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**ADHD Symptoms and Unhealthy Eating Behaviors in Dutch Adolescents: The Role of
Sleep Time, Family Support, and Family Affluence¹**

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¹ *This thesis has been written as a study assignment under the supervision of an Utrecht University teacher. Ethical permission has been granted for this thesis project by the ethics board of the Faculty of Social and Behavioral Sciences, Utrecht University, and the thesis has been assessed by two university teachers. However, the thesis has not undergone a thorough peer-review process so conclusions and findings should be read as such.*

Abstract

Existing research has primarily focused on the relationship between ADHD symptoms and overweight in children, rather than exploring the broader concept of unhealthy eating behaviors and specifically focused on the adolescent population. Therefore, this study aimed to investigate the association between ADHD symptoms and unhealthy eating behaviors among Dutch adolescents, while examining the potential impact of sleep time, family support, and family affluence on this association. This cross-sectional study used Health Behaviour in School Aged Children 2017 data, which included a representative sample of 7,392 adolescents between 11 and 20 years from the Netherlands ($M_{age} = 14.1$, $SD = 1.9$). The results demonstrated that adolescents with more ADHD symptoms were more likely to engage in unhealthy eating behaviors, and that this association can be partially explained by sleep time. The interdisciplinary approach of the study contributes to the comprehensive understanding of the relationship between ADHD symptoms and unhealthy eating behaviors. This study emphasizes the need for selective interventions that address the challenges faced by adolescents with ADHD symptoms to promote healthy eating behaviors and well-being. Moreover, longitudinal designs are recommended to investigate the directionality of relationships over time.

Keywords: adolescents; ADHD symptoms; unhealthy eating behaviors; sleep time; sleep deprivation; family support; family affluence

Samenvatting

Bestaand onderzoek heeft zich voornamelijk gericht op de relatie tussen ADHD-symptomen en overgewicht bij kinderen, in plaats van het bredere concept van ongezond eetgedrag te onderzoeken en zich specifiek te richten op de adolescentenpopulatie. Het doel van deze studie was dan ook om de associatie tussen ADHD-symptomen en ongezond eetgedrag onder Nederlandse adolescenten te onderzoeken, en tegelijkertijd de mogelijke invloed van slaapduur, gezinsondersteuning en gezinswelvaart op deze relatie te onderzoeken. Deze cross-sectionele studie heeft gebruik gemaakt van gegevens uit Health Behaviour in School Aged Children 2017, met een representatieve steekproef van 7,392 adolescenten tussen 11 en 20 jaar uit Nederland ($M_{age} = 14.1$, $SD = 1.9$). De resultaten hebben aangetoond dat adolescenten met meer ADHD-symptomen vaker ongezond eetgedrag vertoonden en dat deze associatie gedeeltelijk verklaard kan worden door slaapduur. De interdisciplinaire aanpak van het onderzoek draagt bij aan een beter begrip van de relatie tussen ADHD-symptomen en ongezond eetgedrag. Dit onderzoek benadrukt de noodzaak van selectieve interventies die gericht zijn op

de uitdagingen waarmee adolescenten met ADHD-symptomen worden geconfronteerd om gezond eetgedrag en welzijn te bevorderen. Bovendien worden longitudinale onderzoeken aanbevolen om de richting van relaties over tijd te onderzoeken.

Sleutelwoorden: adolescenten; ADHD-symptomen; ongezond eetgedrag; slaapduur; slaaptekort; gezinsondersteuning; gezinswelvaart

INTRODUCTION

According to a recent study by the CBS in 2022, 16% of 12–16-year-olds and 19% of 16–20-year-olds in the Netherlands are overweight (CBS, 2022). This highlights the growing problem of unhealthy eating behaviors among adolescents. Unhealthy eating behaviors refer to a range of habits or patterns of eating that can impact both physical and mental well-being (Huang et al., 2017; O’Neil et al., 2014; Udvari, 2020). These behaviors include overeating, skipping meals, binge eating, emotional eating, using food as a coping mechanism, eating while engaged in sedentary activities such as watching TV or using a computer, and consuming a diet that lacks in essential nutrients (Inchley et al., 2016; Kann et al., 2018; Neumark-Sztainer et al., 1997; Rodrigues et al., 2017). In addition to its’ physical consequences, unhealthy eating behaviors can also have a significant impact on adolescents’ mental well-being (Burrows et al., 2016; Martyn-Nemeth et al., 2008; O’Neil et al., 2014). As reported by CBS, the mental health of Dutch adolescents has significantly declined in recent years. In 2021, 18% of individuals aged 12-25 reported to have mental health issues, compared to 11% in 2019 and 2020 (CBS, 2021).

ADHD symptoms and unhealthy eating behaviors

Among adolescents, those with ADHD symptoms may be at an increased risk of developing unhealthy eating behaviors due to the presence impulsivity and inattention, which are main characteristics of ADHD (American Psychiatric Association, 2013). Impulsivity is defined as doing without thinking due to difficulty in impulse regulation (American Psychiatric Association, 2013). Impulsivity make it challenging for individuals with ADHD symptoms to resist the instant satisfaction of unhealthy foods (Jasinska et al., 2012). The impulsive behavior can lead to a higher consumption of calorie-dens, nutrient-poor foods, contributing to unhealthy eating behaviors (Jasinska et al., 2012; Kaisari et al., 2018; Van Egmond-Fröhlich et al., 2012). Additionally, inattention is characterized by having trouble maintaining focus and control about thoughts and behaviors, and having trouble in organizing and completing tasks (American Psychiatric Association, 2013; Barkley, 2010; Cortese & Tessari, 2017). Inattention can contribute to unhealthy eating patterns because individuals with ADHD symptoms have difficulty paying attention to internal hunger and fullness cues and have trouble focusing on meal planning and decision making, resulting in making unhealthy food choices (Cortese & Tessari, 201; Graziano et al., 2011). A cross-sectional study by Rojo-Marticella et al. (2022) demonstrated that children with inattentive symptoms are at higher risk for unhealthy eating habits, and similar findings were reported in cross-sectional research by Li et al. (2020)

regarding adult inattention. Furthermore, research indicate that individuals with ADHD have heightened reward sensitivity, which can increase their desire for foods in high fats sugars while decreasing their interest in for healthy foods like fruits and vegetables (Cortese et al., 2008; Howard et al., 2011). In summary, adolescents with ADHD symptoms may be more likely to develop unhealthy eating behaviors due to difficulties in impulse regulation, challenges in paying attention to hunger cues, and have a stronger preference for foods that are high in calories but low in nutrients. Therefore, in this study we expect that adolescents with more ADHD symptoms will have a higher likelihood to engage in unhealthy eating behaviors compared to adolescents with less ADHD symptoms.

