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The Relationship Between Internet Usage Style and Internet Addiction and Food Addiction in Obese Children Compared to Healthy Children

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What is already known on this topic?

- *Internet and social media addiction has been increasing with increasing internet use in recent years. Obesity has become an important public health problem affecting most societies around the world. Research has focused on internet and social media addiction, lack of physical activity, and the increasing prevalence of obesity in adolescence.*

What this study adds on this topic?

- *Internet addiction and social media applications were found to be significantly related. Internet addiction scores were found to be higher in those using social media applications. There was a positive correlation between internet addiction scores and food addiction scores and body mass index.*

ABSTRACT

Objective: The frequency of using the internet and social media increases in childhood, which leads to a decrease in physical activity. We aimed to investigate the effects of such technological applications on the internet and food addiction in obese and nonobese children.

Materials and Methods: A total of 180 obese and 180 nonobese children were included in this study. Turkish version of the Parent-Child Internet Addiction Scale and Dimensional Yale Food Addiction Scale Version 2.0 for Children were applied.

Results: The frequency of internet addiction in the sample was 1.7%. The mean internet addiction scores of males were found to be significantly higher than females (34.9 ± 20.6, 26 ± 17.2; $P < .001$). Children, who used the internet for information and homework had significantly lower internet addiction scores and food addiction scores, respectively ($P = .002$, $P = .009$). Watching movies, TV series, or sports events ($P < .001$, $P = .009$); following food recipes, campaigns, or advertisements ($P = .04$, $P < .001$); and eating snacks in front of the screen ($P < .001$, $P < .001$) were found to cause higher internet addiction scores and food addiction scores. It was observed that body mass index showed a positive and significant correlation with internet addiction scores and food addiction scores.

Conclusions: Internet addiction and social media applications were found to be significantly related. Considering the relationship between body mass index and addiction, the effect of internet usage style and internet addiction and food addiction on obesity is striking.

Keywords: Children, food addiction, internet addiction, obese

INTRODUCTION

Physical inactivity, sedentary lifestyle, unhealthy eating habits, and insufficient sleep time are risk factors that can be modified among the causes of childhood obesity.[1] The increase in the time spent in front of the screen in school-age children and adolescents, and unlimited internet access causes a further decrease in physical activity.[1,2] Access to the internet has become easier due to the increase in the number of individuals using technological developments, portable mobile devices, and especially smartphones. In 2022, it is thought that there are approximately 5.2 billion active internet users, equivalent to 66% of the global world population.[3] Asia is the region with the largest number of online users.[3] Recent findings show an increase in the use of internet applications, social media platforms and messaging applications in adolescents during the lockdown of the COVID-19 pandemic period.[4] Internet addiction has become an important public health problem in recent years, due to excessive or uncontrolled use of the internet, affecting daily life and causing behavioral and impulsive disorders.[5] Internet addiction has turned into an activity area where we spend most of our daily time in relation to many online activities (online gaming, social networks, virtual

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gambling, access to information, or homework). Especially adolescence stands out as a more vulnerable period for developing internet addiction.[5]

Many health problems such as anxiety disorder, decreased self-confidence, depression, sleep disorders, and eating disorders have been reported in students related to smartphone addiction, internet addiction, or the time spent on the internet without addiction.[6,7] According to the data of the Turkish Statistical Institute for 2021, the frequency of internet usage in children aged 6-15 was 82.7%, and the frequency of using mobile phones or smartphones was 64.4%.[8] Furthermore, 31.3% of the children who use the internet regularly stated that they use the internet for social media networks (such as Facebook, Instagram, Twitter, Youtube, TikTok, WhatsApp, or Telegram).[8] Internet addiction has been shown to have numerous adverse effects on nutrition and physical activities. Frequent breakfast skipping, increase in meal size, habit of snacking while using the internet, being less physically active, irregular sleep pattern, short sleep time, and alcohol and tobacco use can be given as examples.[9-11]

Increasing internet usage and technological developments make our daily life easier, but the fact that people can solve most tasks with 1 click on the screen has started to create a more sedentary lifestyle. The restrictions imposed during the COVID-19 pandemic, the increase in the frequency of smartphone use, social media applications, and increasing internet usage times have made addiction processes a more prominent public health problem.[12] In our study, we aimed to investigate the frequency of internet addiction and food addiction among children with and without obesity after the restriction period in the Central Anatolian Region of Turkey. In addition, we searched for answers to questions such as the means of accessing the internet, the purposes of using the internet, and the frequency and preferences of using certain social media networks, by investigating the relationship between the internet and food addiction and obesity in children. Thus, we investigated the effect of some factors such as the internet and social media applications on obesity.

