Psychiatric Associations with Problematic Internet Use in Children and Adolescents

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INTRODUCTION

The negative implications of problematic internet use (PIU) have long been associated with compromised social, educational and familial function, and they have recently been linked to associations with psychopathology, specifically depression and anxiety[1, 2, 3]. This study sought to determine if an overall low correspondence between self and parent reports is still maintained when considering PIU. While relationships between PIU and depression and anxiety have been fairly consistent in the literature, less consistent are the connections between PIU, ASD and ADHD[1]. This study aimed to look at PIU and its relationships to various DSM-V diagnosis and dimensional indices of psychopathology. Previous studies have linked PIU with avoidant and negative coping strategies, and have inconclusively maintained whether substance abuse plays a substitutive or correlative role in relation to PIU[1]. Links between PIU and dysregulated eating however, have previously been noted, as have studies relating higher levels of PIU to decreased relationships and a decrease in protective effects of familial support, especially with the development of depressive symptoms[2].

METHODS

Sample: 1131 participants (418 female) ages 5 to 21 were recruited as part of the Healthy Brain Network, an ongoing community referred sample of children in the New York City Area[4].
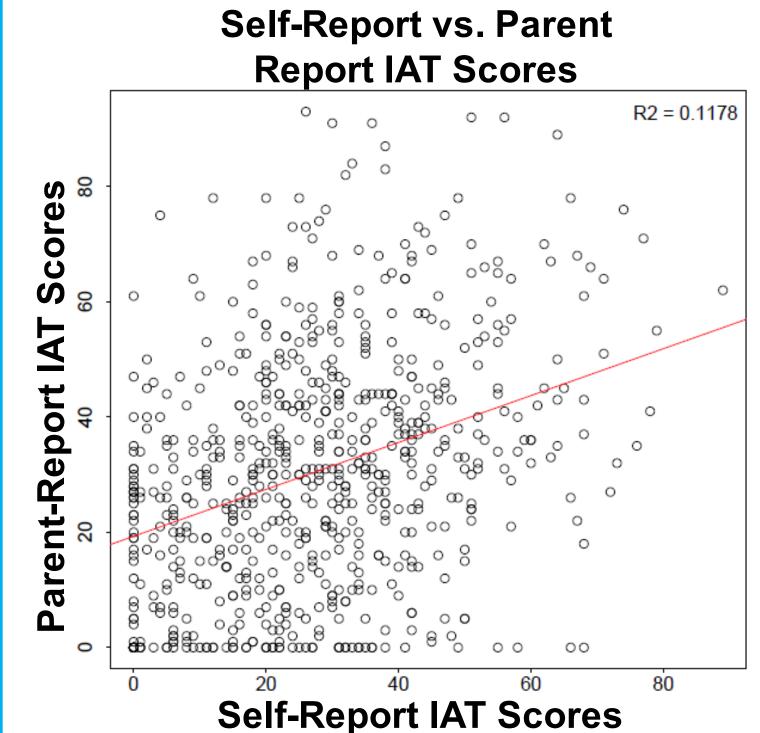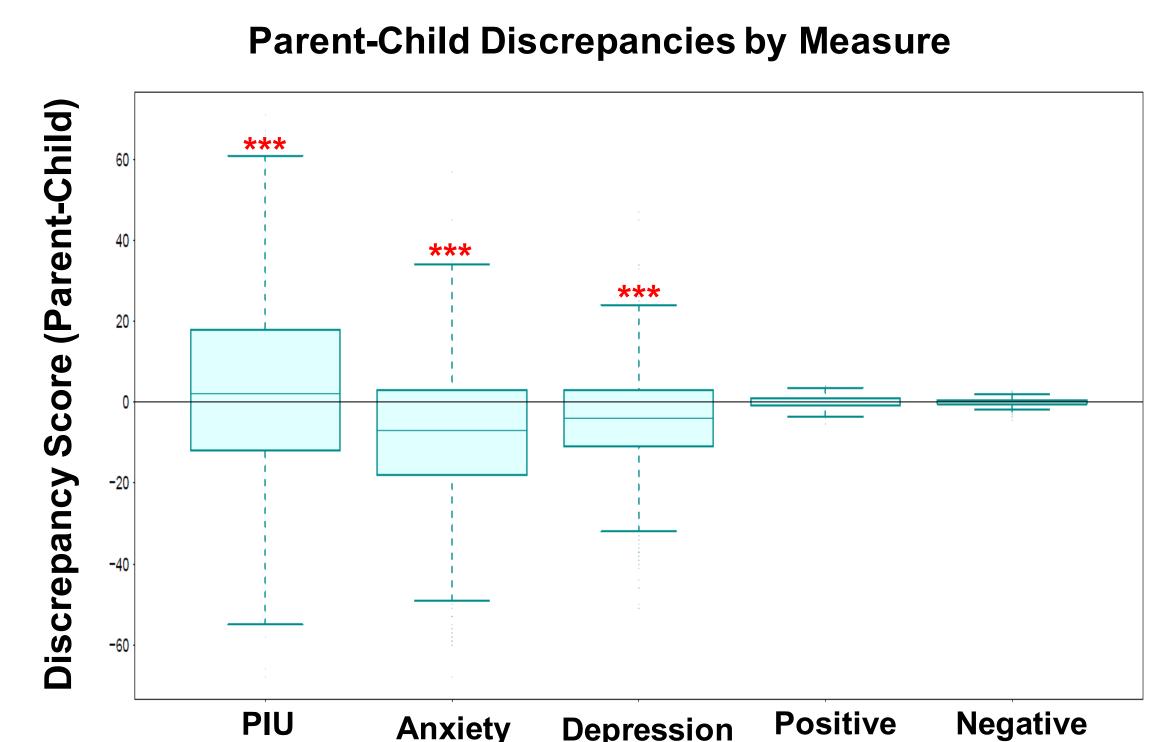
Measures:

Construct Measured	Questionnaire	PR	SR	Subscales Used
Internet Use	IAT	√	√	Full Score
Depression	MFQ	√	√	Full Score
Anxiety	SCARED	√	√	Social Anxiety; Total Anxiety
ASD	ASSQ	√		Full Score
ADHD	SWAN	√		Full Score
ADHD	Conners Short SR		√	Inattention, Hyperactivity/Impulsivity, Learning Problems
Alcohol Use	AUDIT		√	Full Score
Nicotine Use	FTQA/FTND		√	Full Score
Cannabis Use	ESPAD Cannabis follow-up		√	Full Score
Dysreg. eating	YFAS		√	Impairment Score; Sympt. Count Score
Coping Strategies	CCSC		√	Problem Focused Coping; Avoidance Coping; Positive Cognitive Restructuring; Religion; Support Seeking
Parenting Practices	APQ	√		Positive Parenting Composite; Negative Parenting Composite
SES	Barratt	√		Full Score

Statistical Analysis: Pearson correlations were computed between self and parent reported IAT total sum scores and self-reported measures of substance use (nicotine, cannabis, alcohol and food). Prevalence odds ratios of problematic internet use (using a cutoff score of 40)[1] were calculated for each diagnosis for both the full sample and for each collection site separately. Eight regression analysis models were run; parent and self-report internet use were included as outcome variables, and for each, separate models were run examining relationships with psychopathology, coping strategies, and parenting, controlling for age, sex, SES, and collection site. The predictor variables were as follows: 1. diagnosis as a categorical variable (presence or absence of diagnosis); 2. psychopathology as a dimensional variable (total or subscale score on questionnaires); 3. Subscale scores of a coping questionnaire; 4. Subscale scores of a parenting questionnaire.

RESULTS

Q1. How do self- and parent-report measures of PIU patterns compare?