The role of sleep time

The role of sleep time in the link between ADHD symptoms and unhealthy eating behaviors has received significant attention in research. Individuals with ADHD symptoms often experience sleep problems due to difficulties in attention, impulsivity, and hyperactivity, leading to disrupted sleep patterns (Gau et al., 2007). Additionally, the meta-analysis of Cortese et al. (2009) demonstrated that children with ADHD showed higher rates of various sleep difficulties than non-ADHD children. Sleep deprivation can disrupt hunger hormones, impair cognitive functions, and enhance impulsivity. These factors contribute to making unhealthy food choices (Hargens et al., 2013; Owens & Mindell, 2011; St-Onge et al., 2012). Longitudinal studies have demonstrated that children with ADHD who had sleep problems were more likely to have overweight (Carter et al., 2011; Chervin et al., 2001). Additionally, Vgontzas et al. (2008) found that adults with lack of sleep were more likely to engage in emotional eating. In summary, the link between ADHD symptoms and unhealthy eating behaviors may be explained by sleep deprivation, which disrupts hunger hormones, impairs cognitive functions, and enhances impulsivity, resulting in unhealthy food choices. Therefore, in this study we expect that adolescents with more ADHD symptoms will have less sleep compared to those with less ADHD symptoms, and that this sleep deprivation will contribute to an increase in unhealthy eating behaviors.

The role of family support

The link between ADHD symptoms and unhealthy eating behaviors can be explained by the presence of a lack of family support. Adolescents with ADHD often experience challenges in gaining enough family support (Edwards et al., 2001) due to reciprocal factors. On one hand, parents may face difficulties in managing their child's symptoms leading to increased stress and a lack of support for their children. On the other hand, adolescents with

ADHD symptoms may find it challenging to express their needs and experiences and to communicate clearly, resulting to misunderstanding and family conflicts. The strain in communication and the sense of being misunderstood may disrupt family structures (Teixeira et al., 2015). These communication barriers and feelings of being misunderstood may encourage adolescents to seek emotional comfort through excessive and emotional eating at home or by seeking alternative sources of support outside the family context (Christian et al., 2020). This can drive adolescents to engage in unhealthy eating behaviors. According to the results of the study of Dulles et al. (2021), a bad parent-child relationship is also linked to less time spent at home, which increases the risk that adolescents engage in unhealthy eating behaviors outside the home environment. In summary, the difficulties parents face and the perceived misunderstanding between parents and their children may contribute to lower perceived family support. This may further exacerbate unhealthy eating behaviors in adolescents with ADHD symptoms. Therefore, in this study we expect that adolescents with more ADHD symptoms will experience less family support compared to those with less ADHD symptoms, and this lower level of family support will contribute to an increase in engaging of unhealthy eating behaviors.

The role of low family affluence

Finally, the level of family affluence may play an important role in how ADHD symptoms are related to unhealthy eating behaviors. Adolescents with ADHD symptoms from families with lower affluence may be at a greater risk for unhealthy eating behaviors and weight-related problems compared to those from families with higher affluence. Limited access to healthy food options and an increased exposure to advertisements for unhealthy foods in low-affluence families may intensify the association between ADHD symptoms and unhealthy eating behaviors (Janssen et al., 2006). Furthermore, stress and lack of resources associated with low family affluence can make it harder for adolescents with ADHD to make healthy decisions about food, which can worsen their unhealthy eating pattern. In summary, the level of family affluence may impact the association between ADHD symptoms and unhealthy eating behaviors, with adolescents from lower-affluence families being at a greater risk for these behaviors, due to limited access to healthy foods, exposure to unhealthy food advertisements, and added stress and lack of resources. Therefore, we expect that the relationship between adolescents with ADHD symptoms and unhealthy eating behaviors will be stronger among adolescents from low affluence families compared to those from high affluence families.

Current study

Existing literature has extensively examined the link between ADHD symptoms and overweight (Davis, 2010; Egbert et al., 2018; Hersko et al., 2018; Patte et al., 2020). However, there is a lack of research on the relationship between ADHD symptoms and unhealthy eating behaviors. By measuring eating behaviors, a more accurate assessment of nutrition can be obtained, making this a crucial focus of this study (Netherlands Youth Institute, 2022). In addition, previous studies focused on the relationship between ADHD symptoms and unhealthy eating behaviors have mostly focused on children (Mayes & Zickgraf, 2019), ignoring potential differences in ADHD symptoms among adolescents. Therefore, it is crucial to investigate in the relationship in the adolescent population as it offers valuable insights into the underlying mechanisms and specific characteristics of this age group. It is important to consider the relevance of examining the impact of factors like sleep time, family support, and low family affluence, as it provides a comprehensive understanding of the interplay between individual and environmental factors, leading to a more interdisciplinary approach to promote healthy eating behaviors in adolescents with ADHD symptoms. Moreover, understanding the association between ADHD symptoms and unhealthy eating behaviors is valuable for adolescents, as it may provide them crucial information about their food choices and aid in their decision-making. Furthermore, this knowledge is essential for prevention workers to develop effective interventions to support adolescents with ADHD symptoms in making healthier food choices.

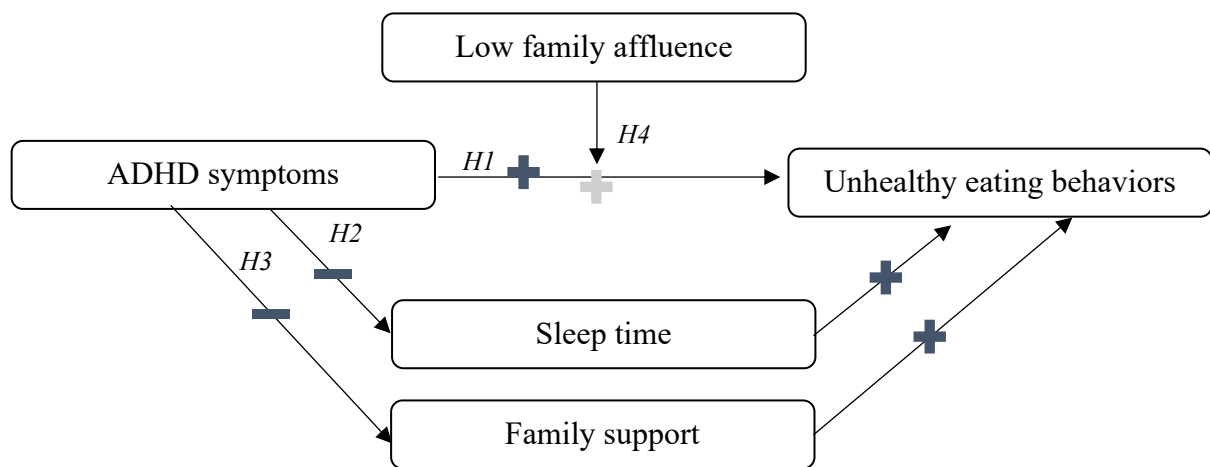
The current study aims to examine the association between ADHD symptoms and unhealthy eating behaviors among adolescents, while also considering the potential effects of sleep time, family support, and family affluence that may affect this association. The model that is used in this study is shown in Figure 1. The study will test the following hypotheses:

1. Hypothesis 1: Adolescents with more ADHD symptoms are at increased risk to engage in unhealthy eating behaviors compared to those with less ADHD symptoms.
2. Hypothesis 2: Adolescents with more ADHD symptoms will have less sleep time in compared to those with less ADHD symptoms, and this sleep deprivation will contribute to an increase in unhealthy eating behaviors.
3. Hypothesis 3: Adolescents with more ADHD symptoms will experience less family support compared to those with less ADHD symptoms, and this low perceived family support will contribute to an increase in unhealthy eating behaviors.

