, we applied path analyses through structural equation modeling (SEM) in Lisrel 8.8 (Jöreskog & Sörbom, 1996). A major advance of SEM is that it enables us to test all effects simultaneously leading to one path model. We specified a structural equation model on the basis of the hypotheses as presented in Figure 1, and we included all exogenous and endogenous variables as observed variables. Although not shown in our figures, we allowed for correlation between the errors of the different parental mediation measures, as well as a correlation between the errors of respondents' pre-adult weight status, educational attainment and current television habits.² In a final analysis we removed non-significant pathways (β s) from the model. Figure 2 shows the results of this model.

TABLE 1
Descriptive statistics of all variables

	Minimum	Maximum	Mean	Std. Deviation
<i>Parental television socialization</i>				
Parental television viewing example	0.00	0.91	0.50	0.27
Parental restrictive mediation	0.02	0.95	0.50	0.29
Parental instructive mediation	0.03	0.99	0.50	0.29
Parental coviewing	0.00	0.92	0.50	0.29
<i>Respondents' characteristics</i>				
Respondents' childhood television viewing	0.00	0.97	0.50	0.27
Respondents' pre-adult weight status	18.52	36.23	22.22	2.46
Respondents' educational attainment	6.00	21.00	12.91	2.98
Respondents' adult television viewing	0.00	0.94	0.50	0.29
Respondents' current weight status	18.56	39.77	25.78	3.73
<i>Parental social background</i>				
Parental educational level	6.00	21.00	11.09	3.24
Parental occupational status	24.00	86.00	48.04	14.61
<i>Family composition</i>				
Divorced parents	0	1	0.06	
Mother's age at childbirth	16.00	45.00	28.46	5.57
Working mother	0	1	0.36	
<i>Control variables</i>				
Respondents' birth year	1955.00	1984.00	1966.89	7.57
Respondents' sex	0	1	0.51	

Source: FSDP 2009; $N = 1,377$.

The Root Mean Square Error of Approximation (RMSEA) (0.00) and Adjusted Goodness of Fit Index (AGFI) (0.99) of our final model indicate a good model fit. Appendix A shows bivariate correlations between all endogenous variables.

Results

Figure 2 presents significant direct standardized effects (β s) of the model estimating effects of parental television socialization on a person's weight status in adulthood.³ The results clearly indicate that there are no significant direct effects of parental television example or television mediation on a respondents' pre-adult and current weight status. However, we observe significant indirect effects (see also the total effects presented in Table 2). This indicates that parental television socialization lastingly affects children's weight status, but that this effect is completely indirect and runs through various pathways. We therefore move on and will describe the actual processes underlying parental television socialization, as well as the distinct paths via which parental socialization activities affect a person's current weight status.

First, our results show that a parental example of time spent on television viewing is negatively related to restrictive and instructive parental television mediation (resp. $\beta = -.179$ and $\beta = -.085$). These findings underscore that parents who are frequent or excessive television viewers themselves are less inclined to guide their children's television behavior in a restrictive manner by setting television rules or instructive manner, for instance by discussion on TV content.⁴ Contrastingly, parents who themselves watched television frequently are more likely to be coviewers with their children ($\beta = .097$).

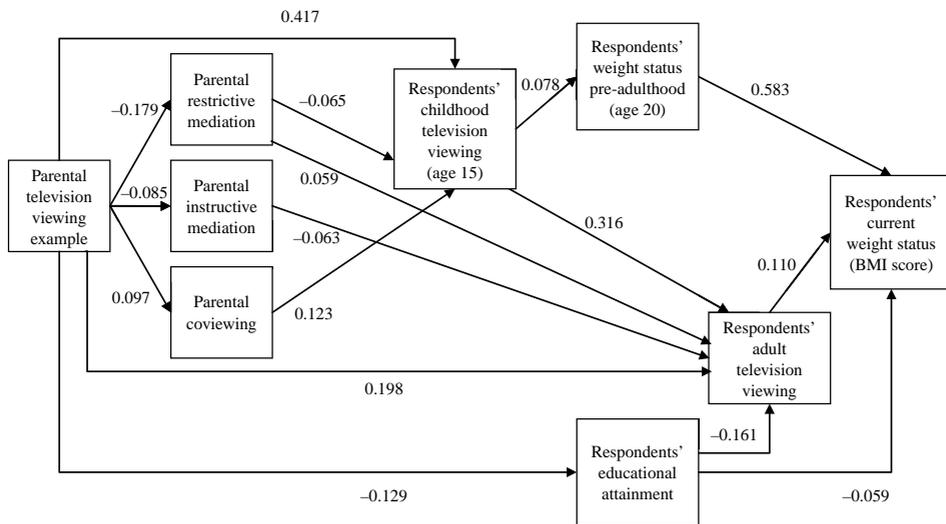


FIGURE 2

Structural equation model of the pathways by which parental television socialization affects children’s weight status in adulthood *Note.* Coefficients are standardized significant ($p < 0.05$) direct effects (β s), non-significant direct effects (β s) are deleted. Controlled for parental SES, family composition and respondents’ sex and birth year (not presented). $Df = 15$; Chi-square = 9.779; RMSEA = 0.000; AGFI = 0.992.