MATERIALS AND METHODS

Participants

The research group consisted of children who were referred to the pediatric endocrinology outpatient clinic for any reason (routine examination, evaluation in terms of puberty or height, laboratory abnormalities in hormonal tests, etc.) and no systemic or endocrine diseases (e.g., hypothyroidism, Cushing's syndrome, diabetes mellitus) were detected based on their medical history, physical examination, and laboratory findings. These children were divided into 2 groups as "obese" the body mass index (BMI) standard deviation (SD) score above 2 SD and "nonobese" BMI SD score (SDS) between –1 and +1 SD according to Centers for Disease Control and Prevention (CDC) age and sex-specific BMI references. Centers for Disease Control and Prevention reference cards were used because they were more internationally acceptable.

All children included in this study were evaluated at Kayseri City Hospital in 2022. The criteria for inclusion in the study are to be able to use the internet effectively and to have completed literacy education (children aged 8-18). Exclusion criteria from the study were to have any endocrine or systemic disease, to be currently following any diet program, to have used any medication in the last 6 months, to be younger than 8 years or older than 18 years, and to have any mental or motor health problems. The study was approved by Kayseri City Hospital clinical research ethics committee with its decision dated March 10, 2022, and numbered 592. Written informed consent forms were obtained from the legal guardians of all participants and patients over 12 years of age. Research ethical principles were conducted in accordance with the Declaration of Helsinki. Our research started in March 2022 with the approval of the ethics committee and ended in July 2022.

Sample size calculation was performed using G*Power version 3.1.9.2 (Kiel University, Kiel, Germany) software program. The sample size was calculated as 164 patients for each group, with 95% power, 5% significance level, and an effect size value of 0.40. One hundred eighty patients for each group were included in the study against the possibility of patient dropouts.

Anthropometric Measurements

In anthropometric examinations, body weight, height, BMI values, age- and sex-specific references, and SDSs of these values were calculated using an online calculation program.[13] The CDC-specific growth charts were used for evaluation. According to the BMI status categories for age and the corresponding percentiles, obese children are classified as those above the 95th percentile, and those who are healthy are classified as those between the 5th percentile and the 85th percentile. We classified the groups according to the BMI SDSs as those above 2 SD and those between –1 and +1 SD so that individuals with borderline ranges were not included in this study. As a measuring device, ADE model M320600-01 (GmbH & Co Hamburg-Germany) weight and height meter was used for measurements.

Questionnaires

Data were obtained through a paper-based, structured questionnaire administered to the family member. The questionnaire consisting of 3 main parts could be answered in 3-5 minutes. It was applied to the participants in their polyclinic applications. In the first part, it includes questions about personal preferences. These were the means of accessing the internet (smartphone, personal computer, or tablet), the social networking services used (Facebook, Instagram, Twitter, Youtube, TikTok, WhatsApp, or Telegram), and the purposes of using the internet (gaining information, homework, shopping, music, video, movie, etc.). In other sections, there were 2 subscales measuring internet addiction and food addiction.

Griffiths[14] defined technological addiction, which is human–machine interaction, as a type of behavioral addiction and described it as a type of nonchemical addiction. Problematic internet use: (i) preoccupation with a particular behavior, (ii) the behavior being used to escape from reality or to create euphoria, (iii) development of tolerance while the behavior continues, (iv) withdrawal symptoms when the behavior is interfered with, (v) emergence of interpersonal problems as a result of the persistent behavior, and (vi) have been described by the experience of relapse against the will. Eating disorders

may occur due to the interaction of many factors such as eating habits (especially binge eating and food addiction), social, psychological, and genetic factors. Studies have shown that binge-focused eating disorders are similar to substance addictions according to substance addiction criteria.[15]