4. Hypothesis 4: The relationship between adolescents with ADHD symptoms and unhealthy eating behaviors will be stronger among adolescents from low-affluence families compared to those from high-affluence families.

Figure 1

Research model of the direct and indirect relationship between ADHD symptoms and unhealthy eating behaviors, with sleep time and family support as mediators and low family affluence as a moderator.



METHOD

Sample

This study is based on the cross-sectional ‘Health Behaviour in School-aged Children’ (HBSC) study, which is conducted in collaboration with the World Health Organization Regional Office for Europe. Since 1983, the HBSC survey has been conducted every four years to track the health behaviors of 11, 13, and 15-year-olds in Europe, North America, and the Middle East (Boer et al., 2020). The current study made use of data from 2017, which included nationally representative data from adolescents in the Netherlands. The survey included a range of questions related to health-risk behaviors, including substance use, physical activity, diet, and mental health. The survey also collected data on demographic characteristics, such as age, gender, and ethnicity.

The analysis sample consisted of 7,392 participants from the initial pool of 8,980 participants, with missing values identified in the education level variable (17.7% out of 8,980). The sample was filtered based on the condition that only participants with filled-in education level data were included. The sample included individuals from the Netherlands, with a mean age of 14.1 years ($SD = 1.9$) and a gender ratio of 51% girls. Individuals were divided into four groups: 15.1% followed vocational education, 27.5% followed the theoretical track of vocational education, 26.1% followed high school, and 31.0% followed pre-university education. The majority of the sample was Dutch (79.0%), with smaller proportions of respondents identifying as other ethnic groups (21%). The sample characteristics are reported in Table 1.

Table 1

Demographic characteristics

Individual variables	N (=7,392)	Percent
Gender		
Boys	3,597	48.7
Girls	3,795	51.3
Education level		
Vocational education	1,136	15.4
Ve: theoretical track	2,035	27.5
High school	1,929	26.1
Pre-university education	2,292	31.0

Ethnic group

Dutch	5,838	79.0
Non-Dutch	1,553	21.0

Design and procedure

The study used a cross-sectional design to investigate the relationship between ADHD symptoms and unhealthy eating behaviors. The HBSC international study protocol was closely adhered to regarding the standardization of sampling techniques, data collection techniques, and questionnaires (Inchley et al., 2018). Without having seen the original English survey questions first, researchers translated the English survey questions into Dutch. After that, linguists from the HBSC network compared the back-translated and original English survey questions. Inconsistencies in the national language surveys were fixed to allow for comparison of results throughout the Dutch language and culture (Inchley et al., 2018). Institutional ethical consent was obtained for each participant, and voluntary and anonymous participation was allowed, providing participants the option to withdraw from the study at any time. Agreement was obtained from adolescents, parents, and schools to participate in the study.

Measurements

ADHD symptoms. ADHD symptoms were measured using the Hyperactivity-Inattention subscale that is part of the Strengths and Difficulties Questionnaire (SDQ). Items 1-3 were negatively worded (“I am easily distracted/I find it hard to concentrate”), whereas items 4 and 5 were positively worded (“I think before I do something”). To ensure consistency in scoring, items 4 and 5 are recoded so that higher scores indicated greater levels of ADHD symptoms, consistent with items 1-3. All five items were assessed on a scale from 1 (not true) to 3 (definitely true). Internal consistency had a Cronbach’s α of .693.

Unhealthy eating behaviors. Unhealthy eating behaviors were measured using the items “How many times in a week do you eat sweets/chocolate?” and “How many times in a week do you drink soda?”, using a 7-point Likert scale, ranging from 1 (never) to 7 (every day, more than once). Pearson correlation between these two items was .327.

Sleep time. Sleep time was measured using the items “What time do you go to sleep?” and “What time do you get up?”. Both items were assessed using a 10-point Likert scale, ranging from 1 (“before 20:00” for the first item, “before 06:00” for the second item) to 10 (“after 00:00” for the first item, “after 09:30” for the second item). Then, a new variable called ‘sleep time’ was created by calculating the difference between participants’ sleep and wake up time to determine their sleep duration. To standardize responses and facilitate data analysis,

Likert scale values of the two questions were converted into logical scale values. For example, 1 (“before 20:00”) was converted to “19:45” and 2 (“between 20:00 and 20:30”) was converted to “20:15” by calculating the average of each time slot for each Likert scale value.

Family support. Family support was measured using four items about receiving support from family members. An example item is “At home they help me with decision making”, using a 7-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). These questions have been assembled into one scale ranging from 0 to 6 with 0 being the lowest indication of family support and 6 being the highest indication of family support. Internal consistency for these items had a Cronbach’s α of .914.

Family Affluence. Family Affluence was measured using the Family Affluence Scale (FAS) including six items (Hartley et al., 2016). An example item is “How many computers does your family have?”, using a 4-point Likert scale for four items, ranging from 1 (none) to 4 (more than two). One item used a 3-point Likert scale, and two items were assessed on yes/no answers (For example “Do you have an own bedroom?”). The scores for each item are summed to create a total FAS score, which ranges from 0 to 13. A higher score means a higher prosperity. The six items all had a significant correlation with each other of at least .104 and at most .233.

Data analysis

Data analysis was conducted using IBM SPSS Statistics 24 with a sample size of 7,392 participants. Pairwise deletion was used for variables with missing values. Factor and reliability analyses were performed, and no outliers were identified. Demographic variables (age, gender, education level, and ethnicity) were checked in the correlation matrix for associations with the independent and dependent variable, and those showing significant associations were included in the regression analyses. Descriptive statistics, correlation matrix, and linear regression were conducted to examine the associations between ADHD symptoms and unhealthy eating behavior, sleep time, family support, and family affluence. Mediation analyses used the Baron & Kenny method (1986) by checking whether there was an effect of the independent variable on the dependent variable, and by assessing whether the independent variable had a significant effect on the mediator, and whether the mediator had a significant effect on the dependent variable. Finally, the independent variable and mediator were included in the same model to test the effect of the independent variable while controlling for the mediator (c').

