



**Problematic gaming
and psychiatric symptoms
in adolescents**

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Supervisors

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Associations between problematic gaming and psychiatric symptoms among adolescents in a community sample compared to adolescents in a clinical sample

Preliminary results

- Psychiatric symptoms are common in adolescents
- Prevalence of problematic gaming (PG) varies widely
- There are high comorbidity between different psychiatric disorders and addictions

Aims of the present study were to investigate

- Prevalence rates of self-rated symptoms of PG and psychiatric symptoms
- Associations between PG and psychiatric symptoms
- Sex differences

Sample and Method 1

- SALVe Cohort - adolescents born 1997 and 1999 in Västmanland, Sweden (N≈1877)
- Self-rating questionnaires was sent home
- Questions regarding psychiatric symptoms and gaming

Sample and Method 2

- Consecutive adolescent psychiatric outpatients in Västmanland, Sweden (N \approx 112) aged 13-17
- Computer assessed self-rating questionnaires at the clinic
- Questions regarding psychiatric symptoms and gaming

Measurements

Gaming Addiction Identification Test (GAIT)^a

- Self-rating scale developed to measure symptoms of gaming addiction in adolescents
- Consists of 15 items (13 included in scoring)
- 5 point scale (disagree-completely agree), total 52 points
- Excellent content validity (I-CVI 0.97, S-CVI/Ave 0.99)
- Internal consistency ($\alpha=0.906$)
- High concordance GAIT/GAIT-P (Spearman's rho, $\rho=0.704$)
- A polythetic approach with cut-off of $\geq 5p$

Measurements

- **Adult ADHD Self-Report Scale Adolescent version (ASRS-A)^b**
(18 items , 5 point scale, total 72p, cut-off ≥ 9 p)
- **Depression Self-Rating Scale Adolescent version (DSRS-A)^c**
(22 items, dichotomous, total 19p, cut-off 1 A-criteria along with 4 other criteria)
- **Spence Children's Anxiety Scale (SCAS)^d**
(44 items, 6 not included in scoring, 4 point scale, total 114p, cut-off ≥ 33 p)
- **Psychotic-Like-Experience (PLE)^e**
(9 original items, 3 point scale, total 18p, cut-off ≥ 4 p + in this study additional items
- symptoms within 12 months and impairment)

Results

self-rated prevalence of symptoms

Community sample

Clinical sample

PG	6.0% (4.6% boys, 1.3% girls)	11.3% (8.5% boys, 2.8% girls)
ADHD	10.3% (9.5%, 11%)	46.4% (22.2%, 57.9%)
Depr.	12.5% (7%, 16.9%)	64.3% (36.1%, 77.6%)
Anx.	13.3% (6.5%, 18.8%)	57.7% (28.6%, 71.1%)
PLE	7.6% (5.1%, 9.5%)	25.9% (16.7%, 30.3%)

Summary

Self-rated prevalence

- PG has similar sex ratio in both samples (Ratio 3:1)
- Significant differences between samples in PG and in all psychiatric domains
- Girls self-rate higher in all psychiatric domains in both samples, however not significant in ADHD in the community sample

Multivariable Logistic Regression analysis

(community sample)

- GAIT as dependent variable
- ASRS-A, DSRS-A, SCAS, and PLE as independent variables
- Adjusted for sex, age, ethnicity, separated parents, parental employment status, school bullying and family maltreatment

Results (community sample)

		ASRS-A			
		OR	<i>p</i>	95% CI	R ²
Total	GAIT problematic gamer	4.06	<.001	2.46- 6.69	.132
Boys	GAIT problematic gamer	3.05	<.001	1.68-5.54	.096
Girls	GAIT problematic gamer	9.29	<.001	3.55-24.25	.186

Compared to adolescents in the community sample without problematic gaming

Results (community sample)

		DSRS-A			
		OR	<i>p</i>	95% CI	R ²
Total	GAIT problematic gamer	2.89	<.001	1.62 – 5.15	.224
Boys	GAIT problematic gamer	3.21	<.001	1.61-6.42	.189
Girls	GAIT problematic gamer	1.93	.231	.66-5.67	.205