An "Internet Addiction Scale (IAS)" consisting of 20 questions was developed by Young[16] by adapting the "Pathological Gambling" criteria of DSM-IV and later developed by Young. The Parent-Child Internet Addiction Scale (PCIAT-20), which is derived from the IAS, in which individuals can self-report, is a Likert-type scale, and the participants are asked "Not Applicable," "Rarely," "Occasionally," "Frequently," "Often," and "Always." It is requested to tick one of the options. These options are given 0, 1, 2, 3, 4, and 5 points, respectively. When a score of 80 or more is obtained, it is defined as "Internet addicted"; It was defined as "Limited Symptoms" when a score of 50-79 was taken; and "Average user" when a score of 49 or less was received. In order to evaluate internet addiction, the Turkish version of the PCIAT-20 was used.[17] Validity and reliability analyses were performed. Based on the fact that binge-focused eating disorders are similar to substance addictions according to substance addiction criteria, the Yale Food Addiction Scale consisting of 27 items was developed to measure food addiction and then this form was revised for children, and the final 16-item Dimensional Yale Food Addiction Scale Version 2.0 for Children was created.[18] The scale was adapted to Turkish, and a validity and reliability analysis was performed.[19] This version was used in our study.

Statistical Analysis

Statistical analyses were performed on Statistical Package for the Social Sciences version 24.0 (IBM Corporation, Armonk, NY, USA) software program. The mean, SD, median, first and third quartile values of the numerical data, and the frequencies and percentages of the categorical data were calculated. Shapiro–Wilk test was used to evaluate the normal distribution. In addition, normally distributed Q-Q plots and histograms, and the variables with kurtosis and skewness values between −2 and +2 were considered to have a normal distribution. In the comparisons of the 2 groups, the Student's *t*-test was used if it was suitable for the parametric test assumptions. If parametric test assumptions could not be met, Mann–Whitney *U*-test was applied. In the comparison of more than 2 independent variables, 1-way ANOVA analysis was used if the normal distribution assumptions were met. Bonferroni correction was applied in post hoc analysis. Chi-square test was used to compare categorical variables. Pearson correlation analysis was used to evaluate the degree and direction of relationship between independent variables. A *P* value less than .05 was accepted for statistical significance.

RESULTS

Our study included 360 children aged between 8 and 18 years, 180 obese (BMI above +2 SDS), and 180 nonobese (BMI between −1 and +1 SDS). All of the participants were from the central Anatolian region of Turkey, living in the city of Kayseri, where we conducted the study. Age, anthropometric measurements, and scores of the internet and food addiction are shown in Table 1.

Table 1. Participants' Age, Anthropometric Measurements, and Internet and Food Addiction Scores

	Obese Group (Mean ± SD)	Nonobese Group (Mean ± SD)	*P*
Age (years)	13.25 ± 2.76	13.79 ± 2.69	.06
BMI (kg/m^2)	31.42 ± 4.62	20 ± 2.63	<.001
BMI SDS	2.28 ± 0.21	0.20 ± 0.68	<.001
Internet addiction scores	32.2 ± 20.3	26.9 ± 17.4	.008
Food addiction scores	27.8 ± 15.6	16.3 ± 12.8	<.001

BMI, body mass index; SD, standard deviation; SDS, standard deviation score. Data with normal distribution evaluated with Student's *t*-test.

While 87 (48.3%) of the obese children were girls and 93 (51.7%) were boys, 129 (71.7%) of the nonobese children were girls and 51 (28.3%) were boys. There was a significant difference between the groups in terms of sex ($P < .001$). Although there was a significant difference between the groups in terms of sex distribution, no significant difference was found between the mean food addiction scores (FAS) of females and males, respectively (20.8 ± 14.9, 24 ± 15.9; $P = .054$). The mean internet addiction scores (IAS) of males were found to be significantly higher than females (34.9 ± 20.6, 26 ± 17.2; $P < .001$). In the analysis of the whole sample, a total of 6 (1.7%) children, 1 female and 5 males, were found to be internet addicted. A total of 48 (13.3%) children, 22 females and 26 males, were found to have limited symptoms. A total of 306 (85%) children, 193 females and 113 males, were asymptomatic average user. Internet addiction was detected in 4 (2.2%) children within the obese group and 2 (1.1%) children within the nonobese control group. Also, it was determined that 27 of the children with limited symptoms were from the obese group and 21 children were from the nonobese control group. Statistically, there was no significant difference between those who were internet addicted, those with limited symptoms, and those who were not internet addicted ($P = .44$). When the sample was divided into 4 groups according to sex and obesity, a significant difference was found in IAS between the groups ($P < .001$). In the comparison of the 4 groups in the post hoc analysis, the mean IAS were ranked from high to low as obese male (group 1 IAS; 34.8 ± 20.1), nonobese male (group 2 IAS; 34.5 ± 20.1), obese female (group 3 IAS; 27.5 ± 18), and nonobese female (group 4 IAS; 23.9 ± 15.4), respectively. In the post hoc comparison results, group 1 and group 2 ($P = 1.00$), group 1 and group 3 ($P = .11$), group 1 and group 4 ($P < .001$), group 2 and group 3 ($P = .21$), group 2 and group 4 ($P = .002$), and group 3 and group 4 ($P = 1.00$) were compared.