RESULTS

Descriptive statistics

In the following section the descriptive statistics are presented, as shown in Table 2, to provide an overview of the participants' ADHD symptoms, unhealthy eating behaviors, sleep time, family support, and family affluence. The sample size was 7,392, and pairwise deletion was used in all analyses to maximize the sample size for each analysis. On average, the participants reported on average having mild to moderate levels of ADHD symptoms ($M = 1.83$, $SD = .47$), and moderate levels of unhealthy foods in a week ($M = 4.14$, $SD = 1.30$). Additionally, they reported an average sleep duration of 8.6 hours per night ($SD = 1.02$) and moderate to high levels of family support ($M = 6.03$, $SD = 1.34$).

Table 2

Descriptives ADHD symptoms, unhealthy eating behaviors, sleep time, family support, and family affluence

Variables	N (=7,392)	Minimum	Maximum	Mean	SD
ADHD symptoms	7,358	1.00	3.00	1.83	.47
Unhealthy eating behaviors	7,390	1.00	7.00	4.14	1.30
Sleep time	7,308	5.5	14.00	8.60	1.03
Family support	7,375	1.00	7.00	6.03	1.34
Family affluence	7199	.00	13.00	9.00	1.87

Correlations

Table 3 shows correlations among demographic variables (gender, age, education level, and ethnicity), ADHD symptoms, unhealthy eating behaviors, sleep time, family support, and family affluence. The analysis was conducted using data from 7,392 participants. The results support the hypotheses, showing significant positive correlations between ADHD symptoms and unhealthy eating behaviors, as well as negative correlations between ADHD symptoms and sleep time, sleep time and unhealthy eating behaviors, and ADHD symptoms and family support. Furthermore, significant correlations were found between demographic variables and the main variables, including a positive correlation between family affluence and education level, and negative correlations between ADHD symptoms and education level. Unhealthy eating was negatively correlated with gender, education level, and ethnicity, while sleep time revealed negative correlations with gender, age, education level, and ethnicity. Negative

correlations were found between family support and age, and family support and ethnicity, while family affluence was negatively correlated with gender, age, and ethnicity. To account for these correlations, gender, age, education level, and ethnicity were included as control variables in the multivariate analyses.

Table 3

Correlation matrix of demographic variables, ADHD symptoms, unhealthy eating behaviors, sleep time, family support, and family affluence (N=7,392)

	1	2	3	4	5	6	7	8	9
1. Gender ^a	1.00								
2. Age	-.00	1.00							
3. Education level	.02	.14**	1.00						
4. Ethnicity ^b	.03*	.02	-.04**	1.00					
5. ADHD symptoms	-.01	-.02	-.17**	-.02	1.00				
6. Unhealthy eating behaviors	-.08**	-.01	-.09**	-.07**	.13**	1.00			
7. Sleep time	-.03*	-.40**	-.06**	-.07**	-.13**	-.08**	1.00		
8. Family support	-.01	-.12**	.01	-.07**	-.16**	-.00	.14**	1.00	
9. Family affluence	-.06**	-.04**	.21**	-.07**	.02	-.00	.00	.10**	1.00

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. For Education Level Spearman's rho was used. Pearson's correlation coefficient was used for all other correlations. ^a Reference category = boys. ^b Reference category = Dutch

ADHD symptoms and unhealthy eating behavior

Hierarchical linear regression analysis was used to examine the relationship between ADHD symptoms and unhealthy eating behaviors, while controlling for gender, age, education level, and ethnicity. The results of the regression analysis are presented in Table 4. The findings show a significant positive association between ADHD symptoms and unhealthy eating behaviors. This indicates that higher levels of ADHD symptoms are associated with more unhealthy eating behaviors. The proportion of explained variance in unhealthy eating behaviors by ADHD symptoms is reported as .013.

Table 4

Linear regression analysis of ADHD symptoms and unhealthy eating behaviors (N=7,355)

<i>Predictor</i>	<i>B</i>	<i>SE</i>	β	<i>p</i>	ΔR^2
Step 1					.020***
Gender ^a	-.19	.03	-.08	<.001***	
Age	.00	.01	.00	.826	
Education level	-.12	.01	-.07	<.001***	
Ethnicity ^b	-.23	.04	-.07	<.001***	
Step 2					.013***
ADHD symptoms	.32	.03	.12	<.001***	

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

^a Reference category = boys. ^b Reference category = Dutch

The role of sleep time

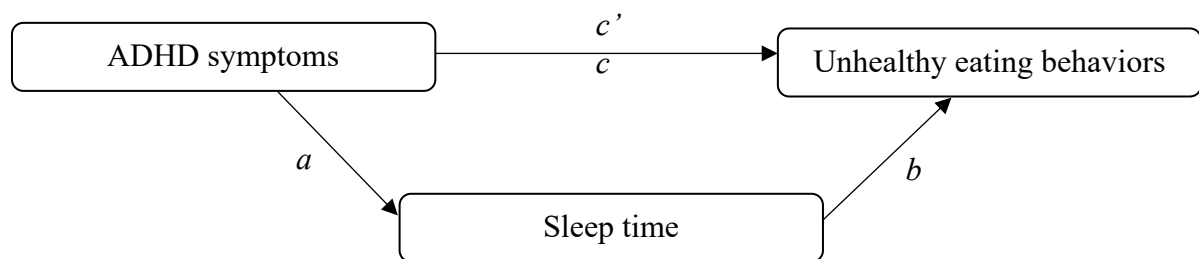
Given the significant correlation between ADHD symptoms as independent variable and unhealthy eating behaviors as dependent variable (Baron & Kenny, 1986), it is possible to test for a mediating effect in the relation between ADHD symptoms and unhealthy eating behaviors. To test the mediation effect of sleep time on the relation between ADHD symptoms and unhealthy eating behaviors, a hierarchical regression analysis was conducted. Table 5 shows that ADHD symptoms was significantly associated with sleep time, indicating that adolescents with more ADHD symptoms tended to have reduced sleep time. Similarly, sleep time was significantly correlated with unhealthy eating behaviors, indicating that less sleep time was associated with a higher likelihood of engaging in unhealthy eating behaviors.

The results suggest a partial mediation effect of sleep time on the relationship between ADHD symptoms and unhealthy eating behaviors because the effect of ADHD symptoms on

unhealthy eating behaviors remained significant when the effect of sleep time on unhealthy eating behaviors was also significant. Sleep time explained .010 of the variance of unhealthy eating behaviors. To confirm the mediation effect, a Sobel test was conducted to examine the significance of the difference between the direct effect of ADHD symptoms on unhealthy eating behaviors (path c) and the total effect of ADHD symptoms on unhealthy eating behaviors through sleep time (path c'). The results of the Sobel test indicated a significant mediation effect ($p < .001$), that implies that sleep time partially mediates the relationship between ADHD symptoms and unhealthy eating behaviors.