Next, we examine the effects of the parental television socialization activities on respondents’ childhood television consumption. Corroborating the imitation hypotheses we find that children replicate their parents’ television behavior to a large extent, resulting in a positive direct path between parental television viewing frequency and a respondents’ time spent watching television in childhood ($\beta = .417$). Our results also reveal significant direct effects of parental television mediation on television consumption in childhood. Parental rules regarding television consumption (restrictive mediation) result in less

TABLE 2

Total, direct, and indirect effects of parental television socialization on current weight status, standardized effects (β), Lisrel estimates (maximum likelihood)

	Respondents’ Current Weight Status (BMI)		
	Total	Direct	Indirect
<i>Independent variables</i>			
Parental television viewing example	0.066*		0.066*
Parental restrictive mediation	0.001		0.001
Parental instructive mediation	-0.007*		-0.007*
Parental covieing	0.010*		0.010*
Respondents’ childhood television viewing	0.080*		0.080*
Respondents’ pre-adult weight status	0.583*	0.583*	
Respondents’ educational attainment	-0.076*	-0.059*	-0.018*
Respondents’ adult television viewing	0.110*	0.110*	

Note. Significance: * $p < 0.05$. *Source:* FSDP 2003, 2009; $N = 1,377$. $Df = 15$; Chi-square = 9.779; RMSEA = 0.000; AFGI = 0.992. Controlled for parental SES, family composition and respondents’ sex and birth year (not presented).

childhood television consumption ($\beta = -.065$). On the other hand, parental coviewing seems to stimulate childhood television consumption ($\beta = .123$). By simply watching television together without commenting, parents guide their children to become frequent television viewers. Instructive parental guidance has no direct effect on television consumption in childhood.

Our structural equation model indicates that a respondents' pre-adult weight status, adult television use, and educational attainment mediate the effects of parental television socialization and childhood television consumption on a person's weight status in adulthood. To begin, we find that a respondent's pre-adult weight status is directly and positively affected by childhood television viewing ($\beta = .078$). It shows that a respondent's pre-adult weight status is affected by parental television socialization solely through a respondent's childhood television viewing. Apparently the effects of parental television socialization already manifest themselves in childhood. Hence, by stimulating or restricting childhood television viewing, parents affect their children's weight status in young adulthood, and this holds large effects for weight status in adulthood ($\beta = .583$).

Respondents' adult television viewing positively relates to current weight status ($\beta = .110$), and it thereby functions as a relevant mediator of parental television example and mediation activities. The results reveal a significant positive direct path between parental television example and respondents' adult television viewing ($\beta = .198$), implying that imitation patterns seem to last into adulthood. Remarkable is our finding of a positive relation between parental television restrictions and adult television viewing ($\beta = .059$). Perhaps here we encounter causality problems; respondents who frequently watch television in adulthood report their parents as being more restrictive in childhood. Or perhaps more likely, for children older than 15, as in adolescents, restrictive mediation might have a contradictory effect in that it stimulates adolescents to watch even more (i.e., reactance). Parental instructive mediation directly affects adult television consumption ($\beta = -.063$). Parents critically discussing television content with their children stimulate their offspring to become more modest television viewers, resulting in less time spent watching television in adulthood and eventually a lower-weight status in adult life.

As expected we observe a large positive direct effect between childhood television consumption and current television viewing ($\beta = .316$). So, it seems that television habits developed in childhood continue into adulthood. In line with previous research (e.g., Notten & Kraaykamp, 2010) this study finds that frequent parental television viewing negatively affects a respondent's educational attainment ($\beta = -.129$). Hence by affecting a person's educational success, a parental example of frequent television viewing in childhood may stimulate more frequent television consumption as well as an excessive weight status in adulthood. Overall, our results highlight indirect effects of parental television socialization on current weight status mainly through a respondent's adult television viewing and his/her educational attainment.

Table 2 presents direct, indirect and total effects from the structural equation modeling. We expected the impact of parental television socialization on a person's current weight status to be at least partly explained by childhood television viewing and to run via two distinct pathways: via pre-adult weight status and via individual characteristics of the respondent as educational attainment and adult television viewing frequency. Total effects presented in Table 2 clearly support these theoretical notions and show that parental television socialization long-lastingly and totally indirect affects a person's weight status. Parents to some extent stimulate their children being overweight in adulthood by setting

an example of frequent television viewing (total effect $\beta = .066$) and by coviewing (total effect $\beta = .010$). Contrastingly, parental instructive television mediation reduces the likelihood of their children suffering weight problems in the long run (total effect $\beta = -.007$). Note that the strongest predictors of a person's current weight status are pre-adult weight status ($\beta = .583$) and television viewing habits in adulthood ($\beta = .110$).