According to age range, the sample was divided into 3 subgroups as 8-12 years old, 12-15 years old, and 15-18 years old. There was no significant difference between the mean IAS ($P = .09$) and the mean FAS ($P = .44$) of these 3 subgroups. Internet addiction scores and FAS were compared according to puberty stage. Internet addiction scores of children in prepubertal period were lower than children with puberty stage 2 and later, respectively (IAS; 24 ± 20.5, 30.6 ± 18.7; $P = .03$). Similarly, FAS of children in prepubertal period were lower than children with puberty stage 2 and later, but there was no statistically significant difference (FAS; 20.9 ± 15, 22.3 ± 15.5; $P = .52$).

The comparison of the internet access tools, social media applications used, and personal preferences is shown in Table 2. Furthermore, the comparison of the mean IAS and FAS with each social media application used and personal preferences are shown in Table 3.

It was observed that BMI showed a positive and significant correlation with IAS and FAS. In addition, IAS and FAS also showed a positive relationship. The factors affecting IAS and FAS are shown in Table 4.

DISCUSSION

In our study, the frequency of internet addiction was found to be 1.7% in the whole sample and 2.2% in the obese group. Internet addiction has similar meanings with definitions such as "compulsive internet use," "problematic internet use," and "pathological internet use." Its prevalence is very variable worldwide due to the differences in the diagnostic criteria used in studies on internet addiction and the different ethnic and social structures in the regions where the assessment is made.[20] The prevalence of internet addiction worldwide varies between 1% and 18%. In a study conducted on adolescents in Europe, the prevalence was reported between 1% and 11%, with an average of around 4%.[21] In a study conducted in our country, in which the highest rate was found compared to some other studies, the rate of internet addiction in obese adolescents was found to be 24.6%. However, as in this study, it is thought that the rate may have been found to be higher due to some reasons such as the age range being limited as adolescence and the effect of different demographic regions.[22] As in our study, studies found IAS higher in males have been reported when comparing IAS by sex.[5,6,23] The increase in the time spent on the internet is associated with smartphone addiction and internet addiction, and it is thought to be indirectly related to eating behavior disorders and obesity. Different types of eating disorders (anorexia nervosa, bulimia nervosa, binge eating disorder, preoccupation with food, loss of control over eating, and dieting) have been reported to be associated with internet addiction. In our study, we have shown that food addiction may also be associated with internet addiction. We found a significant relationship between FAS and both IAS and BMI, respectively. Furthermore, internet addiction and some social media applications were found to be significantly related. In a recently published study, the time spent on smartphones and TikTok use among adolescents in Italy during the COVID-19 pandemic was found to be particularly associated with social media addiction.[12] In our study, we found a significant relationship between having any social media application and IAS, regardless of the duration. Internet addiction scores were markedly higher in those who used Instagram, TikTok, WhatsApp or Telegram, Facebook, Youtube, and Twitter applications. In recent years, the very active use of smartphones and social media applications, especially in adolescence, increases the time individuals spend in front of the screen and paves the way for obesity.[6,24] Moreover, as the BMI increases, smartphone addiction also increases.[25] Personal preferences may also play an active role in terms of internet addiction. In our study, when the relationship between questions about the purpose of internet use and internet addiction and food addiction was examined, it was found that those who used the internet for information and homework had significantly lower IAS and FAS, respectively. This situation can be expressed as an example of the correct use of the internet. Contrarily, for those who use the internet to watch movies, TV series, or sports events; to watch recipes, campaigns, or advertisements; and those