Figure 2

Path diagram of ADHD symptoms, sleep time, and unhealthy eating behaviors.



Note. Path a: Direct effect of ADHD symptoms on sleep time. Path b: Direct effect of sleep time on unhealthy eating behaviors. Path c: Direct effect of ADHD symptoms on unhealthy eating behaviors. Path c' : Total effect of ADHD symptoms on unhealthy eating behaviors explained by sleep time.

Table 5

Linear regression analysis of ADHD symptoms and unhealthy eating behaviors mediated by sleep time.

<i>Predictor</i>	<i>B</i>	<i>SE</i>	β	<i>p</i>	ΔR^2
Outcome sleep time (N=7,305)					
Step 1					.163***
Gender ^a	-.05	.02	-.02	.028*	
Age	-.25	.01	-.40	<.001***	
Education level	.00	.01	.00	.701	
Ethnicity ^b	-.15	.03	-.06	<.001***	
Step 2					.021***

ADHD symptoms	-.32	.02	-.15	<.001***	
<hr/>					
Outcome unhealthy eating behaviors (N=7,305)					
<hr/>					
Step 1					.020***
Gender ^a	-.91	.03	-.08	<.001***	
Age	.00	.01	.00	.826	
Education level	-.12	.01	-.10	<.001***	
Ethnicity ^b	-.23	.04	-.07	<.001***	
Step 2					.010***
Sleep time	-.14	.02	-.11	<.001***	
<hr/>					
Outcome unhealthy eating behaviors (N=7,305)					
<hr/>					
Step 1					.020***
Gender ^a	-.19	.03	-.08	<.001***	
Age	.00	.01	.00	.826	
Education level	-.12	.01	-.10	<.001***	
Ethnicity ^b	-.23	.04	-.07	<.001***	
Step 2					.020***
ADHD symptoms	.28	.03	.10	<.001***	
Sleep time	-.12	.02	-.09	<.001***	

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

^a Reference category = boys. ^b Reference category = Dutch

The role of family support

Given the significant correlation between ADHD symptoms as independent variable and unhealthy eating behaviors as dependent variable (Baron & Kenny, 1986), a hierarchical regression analysis was conducted to examine the possible mediating effect of family support. Table 6 shows that ADHD symptoms was significantly positively associated with family support, but there was no significant association between family support and unhealthy eating behaviors. These results show that assumptions for mediation were not met, and therefore, the possible mediation effect could not be tested in this study.

Table 6

Linear regression analysis of ADHD symptoms and unhealthy eating behaviors mediated by family support.

Predictor	B	SE	β	p	ΔR^2
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Outcome family support (N=7,341)					
Step 1					.025***
Gender ^a	-.03	.03	-.01	.305	
Age	-.11	.01	-.13	<.001***	
Education level	.10	.02	.08	<.001***	
Ethnicity ^b	-.20	.04	-.06	<.001***	
Step 2					.024***
ADHD symptoms	-.44	.03	-.16	<.001***	
Outcome unhealthy eating behaviors (N=7,372)					
Step 1					.020***
Gender ^a	-.19	.03	-.08	<.001***	
Age	.00	.01	.003	.825	
Education level	-.12	.01	-.10	<.001***	
Ethnicity ^b	-.23	.04	-.07	<.001***	
Step 2					.000
Family support	-.00	.01	-.00	.956	

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

^a Reference category = boys. ^b Reference category = Dutch

The role of family affluence

A hierarchical regression analysis was conducted to examine the potential effect of family affluence on the relationship between ADHD symptoms and unhealthy eating behaviors. Model 3 of Table 7 presents the results with the addition of the interaction term between ADHD symptoms and family affluence. However, the interaction term was not significant, indicating that the association between ADHD symptoms and unhealthy eating behaviors does not significantly interact with various levels of family affluence.

Table 7

Linear regression analysis of ADHD symptoms and unhealthy eating behaviors moderated by family affluence (N = 7,211).

Predictor	B	SE	β	p	ΔR^2
Step 1					.020***
Gender ^a	-.19	.03	-.08	<.001***	
Age	.00	.01	.00	.825	

Education level	-.12	.02	-.10	<.001***	
Ethnicity ^b	-.23	.04	-.07	<.001***	
Step 2					.014***
ADHD symptoms	.33	.03	-.12	<.001***	
Step 3					.000
Family affluence	.02	.03	.02	.627	
ADHD symptoms *	-.01	.02	-.04	.540	
Family affluence					

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

^a Reference category = boys. ^b Reference category = Dutch

DISCUSSION

The aim of the current study was to examine the association between ADHD symptoms and unhealthy eating behaviors among Dutch adolescents, and to investigate the potential effect of sleep deprivation, family support, and family affluence on this relationship. The results demonstrated a significant association between ADHD symptoms and unhealthy eating behaviors, even after controlling for sleep deprivation. This indicates the presence of additional (unknown) mechanisms that contribute to the relationship.

The results support Hypothesis 1, that proposed that adolescents with more ADHD symptoms would have a higher likelihood of engaging in unhealthy eating behaviors. These findings are in line with previous studies that emphasized how ADHD symptoms make it harder for individuals to regulate impulses, pay attention to hunger cues, make healthy food choices, and control food intake (Jasinska et al., 2012; Kaisari et al., 2018; Van Egmond-Fröhlich et al., 2012).

Hypothesis 2 posited that more ADHD symptoms would be associated with less sleep time, leading to an increase in unhealthy eating behaviors. The results confirmed this hypothesis, showing a significant association between ADHD symptoms and sleep time, as well as between sleep time and unhealthy eating behaviors. This implies that adolescents with more ADHD symptoms tend to experience less sleep time, which is linked to a heightened risk of engaging in unhealthy eating behaviors. The direct association between ADHD symptoms and unhealthy eating behaviors remains even after considering the role of sleep time, indicating a partial mediation. These findings are in line with research by Cortese et al. (2009) highlighting the link between ADHD symptoms and reduced sleep time. Moreover, sleep deprivation is known to increase impulsivity, and disrupt hunger regulation (Hargens et al., 2013; Owens & Mindell, 2011; St-Onge et al., 2012).

Additionally, Hypothesis 3 suggested that adolescents with more ADHD symptoms will experience less family support, and this low perceived family support will contribute to an increase in unhealthy eating behaviors. While the results confirmed a significant negative association between ADHD symptoms and family support (Edwards et al., 2001), no significant association was found between family support and unhealthy eating behaviors, suggesting the presence of additional individual or social factors.