Compared to adolescents in the community sample without problematic gaming

Results (community sample)

		SCAS			
		OR	<i>p</i>	95% CI	R ²
Total	GAIT problematic gamer	2.46	.002	1.37–4.39	.193
Boys	GAIT problematic gamer	2.97	.003	1.45-6.08	.186
Girls	GAIT problematic gamer	1.51	.434	.536-4.27	.144

Compared to adolescents in the community sample without problematic gaming

Results (community sample)

		PLE			
		OR	<i>p</i>	95% CI	R ²
Total	GAIT problematic gamer	2.02	.036	1.05- 3.89	.112
Boys	GAIT problematic gamer	2.31	.039	1.04-5.12	.137
Girls	GAIT problematic gamer	1.37	.621	.39-4.69	.090

Compared to adolescents in the community sample without problematic gaming

Summary (community sample)

Problematic gamers have;

≈ more than **4** times elevated odds of ADHD-symptoms

≈ almost **3** times elevated odds of depressive symptoms

≈ almost **2.5** times elevated odds of anxiety symptoms

≈ **2** times elevated odds of PLE symptoms

Compared to adolescents in the community sample without problematic gaming

Main findings

- Prevalence rates of PG in community sample are concordant with other findings
- PG is fairly similar in community- and clinical sample with similar sex differences
- Associations between PG and psychiatric symptoms were found in total and in boys, in girls only in ADHD
- When detecting PG among adolescents the probability of psychiatric comorbidity should be considered



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Thank you for listening!

ASRS-A

- Self-rating scale regarding symptoms of ADHD adapted for adolescents
- Consisting of 18 items on two subscales – inattention (IA) and hyperactivity-impulsivity (HD)
- Response option of 0-4, from “never” to “very often”
- Total sum of 72 points
- Internal consistency in adolescent psychiatric population $\alpha=0.92$, in adolescent general population $\alpha=0.787$
- In the present study clinical significant level of ADHD symptoms was defined by a cut-off ≥ 9 of ASRS-A

DSRS-A

- Self-rating scale based on the DSM-IV criteria for major depression adapted for adolescents
- Consists of 22 dichotomy items, ranging from 0-19
- One question regarding irritability was built-in along with general criteria (Sonnby et al 2011)
- DSRS-A is widely used in adolescent populations and have shown good psychometric properties in adults (Svanborg & Ekselius 2003)
- Indications of clinical significant levels of depressive symptoms was defined as meeting at least one of the general criteria accompanied by at least four other symptoms

SCAS

- Self-rating scale designed to measure anxiety symptoms in children and adolescents
- It consists of 44-items, (whereas 6 items are included as positive filler to reduce negative bias and are not included in the scoring)
- Response options of 0-3, from “never” to “always”
- SCAS provides a total score of 114 points as well as scores on six different subscales
- Internal consistency for total scale in general population $\alpha=0.94$ (Olofsdotter et al 2015)
- A cut-off of ≥ 33 as indication of clinical significant levels of anxiety symptoms are used in the present study

PLE

- Self-rating scale developed for screening for early detection of psychotic-like experiences in child and adolescent population
- Consisting of 9 items, 3 response options (not true=0, somewhat true=1, and certainly true=2)
- Additional questions - symptoms within 12 months and impairment included
- A total score of 18 points
- Internal consistency $\alpha=0.82$ (Laurens et al 2007)
- A cut-off of ≥ 4 p, within 12 months and impairment was set as “at risk of PLE” in the present study

Paper 1

Abstract

This study describes the development of a screening tool for gaming addiction in adolescents, named the Gaming Addiction Identification Test (GAIT). Its development was based on the research literature on gaming and addiction. An expert panel comprising professional raters ($n = 7$), experiential adolescent raters ($n = 10$), and parent raters ($n = 10$) estimated the content validity of each item (I-CVI) as well as of the whole scale (S-CVI/Ave), and participated in a cognitive interview about the GAIT scale. The mean scores for both I-CVI and S-CVI/Ave ranged between 0.97 and 0.99 compared with the lowest recommended I-CVI value of 0.78 and the S-CVI/Ave value of 0.90. There were no sex differences and no differences between expert groups regarding ratings in content validity. No differences in the overall evaluation of the scale emerged in the cognitive interviews. Our conclusions were that GAIT showed good content validity in capturing gaming addiction. The GAIT needs further investigation into its psychometric properties of construct validity (convergent and divergent validity) and criterion-related validity, as well as its reliability in both clinical settings and in community settings with adolescents.