Table 2. Comparison of the Internet Access Tools, Social Media Applications Used, and Personal Preferences

	Answers				
	Obese Group (n = 180)		Nonobese Group (n = 180)		
Questions	No (%)	Yes (%)	No (%)	Yes (%)	*P*
Personal smartphone?	36.7	63.3	32.8	67.2	.44
Personal computer?	54.4	45.6	57.8	42.2	.52
Personal tablet?	66.7	33.3	64.4	35.6	.66
Facebook account?	70.6	29.4	80.6	19.4	.03
Instagram account?	40	60	49.4	50.6	.07
Twitter account?	78.3	21.7	84.4	15.6	.14
Youtube account?	46.7	53.3	38.3	61.7	.11
TikTok account?	70.6	29.4	70.6	29.4	1.00
WhatsApp or Telegram account?	36.7	63.3	36.1	63.9	.91
Watching videos and listening to music on the internet?	6.7	93.3	5	95	.50
Watching movies, TV shows, and sports online?	31.7	68.3	33.3	66.7	.74
Online TV platform membership at home (Netflix, etc)	73.3	26.7	71.1	28.9	.64
Obtaining information or doing homework online?	7.2	92.8	2.8	97.2	.06
Ordering food online?	73.3	26.7	73.3	26.7	1.00
Watching food recipes, campaigns, and advertisements online?	60.6	39.4	65.6	34.4	.33
Eating snacks on the screen?	31.1	68.9	26.7	73.3	.35
Visiting internet cafes, gaming rooms at least once a week?	93.3	6.7	95	5	.50
Doing sports activities regularly (at least 2 days a week)	80.6	19.4	72.8	27.2	.08
Using a house vehicle or school bus to go to school	52.2	47.8	54.4	45.6	.67
Monthly salary below the minimum wage (in 2022)	36.1	63.9	43.9	56.1	.13

Chi-square test was used.

Table 3. Comparison of the Mean Internet Addiction Scores and Food Addiction Scores According to Personal Preference Questions

Questions	Answers	Internet Addiction Scores Mean ± SD or Median (Q1-Q3)	*P*	Food Addiction Scores Mean ± SD or Median (Q1-Q3)	*P*
Personal smartphone?	Yes	32.2 ± 18.3	<.001	22.8 ± 15.7	.24
	No	24.6 ± 19.6		20.8 ± 14.7	
Personal computer?	Yes	32.9 ± 19.4	.004	23.1 ± 16.1	.25
	No	27 ± 18.5		21.2 ± 14.8	
Personal tablet?	Yes	28.8 ± 20	.57	22 ± 16.3	.94
	No	30 ± 18.6		22.1 ± 14.9	
Facebook account?	Yes	33.9 ± 18.8	.01	24.7 ± 16.1	.08
	No	28.1 ± 19		21.2 ± 15.1	
Instagram account?	Yes	**32 (20-44)**	**<.001**	**21 (10-34)**	**.09**[α]
	No	**21 (11-36)**		**18 (7-31)**	
Twitter account?	Yes	**35 (21-43)**	**.003**	**20 (10-33)**	**.31**[α]
	No	**24 (14-39)**		**20 (8-33)**	
Youtube account?	Yes	31.5 ± 18.3	.03	21.7 ± 15.3	.56
	No	27 ± 19.8		22.6 ± 15.6	
TikTok account?	Yes	37.7 ± 20	<.001	27.3 ± 17.3	<.001
	No	26.2 ± 17.6		19.9 ± 14	
WhatsApp or Telegram account?	Yes	32.4 ± 18.6	<.001	22.5 ± 15.9	.42
	No	24.5 ± 18.9		21.2 ± 14.5	
Watching videos and listening to music on the internet?	Yes	**28 (15-42)**	**.004**	**20 (9-33)**	**.99**[α]
	No	**13 (4-30.5)**		**19 (7.5-36.5)**	
Watching movies, TV shows, and sports online?	Yes	32.5 ± 19	<.001	23.5 ± 15.6	.009
	No	23.4 ± 17.9		19.1 ± 14.6	
Online TV platform membership at home (Netflix, etc.)	Yes	33.1 ± 18.5	.03	23.2 ± 15.2	.40
	No	28.2 ± 19.2		21.6 ± 15.5	
Obtaining information or doing homework online?	Yes	**26 (14-39)**	**.002**	**18 (8.8-32)**	**.009**[α]
	No	**46.5 (26-61.5)**		**31.5 (18.8-42)**	
Ordering food online?	Yes	32.6 ± 17.7	.06	25 ± 16.2	.04
	No	28.5 ± 19.5		21 ± 15	
Watching food recipes, campaigns, and advertisements online?	Yes	32.3 ± 18.6	.04	27.4 ± 16.4	<.001
	No	27.9 ± 19.2		18.9 ± 13.8	
Eating snacks on the screen?	Yes	31.9 ± 18.4	<.001	23.8 ± 15.5	<.001
	No	23.9 ± 19.6		17.7 ± 14.3	
Visiting internet cafes, gaming rooms at least once a week?	Yes	**24 (14-39.5)**	**.97**	**22 (14-31.5)**	**.46**[α]
	No	**28 (14-40)**		**20 (8-33)**	
Doing sports activities regularly (at least 2 days a week)	Yes	26.6 ± 19.7	.12	18.5 ± 14.2	.01
	No	30.5 ± 18.9		23.1 ± 15.6	
Using a house vehicle or school bus to go to school	Yes	28.5 ± 16.5	.32	21.5 ± 14.6	.48
	No	30.5 ± 21.1		22.6 ± 16.1	
Monthly salary below the minimum wage (in 2022)	Yes	28.8 ± 20	.37	22 ± 15.2	.95
	No	30.6 ± 17.7		22.1 ± 15.8	