Finally, Hypothesis 4 proposed that adolescents from families with low affluence would demonstrate a stronger relationship between ADHD symptoms and unhealthy eating behaviors than their peers from families with high affluence. However, the findings of this study did not

support this hypothesis. It is possible that other factors, such as accessibility to alternative sources, or cultural norms about foods, may play a more important role in engagement in unhealthy eating behaviors.

Limitations

It is important to emphasize that the present study both has strengths and limitation that should be accounted for when interpreting the results. Regarding the strengths, the use of the representative school sample of the HBSC study enhances the generalizability of the findings. Moreover, by incorporating demographic variables such as age, gender, education level, and ethnicity, the study benefits from the ability to control for confounding effects. Controlling for these variables helps to ensure that found associations between ADHD symptoms and unhealthy eating behaviors are not the result of a confounding effect of demographic factors. Furthermore, the interdisciplinary consideration of variables on individual, familial and societal level, such as sleep time, family affluence and family support, enables a more comprehensive understanding of the relation between ADHD symptoms and unhealthy eating behaviors. The study also has several limitations. Firstly, the cross-sectional design of the study limits the possibility to draw causal relationships regarding the causal direction. Longitudinal designs are needed in future research to investigate the directionality of relationships over time. This would give a clearer understanding of how these factors impact each other. Secondly, self-assessment of ADHD symptoms, sleep duration and food intake by adolescents may be subjective and compromise measurement error. By incorporating more objective measures in future research, such as polysomnography or actigraphy for sleep duration, subjective self-assessment and measurement error would be reduced. Thirdly, measuring unhealthy eating behaviors based on the intake of soda and sweet/chocolate do not cover the full problem of unhealthy eating. It would be beneficial to include a more complete range of dietary indicators, such as other processed foods. Fourthly, another limitation is that medication intake for ADHD and comorbidities, such as anxiety disorders that are often associated with ADHD, was not considered. These medications may influence not only ADHD symptoms, but also other factors related to sleep time and eating behaviors. Future research should consider the potential effects of ADHD medication on these variables. Lastly, the assessment of ADHD symptoms is another limitation. Only five items were used to capture a wide range of symptoms across impulsivity, inattention, and hyperactivity. This measure may not fully cover the complexity of ADHD symptoms. A more accurate and nuanced knowledge of the ADHD symptoms is needed to understand the ADHD diagnosis and its relationship with unhealthy eating behaviors,

Conclusion

This study expands our understanding of the complex interaction between ADHD symptoms and unhealthy eating behaviors in adolescents. We discovered that Dutch adolescents are more likely to engage in unhealthy eating behaviors when they have more ADHD symptoms. Moreover, the study highlights the importance of considering the role of sleep and gives insight on the influence of family support and family affluence. However, further investigation is needed to completely understand the underlying mechanisms of unhealthy eating behaviors in adolescents with ADHD symptoms and to investigate the directionality of relationships over time by conducting longitudinal designs. Practical implications for healthcare are the need for selective interventions targeting adolescents with ADHD, focusing on strategies to address impulsive and inattentive behaviors. The aim of these interventions is to enhance the behavioral control and to promote healthier eating habits among adolescents with ADHD symptoms. In conclusion, this research contributes to a more comprehensive understanding of the relationship between ADHD symptoms and unhealthy eating behaviors. It promotes healthier lifestyles among adolescents with ADHD by paving the way for future research and developing interventions targeting adolescents with ADHD.

References

- American Psychiatric Association (2013) *Diagnostic and statistical manual of mental disorders* (5th ed, Washington, DC: Author. <https://doi/10.1176/appi.books>
- Barkley, R. A. (2010). Differential Diagnosis of Adults With ADHD. *The Journal of Clinical Psychiatry, 71*(07), e17. <https://doi.org/10.4088/jcp.9066tx1c>
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173. <https://doi.org/10.1037//0022-3514.51.6.1173>
- Boyce, W., Torsheim, T., Currie, C., & Zambon, A. (2006). The family affluence scale as a measure of national wealth: validation of an adolescent self-report measure. *Social indicators research, 78*, 473-487. <http://dx.doi.org/10.1007/s11205-005-1607-6>
- Burrows, T., Goldman, S., Pursey, K. & Lim, R. (2016). Is there an association between dietary intake and academic achievement: a systematic review. *Journal of Human Nutrition and Dietetics, 30*(2), 117–140. <https://doi.org/10.1111/jhn.12407>
- Carter, P. J., Taylor, B. J., Williams, S. M., & Taylor, R. W. (2011). Longitudinal analysis of sleep in relation to BMI and body fat in children: the FLAME study. *BMJ, 342*(may26 2), d2712–d2712. <https://doi.org/10.1136/bmj.d2712>
- Centraal Bureau voor de Statistiek. (2021). Mental health of young people declined. Retrieved from <https://www.cbs.nl/en-gb/news/2022/22/mental-health-of-young-people-declined>
- Centraal Bureau voor de Statistiek. (2022). Height and weight of individuals, underweight and overweight; from 1981 [Dataset]. Retrieved from <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81565NED/table?ts=1553851467369>
- Chervin, R. D., Archbold, K. H., Panahi, P., & Pituch, K. J. (2001). Sleep Problems Seldom Addressed at Two General Pediatric Clinics. *Pediatrics, 107*(6), 1375–1380. <https://doi.org/10.1542/peds.107.6.1375>
- Christian, C., Martel, M. M., & Levinson, C. A. (2020). Emotion regulation difficulties, but not negative urgency, are associated with attention-deficit/hyperactivity disorder and eating disorder symptoms in undergraduate students. *Eating Behaviors, 36*, 101344. <https://doi.org/10.1016/j.eatbeh.2019.101344>
- Statistics on overweight | Dutch Youth Institute. (2022, October 21). Retrieved from <https://www.nji.nl/en/figures/overweight>