Self-Report vs. Parent Report IAT Scores (R2 = 0.1178)

Parent-Child Discrepancies by Measure

Q2. Do associations with PIU differ among DSM-5 diagnoses?

	Self-Reported PIU						Parent-Reported PIU							
	General			Staten Island		Midtown		General			Staten Island		Midtown	
Diagnosis	PIU (n=171)	Non-PIU (n=558)	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	PIU (n=260)	Non-PIU (n=826)	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
ASD	34	75	1.58 (1.01-2.48)	0.043*	1.93 (1.11-3.37)	0.02*	1.03 (0.47-2.26)	0.9	54	124	1.47 (1.03-2.10)	0.032*	1.80 (1.15-2.82)	0.009**	1.00 (0.55-1.82)	0.99
Learning Disorder	19	96	0.60 (0.35-1.01)	0.052	0.58 (0.27-1.22)	0.15	0.55 (0.25-1.21)	0.1	38	125	0.95 (0.64-1.41)	0.81	0.90 (0.52-1.56)	0.70	0.98 (0.54-1.75)	0.93
Anxiety	54	152	1.22 (0.84-1.77)	0.296	0.92 (0.55-1.54)	0.76	1.62 (0.88-2.97)	0.1	81	188	1.52 (1.12-2.07)	0.007**	1.3 (0.86-1.96)	0.21	1.71 (1.03-2.82)	0.04*
Depression	33	53	2.26 (1.41-3.62)	< 0.001***	2.42 (1.30-4.51)	0.004**	1.93 (0.89-4.21)	0.1	47	42	4.09 (2.63-6.37)	< 0.001***	3.55 (1.97-6.39)	< 0.001***	5.05 (2.48-10.30)	< 0.001***
ADHD-C	50	121	1.48 (1.00-2.17)	0.047*	1.37 (0.83-2.25)	0.22	1.55 (0.82-2.94)	0.2	81	211	1.31 (0.96-1.77)	0.085	1.34 (0.91-1.96)	0.13	1.15 (0.68-1.94)	0.60
ADHD-I	47	144	1.08 (0.73-1.59)	0.701	1.19 (0.74-1.90)	0.48	0.77 (0.38-1.56)	0.5	84	155	2.05 (1.50-2.80)	< 0.001***	2.06 (1.40-3.03)	< 0.001***	2.15 (1.25-3.71)	0.005**
ADHD-H	3	10	0.97 (0.26-3.57)	0.965	n < 30		n < 30		5	31	0.50 (0.19-1.30)	0.147	n < 30		n < 30	
Social Anxiety	10	41	0.78 (0.38-1.59)	0.487	0.49 (0.17-1.45)	0.19	n < 30		21	44	1.55 (0.90-2.66)	0.108	1.11 (0.51-2.42)	0.78	n < 30	

Predictor	Self-Reported PIU (R2 = .067**)		Parent-Reported PIU (R2 = .262**)	
	b	p	b	p
(Intercept)	17.50**		-1.01	
ASD	1.15	0.53	3.18	0.03*
Learning Disorder	-4.41	0.01*	-2.01	0.19
Anxiety	1.23	0.46	2.83	0.05*
Depression	5.21	0.02*	6.93	0.001**
ADHD-C	3.79	0.03*	6.31	< 0.001***
ADHD-I	1.45	0.36	6.46	< 0.001***
ADHD-H	3.74	0.44	2.56	0.41
Social Anxiety	-1.86	0.51	-3.81	0.14
Sex	-1.07	0.48	-4.39	< 0.001***
Age	0.98	< 0.001***	2.57	< 0.001***
SES	-0.06	0.19	0	0.95
Site	0.05	0.94	-0.69	0.27

Q3. Do associations with PIU differ among dimensional indices of psychopathology?