Student's *t*-test was used.
[α]Mann–Whitney *U*-test was used.

who eat snacks in front of the screen, both IAS and FAS were found to be significantly higher. Neuromediators such as melanocortin and orexin, which are involved in the pathogenesis of addiction-related behaviors in adolescents, also play a role in the pathophysiology of obesity.[26,27] Considering the relationship between BMI and addiction scores, the effect of internet use on obesity is striking.

There are also some limitations of our study. First, since it is a case-control study, the relationship between obesity and addiction could not be evaluated in terms of cause and effect. Second, a limited number of variables were evaluated in terms of their relationship with obesity. No evaluation was made for conditions such as nutrition, physical activity, state of mind, and sleep pattern. Third, school performance and school grade of patients, and parental BMI scores were not evaluated. Fourth, there is a gender difference between the groups. The prevalence of males is higher in the obese group. Finally, although the assessment was made through a face-to-face survey with parental supervision, the responses to questions are open to bias. In this respect, prospective studies with larger samples are needed.

Table 4. Factors Affecting Internet Addiction and Food Addiction Scores

	Internet Addiction Scores		Food Addiction Scores	
	r	*P*	*r*	*P*
Age	0.09	.1	0.04	.49
BMI	0.20	<.001	0.41	<.001
BMI SDS	0.15	.008	0.40	<.001
Internet addiction scores			0.43	<.001

BMI, body mass index; SDS, standard deviation score.
Pearson correlation analysis was used.

Despite all these limitations, our study is the first to evaluate a wide period such as the 8-18 age range. The strengths of our study are that we separated the obese and nonobese controls with appropriate cut-off values by excluding the borderline values in terms of BMI. Also, the sample group was evaluated in terms of medical history, physical examination, and biochemical measurements. Furthermore, the diseases that could accompany secondary were excluded, and the questionnaires were conducted by face-to-face evaluation.

CONCLUSION

In our study, we found that individuals with obesity had higher IAS and FAS. Although the correlation coefficients are relatively low and the strength of this relationship is partially weak, we determined that there is a positive relationship between addiction scores and BMI. Therefore, it will be a necessary preventive measure for public health to make healthy suggestions and take precautions for the use of the internet and social media, both in the family and in the social environment, starting from childhood.

Ethics Committee Approval: The study was organized in accordance with the ethical standards settled by the Ethics Committee of Health Sciences University Kayseri City Hospital dated March 10, 2022, and numbered 592.

Informed Consent: Written informed consent forms were obtained from the legal guardians of all participants and patients over 12 years of age.