- Cortese, S., Bernardina, B. D., & Mouren, M. C. (2008). Attention-Deficit/Hyperactivity Disorder (ADHD) and Binge Eating. *Nutrition Reviews*, 65(9), 404–411. <https://doi.org/10.1111/j.1753-4887.2007.tb00318.x>
- Cortese, S., Faraone, S. V., Konofal, E., & Lecendreux, M. (2009). Sleep in Children with Attention-Deficit/Hyperactivity Disorder: Meta-Analysis of Subjective and Objective Studies. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48(9), 894–908. <https://doi.org/10.1097/chi.0b013e3181ac09c9>
- Cortese, S., & Tessari, L. (2017). Attention-Deficit/Hyperactivity Disorder (ADHD) and Obesity: Update 2016. *Current Psychiatry Reports*, 19(1). <https://doi.org/10.1007/s11920-017-0754-1>
- Davis, C. (2010). Attention-deficit/Hyperactivity Disorder: Associations with Overeating and Obesity. *Current Psychiatry Reports*, 12(5), 389–395. <https://doi.org/10.1007/s11920-010-0133-7>
- Dullas, A. R., Yncierto, K. D., Labiano, M. A., & Marcelo, J. C. (2021). Determinants of a Variety of Deviant Behaviors: An Analysis of Family Satisfaction, Personality Traits, and Their Relationship to Deviant Behaviors Among Filipino Adolescents. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.645126>
- Edwards G, Barkley RA, Laneri M, Fletcher K, Metevia L. (2001). Parent–Adolescent Conflict in Teenagers with ADHD and ODD. *J Abnorm Child Psychol*. 29(6):557–72. doi: 10.1023/a:1012285326937
- Gau, S., Kessler, R., Tseng, W., Wu, Y., Chiu, Y., Yeh, C., & Hwu, H. (2007). Association between sleep problems and symptoms of attention-deficit/hyperactivity disorder in young adults. *Sleep*, 30(2), 195–201. <https://doi.org/10.1093/sleep/30.2.195>
- Goodman, R., Meltzer, H., & Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study on the validity of the self-report version. *European child. & adolescent psychiatry*, 7(3), 125-130. <https://doi.org/10.1007/s007870050057>
- Graziano, P. A., Bagner, D. M., Waxmonsky, J. G., Reid, A., McNamara, J. P., & Geffken, G. R. (2011). Co-occurring weight problems among children with attention deficit/hyperactivity disorder: the role of executive functioning. *International Journal of Obesity*, 36(4), 567–572. <https://doi.org/10.1038/ijo.2011.245>
- Hargens, T., Kaleth, Edwards, & Butner. (2013). Association between sleep disorders, obesity, and exercise: a review. *Nature and Science of Sleep*, 27. <https://doi.org/10.2147/nss.s34838>

- Hartley, J., Levin, K. A., & Currie, C. (2016). A new version of the HBSC Family Affluence Scale - FAS III: Scottish Qualitative Findings from the International FAS Development Study. *Child Indicators Research*, 9(1), 233–245. <https://doi.org/10.1007/s12187-015-9325-3>
- Hershko, S., Aronis, A., Maeir, A. & Pollak, Y. (2018). Dysfunctional Eating Patterns of Adults with Attention Deficit Hyperactivity Disorder. *The Journal of Nervous and Mental Disease*, 206 (11), 870-874. doi: 10.1097/NMD.0000000000000894.
- Howard, A. L., Robinson, M., Smith, G. J., Ambrosini, G. L., Piek, J. P. & Oddy, W. H. (2010). ADHD Is Associated With a “Western” Dietary Pattern in Adolescents. *Journal of Attention Disorders*, 15(5), 403–411. <https://doi.org/10.1177/1087054710365990>
- Huang, C., Momma, H., Cui, Y., Chujo, M., Otomo, A., Sugiyama, S., Ren, Z., Niu, K., & Nagatomi, R. (2017). Independent and combined relationship of habitual unhealthy eating behaviors with depressive symptoms: A prospective study. *Journal of Epidemiology*, 27(1), 42–47. <https://doi.org/10.1016/j.je.2016.08.005>
- Inchley, J., Currie, D., Young, T., Samdal, O., Torsheim, T., Augustson, L., Mathison, F., Aleman-Diaz, A. Y., Molcho, M., Weber, M., & Barnekow, V. (2016). Growing Up Unequal: Gender and Socioeconomic Differences in Young People’s Health and Well-Being. Health Behaviour in School-Aged Children (HBSC) Study: International Report from the 2013/2014 Survey. *World Health Organization*.
- Janssen, I., Boyce, W. F., Simpson, K., & Pickett, W. (2006). Influence of individual- and area-level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. *The American Journal of Clinical Nutrition*, 83(1), 139–145. <https://doi.org/10.1093/ajcn/83.1.139>
- Jasinska, A. J., Yasuda, M., Burant, C. F., Gregor, N., Khatri, S., Sweet, M., & Falk, E. B. (2012). Impulsivity and inhibitory control deficits are associated with unhealthy eating in young adults. *Appetite*, 59(3), 738–747. <https://doi.org/10.1016/j.appet.2012.08.001>
- Kaisari, P., Dourish, C. T., Rotshtein, P., & Higgs, S. (2018). Associations Between Core Symptoms of Attention Deficit Hyperactivity Disorder and Both Binge and Restrictive Eating. *Frontiers in Psychiatry*, 9. <https://doi.org/10.3389/fpsy.2018.00103>
- Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., Lowry, R., Chyen, D., Whittle, L., Thornton, J., Lim, C., Bradford, D., Yamakawa, Y., Leon, M., Brener, N., & Ethier, K. A. (2018). Youth Risk Behavior Surveillance — United States, 2017. *MMWR. Surveillance Summaries*, 67(8), 1–114. <https://doi.org/10.15585/mmwr.ss6708a1>

- Li, L., Taylor, M. J., Bälter, K., Kuja-Halkola, R., Chen, Q., Hegvik, T., Tate, A. E., Chang, Z., Arias-Vásquez, A., Hartman, C. A., & Larsson, H. (2020). Attention-deficit/hyperactivity disorder symptoms and dietary habits in adulthood: A large population-based twin study in Sweden. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *183*(8), 475–485. <https://doi.org/10.1002/ajmg.b.32825>
- Martyn-Nemeth, P., Penckofer, S., Gulanick, M., Velsor-Friedrich, B. & Bryant, F. B. (2008). The relationships among self-esteem, stress, coping, eating behavior, and depressive mood in adolescents. *Research in Nursing & Health*, *32*(1), 96–109. <https://doi.org/10.1002/nur.20304>
- Mayes, S. D., & Zickgraf, H. (2019). Atypical eating behaviors in children and adolescents with autism, ADHD, other disorders, and typical development. *Research in Autism Spectrum Disorders*, *64*, 76-83. <https://doi.org/10.1016/j.rasd.2019.04.002>
- Neumark-Sztainer, D., Story, M., Toporoff, E., Himes, J. H., Resnick, M. D., & Blum, R. W. (1997). Covariations of eating behaviors with other health-related behaviors among adolescents. *Journal of Adolescent Health*, *20*(6), 450–458. [https://doi.org/10.1016/s1054-139x\(96\)00279-0](https://doi.org/10.1016/s1054-139x(96)00279-0)
- O’Neil, A., Quirk, S. E., Housden, S., Brennan, S. L., Williams, L. J., Pasco, J. A., Berk, M., & Jacka, F. N. (2014). Relationship Between Diet and Mental Health in Children and Adolescents: A Systematic Review. *American Journal of Public Health*, *104*(10), e31–e42. <https://doi.org/10.2105/ajph.2014.302110>
- Owens, J. A., & Mindell, J. A. (2011). Pediatric Insomnia. *Pediatric Clinics of North America*, *58*(3), 555–569. <https://doi.org/10.1016/j.pcl.2011.03.011>
- Patte, K. A., Davis, C. A., Levitan, R. D., Kaplan, A. S., Carter-Major, J. & Kennedy, J. L. (2016). A Behavioral Genetic Model of the Mechanisms Underlying the Link Between Obesity and Symptoms of ADHD. *Journal of Attention Disorders*, *24*(10), 1425–1436. <https://doi.org/10.1177/1087054715618793>
- Rodrigues, P. R. M., Luiz, R. R., Monteiro, L. S., Ferreira, M. G., Gonçalves-Silva, R. M. V., & Pereira, R. A. (2017). Adolescents’ unhealthy eating habits are associated with meal skipping. *Nutrition*, *42*, 114-120.e1. <https://doi.org/10.1016/j.nut.2017.03.011>
- Rojo-Marticella, M., Arija, V., Alda, J. N., Morales-Hidalgo, P., Esteban-Figuerola, P., & Canals, J. (2022). Do Children with Attention-Deficit/Hyperactivity Disorder Follow a Different Dietary Pattern than That of Their Control Peers? *Nutrients*, *14*(6), 1131. <https://doi.org/10.3390/nu14061131>