Self-Report Questionnaires (R2 = .188**)			Parent-Report Questionnaires (R2 = .309**)		
Predictor	b	p	Predictor	b	p
(Intercept)	-5.73		(Intercept)	-5.76	
Conners Hyperactivity/Impulsivity	0.09	0.18	ASSQ	0.10	0.17
Conners Inattention	0.11	0.09	SWAN Inattentive	217230.07	0.78
Conners Learning Problems	-0.01	0.83	SWAN Hyperactive	217227.41	0.78
Social Anxiety SR	-0.04	0.88	SWAN Total	-434455.16	0.78
Total Anxiety SR	0.24	< 0.001***	Social Anxiety P	-0.10	0.65
Depression SR	0.15	0.04*	Total Anxiety P	0.03	0.66
Sex	-3.6	0.008**	Depression P	0.56	< 0.001***
Age	1.57	< 0.001***	Sex	-4.68	< 0.001***
SES	-0.04	0.31	Age	2.43	< 0.001***
Site	-0.46	0.50	SES	0.04	0.28
			Site	0.22	0.73

Q4. Is PIU associated with other forms of negative coping, including substance use and dysregulated eating?

	M	SD
PIU SR	27.43	17.33
PIU PR	25.78	20.42
Alcohol	0.43	1.94
Cannabis	2.72	1.89
Nicotine	0.09	0.6
Dysreg. Eating-Impairment	0.89	1.62
Dysreg. Eating-Symptom Count	4.15	1.77
Sex	0.38	0.48
Age	10.01	3.67
Site	1.51	0.86
SES	46.68	15.11

Predictor	Self-Reported PIU (R2=.090**)		Parent-Reported PIU (R2=.140**)	
	b	p	b	p
(Intercept)	3.85		9.53	
Problem Focused Coping	-1.28	0.47	-3.90	0.04*
Avoidance Coping	6.82	< 0.001***	0.23	0.88
Positive Cognitive Restructuring	-0.82	0.63	2.04	0.27
Religion	-0.07	0.94	-0.68	0.47
Support Seeking	0.78	0.60	0.29	0.86
Sex	-2.04	0.15	-6.59	< 0.001***
Age	1.30	< 0.001***	2.46	< 0.001***
SES	-0.06	0.23	0.00	0.93
Site	-0.03	0.97	0.41	0.63

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

RESULTS CONT'D

Q5. Is PIU related to parenting skills?

Predictor	Self-Report (R2=.094**)		Parent-Report (R2=.287**)	
	b	p	b	p
(Intercept)	16.38**		2.96	
Positive Parenting	0.35	0.54	-0.28	0.66
Negative Parenting	5.29	< 0.001***	9.14**	< 0.001***
Sex	-1.48	0.27	-4.74**	< 0.001***
Age	1.27	< 0.001***	2.38**	< 0.001***
SES	-0.05	0.29	0.04	0.30
Site	-0.24	0.73	-0.09	0.88

DISCUSSION

• Parent report tends to indicate greater PIU than self-report; this pattern is opposite that observed for internalizing behaviors. Associations between psychopathology and PIU appeared to be stronger for parent- than self-report.

• Consistent with prior findings from adult studies[1,3], a robust relationship between PIU and depression was noted, which remained after taking into account shared variance with other disorders and was reproducible across collection sites.

• ADHD subtypes exhibited positive associations with PIU, though findings were less robust across sites than depression, and associations with specific subtypes varied across reporters.

• No significant relationship between PIU and nicotine, alcohol and marijuana use, possibly suggesting that PIU may be a replacement for these other negative coping strategies; alternatively, an older sample would be needed to appreciate associations. In contrast, significant positive relationship between self-reported PIU and dysregulated eating.

Future Directions:

• Identify specific relationships between different internet-related activities (e.g. social media, gaming, gambling) and different diagnoses.
• Further explore links between PIU and anxiety.
• Longitudinal studies to explore causal relationships.
• Explore neural correlates of PIU.

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