Conclusion and Discussion

In this study we focused on the lasting effects of parental television socialization activities on a person's weight status in adulthood. Employing Dutch nationally representative data, we performed structural equation models to analyze whether parental television habits at home affect a person's weight status (measured by BMI score). Our main conclusion is that parental television example and mediation activities have a lasting impact on their children's weight status, even into adult BMI. Effects of parental television socialization activities, however, are entirely indirect. Foremost parents' frequency in television viewing and television guidance affect weight status in adulthood via (i) a respondent's pre-adult weight status, and via (ii) a respondent's educational attainment and television viewing frequency in adulthood. Whereas the parental example of frequent television viewing and coviewing amplifies a child's odds of being overweight in adulthood, parental critical discussion of television content lowers their children's risk of excessive weight in adulthood. Apparently, by teaching children to become critical and modest viewers, parents reduce their children's odds of an unhealthy adult weight status.

Surely our study has some drawbacks. First, we made use of retrospective information and these kind of data may suffer from memory effects. For instance, due to telescoping, the relation between parental television viewing and a respondent's television habits may be overestimated. Although previous research on the FSDP data, using equivalent measures of parental socialization activities, revealed no serious recall bias (e.g., De Vries & De Graaf, 2008), we formulate the conclusions of our study carefully. Future research may gain more insight into causality issues by applying a longitudinal design that could also shed more light onto fluctuations in the intensity and direction of parent-child interactions. Second, the FSDP data lacks socialization factors found to be highly influential when it comes to weight problems, such as family meal frequency and availability of healthy and home-cooked meals (e.g., Gable et al., 2007). We dealt with this issue by controlling for family composition and parental socioeconomic status, which are well-known factors that predict childhood nutrition conditions. Another potential drawback of our study may be the absence of information about the parent's own BMI during a respondent's childhood. Previous research, however, reveals that even if parental weight status is taken into account, television exposure effects still show up (Brown et al., 2010; Hancox et al., 2004). A further point of discussion on causality might be that overweight children watch more TV than normal-weight individuals, simply because they suffer from overweight (Vandewater et al., 2004). Finally, it may be thinkable that certain parenting styles increase the impact of television-mediation strategies; a parental media socialization may be most effective in warm families (Austin, 2001; Bandura & Walters, 1963; Darling & Steinberg, 1993). In families characterized by neglectful and loose parenting possible harmful effects of television viewing may be more severe. Future research should provide deeper insights on these issues.

Our study identified several parental socialization activities that proved relevant in stimulating children's (un)healthy weight status, lasting into adulthood. The findings of this study indicate that frequent in-home television viewing should not be viewed as just a harmless way to spend leisure time; it is shown that long-term health consequences occurred that continue into the next generation. For policymakers and pediatricians, supporting parents to reflect on their television habits and encouraging them to stimulate children to become critical television viewers, may be useful tools reducing children's health risks. This is especially relevant these days since overweight now is a health problem worldwide and children's media use seems to increase every day.

NOTES

1. The initial number of primary respondents in the 2009 FSDP is $N = 2,969$. Mainly because of the selection on birth cohort the number of respondents is reduced seriously.
2. Additional analyses showed no multicollinearity problems regarding the inclusion of parental viewing and parental covieing as well as parental covieing and childhood TV-viewing frequency.
3. We analyzed children from various birth cohorts. No significant differences could be revealed. Controlling for parental sports participation and unhealthy parental behaviors such as smoking and drinking alcohol during respondents' youth did not change the results.
4. Controlling for general parenting styles (parental warmth or support, strictness and conformity) in our analyses resulted in a non-significant path between parental television viewing and parental instructive mediation, most likely due to the fact that parental warmth to some extent captures the same concept as instructive mediation (i.e., equivalence). All other direct, indirect and total effects, however, remained unchanged. We therefore chose not to include these general parenting styles in the final modeling, since the purpose of our study is to analyze distinct parental television socialization activities in relation to a person's (adult) weight status.

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Appendix A: Bivariate Correlations

	Parental Restrictive Mediation	Parental Instructive Mediation	Parental Coviewing	Respondents' Childhood Television Viewing	Respondents' Pre-adult Weight Status	Respondents' Educational Attainment	Respondents' Adult Television Viewing	Respondents' Current Weight Status
Parental television viewing example	- 0.196	- 0.101	0.088	0.452	0.045	- 0.212	0.371	0.074
Parental restrictive mediation		0.339	0.143	- 0.136	- 0.005	0.056	- 0.059	0.001
Parental instructive mediation			0.530	0.000	- 0.014	0.062	- 0.086	- 0.065
Parental coviewing				0.152	0.003	0.012	0.042	- 0.005
Respondents' childhood television viewing					0.103	- 0.134	0.406	0.087
Respondents' pre-adult weight status						- 0.075	0.076	0.578
Respondents' educational attainment							- 0.264	- 0.147
Respondents' adult television viewing								0.180

Note. **Bold** = significant at $p < 0.5$. Source: FSDP 2009 (N = 1,377).

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