- Salvini, S., Hunter, D. J., Sampson, L., Stampfer, M. J., Colditz, G. A., Rosner, B., & Willett, W. C. (1989). Food-based validation of a dietary questionnaire: the effects of week-to-week variation in food consumption. *International journal of epidemiology*, *18*(4), 858-867.
- St-Onge, M. P., McReynolds, A., Trivedi, Z. B., Roberts, A. L., Sy, M., & Hirsch, J. (2012). Sleep restriction leads to increased activation of brain regions sensitive to food stimuli. *The American Journal of Clinical Nutrition*, *95*(4), 818–824. <https://doi.org/10.3945/ajcn.111.027383>
- Van Egmond-Fröhlich, A. W. A., Widhalm, K., & de Zwaan, M. (2012). Association of symptoms of attention-deficit/hyperactivity disorder with childhood overweight adjusted for confounding parental variables. *International Journal of Obesity*, *36*(7), 963–968. <https://doi.org/10.1038/ijo.2012.78>
- Vgontzas, A. N., Lin, H. M., Papaliaga, M., Calhoun, S., Vela-Bueno, A., Chrousos, G. P., & Bixler, E. O. (2008). Short sleep duration and obesity: the role of emotional stress and sleep disturbances. *International Journal of Obesity*, *32*(5), 801–809. <https://doi.org/10.1038/ijo.2008.4>
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of personality assessment*, *52*(1), 30-41. https://psycnet.apa.org/doi/10.1207/s15327752jpa5201_2

Appendix A

Interdisciplinarity

The relationship between ADHD symptoms and unhealthy eating behaviors involves multiple interdisciplinary factors that are helpful in creating a full comprehensive model. Theoretical insights from various scientific disciplines, such as psychology, biology, neuroscience, nutrition, sociology, economy, anthropology, and pedagogy would be helpful to understand this relationship.

Psychological theories about impulsivity and inattention may help to explain why adolescents with ADHD symptoms are more likely to engage in unhealthy eating behaviors. Biological theories can provide insights into the underlying neural mechanisms and genetic, as well as the ways in which the body and brain may be affected by ADHD and sleep deprivation. Nutritional research may be important to understand the specific kinds of foods and diets that may be problematic for adolescents with ADHD symptoms. Social research can provide insights into how factors as peer pressure and family dynamics (relationship with parents) may impact eating behaviors. Economic theories may provide insight into how factors such as poverty and access to healthy foods can impact eating behaviors. Anthropological research can provide research into how cultural and historical factors may shape the relation between ADHD symptoms and eating behaviors. Pedagogical theories can provide insight into how school interventions can be improved to help adolescents with ADHD symptoms in developing healthier eating habits.

In Sameroff's terms, the factors in my model can be in the following spheres:

- ADHD: Person: ADHD affects the ability to regulate eating behaviors, which can lead to unhealthy eating habits
- Social-economic status: Society: SES can impact access to healthy foods and resources for managing ADHD, which can lead to unhealthy eating behaviors
- Sleep deprivation: Person: Sleep deprivation can also impact the ability to regulate their eating behaviors, leading to unhealthy eating habits.
- Relationship with parents: Group context: A poor relationship with parents may affect the emotional regulation, which may lead to unhealthy eating behaviors.

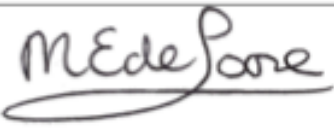


The use of different disciplines and the use of multiple levels of analysis, such as person, group and society, help to identify the different factors that may be involved in the relationship between ADHD symptoms and unhealthy eating behaviors, and how they interact and build on each other. This allows for a comprehensive understanding of the problem.

Appendix B
Mini internship 60 hours

Registration Form: Research Activities for TED-students (in total 60 hrs)

Lotte Jansen.....(Name)

5733677.....(Student number)

Research Activities	Total number of Hours	Signature YS staff
M. De Looze Transcripts onderzoek seksuele vorming, transcripts filmpjes en vertalen voor HBSC study, codes onderzoek seksuele vorming	20	
V. Duindam Individueel voorbereiden bijeenkomsten leeronderzoek, samen met duo voorbereiden bijeenkomsten, aanwezigheid en lesgeven bijeenkomsten	30	
V. Duindam Maken van nieuwe PowerPoints en voorbeelden data-analyse plan voor bijeenkomsten	10	
Total	60	

Appendix C

Contract data-use TED track

This letter constitutes formal confirmation of the fact that the data from the Utrecht University HBSC Study 2021 have been made available to Lotte Jansen of Utrecht University.

These data will not be made available to others, and the data may be used only for analysis and reporting on topics for the thesis, about which agreement has been reached with Regina van den Eijnden.

Lotte Jansen will receive access to the data from the dataset in order to answer the following research questions within the framework of the thesis:

Research question: ADHD Symptoms and Unhealthy Eating Behaviors in Dutch Adolescents: The Role of Sleep Time, Family Support, and Family Affluence

The following variables will be used:

Dependent variable: Unhealthy eating behaviors

Independent variables: ADHD symptoms

Other variables: Sleep time, family support, family affluence

No report based on the data from the project entitled HBSC will be made public, unless permission has been obtained in advance from the Project Coordinator for the HBSC.

After the expiration of this contract, dated 30 June 2023, Lotte Jansen shall delete the HBSC data.

Dates and signature: 27/01/2023



Name of student: Lotte Jansen

Name of Project Coordinator: Regina van den Eijnden.