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Supplementary Table 1. Dimensional Yale Food Addiction Scale Version 2.0 for Children					
IN THE LAST YEAR (PAST 12 MONTHS): We want to know how kids feel about food and eating. There are no right or wrong answers. Every kid is different. We just want to know how you feel about "junk foods" like: • Sweets like ice cream, chocolate, doughnuts, cookies, cake, and candy • Salty snacks like chips, pretzels, and crackers • Fatty foods like steak, bacon, hamburgers, cheeseburgers, pizza, and French fries • Sugary drinks like soda pop, lemonade, sports drinks, and energy drinksWhen we say "CERTAIN FOODS" we want you to think of ANY "junk food" like those above.	Never	Rarely	Sometimes	Very Often	Always
Questions	Scores				
When I started to eat certain foods, I found it hard to stop.	0	1	2	3	4
I kept eating certain foods even though I was not hungry.	0	1	2	3	4
I ate until my stomach hurt or I felt sick.	0	1	2	3	4
I worried about cutting down on certain foods, but ate them anyway.	0	1	2	3	4
I spent a lot of time feeling tired from eating too much.	0	1	2	3	4
I ate certain foods all day long.	0	1	2	3	4
If I could not find a food I wanted, I tried hard to get it. (examples: asked a friend to get it for me, found a vending machine, snuck food when people weren't looking)	0	1	2	3	4
When I cut down on or stopped eating certain foods, I felt angry, upset or sad.	0	1	2	3	4
When I cut down or stopped eating certain foods, I craved them a lot more.	0	1	2	3	4
I kept eating too much even though it made me feel sad, nervous, or guilty.	0	1	2	3	4
I kept eating too much even though it made me unhealthy.	0	1	2	3	4
When I ate the same amount of food, it didn't make me feel as good as it used to. (examples: feel happy, calm, relaxed)	0	1	2	3	4
I really wanted to cut down on or stop eating certain kinds of foods, but I just couldn't.	0	1	2	3	4
I was craving certain foods so much that I felt like I had to eat them right away.	0	1	2	3	4
I tried to cut down on certain foods, but it didn't work.	0	1	2	3	4
I tried and failed to stop eating certain foods.	0	1	2	3	4

Supplementary Table 2. Parent-Child Internet Addiction Test (PCIAT)						
Based upon the following 5-point Likert scale, select the response that best represents the frequency of the behavior described in the following 20-item questionnaire	**Not Applicable**	**Rarely**	**Occasionally**	**Frequently**	**Often**	**Always**
Questions	**Scores**					
How often does your child disobey time limits you set for online use?	0	1	2	3	4	5
How often does your child neglect household chores to spend more time online?	0	1	2	3	4	5
How often does your child prefer to spend time online rather than with the rest of your family?	0	1	2	3	4	5
How often does your child form new relationships with fellow online users?	0	1	2	3	4	5
How often do you complain about the amount of time your child spends online?	0	1	2	3	4	5
How often do your child's grades suffer because of the amount of time he or she spends online?	0	1	2	3	4	5
How often does your child check his or her e-mail before doing something else?	0	1	2	3	4	5
How often does your child seem withdrawn from others since discovering the internet?	0	1	2	3	4	5
How often have you caught your child sneaking online against your wishes?	0	1	2	3	4	5
How often does your child spend time alone in his or her room playing on the computer?	0	1	2	3	4	5
How often does your child receive strange phone calls from new "online" friends?	0	1	2	3	4	5
How often does your child snap, yell, or act annoyed if bothered while online?	0	1	2	3	4	5
How often does your child seem more tired and fatigued than he or she did before the internet came along?	0	1	2	3	4	5
How often does your child seem preoccupied with being back online when offline?	0	1	2	3	4	5
How often does your child throw tantrums with your interference about how long he or she spends online?	0	1	2	3	4	5
How often has your child choose to spend time online rather than doing once enjoyed hobbies and/or outside interests?	0	1	2	3	4	5
How often does your child become angry or belligerent when you place time limits on how much time he or she is allowed to spend online?	0	1	2	3	4	5
How often does your child choose to spend more time online than going out with friends?	0	1	2	3	4	5
How often does your child feel depressed, moody, or nervous when offline which seems to go away once back online?	0	1	2	3	4	5