Paper 2

Abstract

Objective: To evaluate the psychometric properties of the Gaming Addiction Identification Test (GAIT) and its parent version (GAIT-P), in a representative community sample of adolescents and parents in Västmanland, Sweden.

Method: Self-rated and parent-rated gaming addictive symptoms identified by GAIT and GAIT-P were analyzed for frequency of endorsement, internal consistency, concordance, factor structure, prevalence of Internet gaming disorder (IGD), concurrence with the Gaming Addiction Scale for Adolescents, 7-item version (GAS) and the parent version of GAS (GAS-P), and for sex differences.

Results: The 12-month prevalence of IGD was found to be 1.3% with GAIT and 2.4% with GAIT-P. Results also indicate promising psychometric results within this population, with high internal consistency, and high concurrent validity with GAS and GAS-P. Concordance between adolescents and parents ratings was high, although moderate in girls. Although exploratory factor analysis indicated poor model fit, it also indicated unidimensionality and high factor loadings in all analyses.

Conclusion: GAIT and GAIT-P are suitable for continued use in measuring gaming addiction in adolescents, and, with the additional two items, they now cover all nine IGD criteria.



Paper 1

Development and content validity of a screening instrument for gaming addiction in adolescents: The Gaming Addiction Identification Test (GAIT)

Our definition of Gaming Addiction;

- a behavioral addiction that can be related to all kinds of **digital games** (online and off-line games, on computers, TV, mobiles, tablets, or any other type of gaming console)
- that you are not addicted *to* the Internet
(though we see the Internet as a medium)
- that there are many different paths to develop an addiction

We adopted the biopsychosocial perspective

& Nower, 2002; Shaffer et al., 2004; and others)

(Blasczynski

*The Gaming Addiction Identification Test (GAIT)
are based upon;*

- Alcohol Use Disorders Identification Test (AUDIT)
(Bush et al 1998)
- Gambling Disorder, suggested criteria for DSM-5
(APA , May 1, 2012)
- Griffiths six core components of addiction
(Griffiths 2005)
- Problematic Online Gaming Questionnaire (POGQ)
the 26-item version (Demetrovics et al 2012)

- A panel of experts (7 professional raters, 10 adolescent raters and 10 parent raters) estimated the content validity of GAIT along with cognitive interviews
- I-CVI and S-CVI/Ave ranged between 0.97 and 0.99 (compared with the lowest recommended I-CVI value 0.78 and S-CVI/Ave 0.90)
- No sex differences, no differences in ratings, no differences in the overall evaluation of GAIT in the cognitive interviews

*GAIT show good content validity in capturing
gaming addiction (Vadlin et al 2015)*

Paper 2

*Psychometric evaluation of the adolescent and
parent versions of the Gaming Addiction
Identification Test (GAIT)*

- Data from the SALVe cohort (adolescents in Västmanland born 1997 and 199 and their parents) was used in this study
- 1736 complete adolescent-parent pairs of GAIT and GAIT-P was analysed
- A randomized sub-sample of adolescent-parent pairs (N=64) answered the same questions one-year later, with the additional questionnaires 7-item version of GAS (Lemmens et al 2009) and GAS-P (parent version of GAS)

*The aims was to evaluate the psychometric properties of
GAIT /GAIT-P regarding;*

- 1) frequency of endorsement and internal consistency
- 2) concordance between adolescents' and parents' ratings of adolescents' gaming addiction symptoms
- 3) prevalence of IGD using a monothetic approach of the suggested IGD criteria
- 4) factor structure
- 5) concurrent validity of GAIT/GAS and GAIT-P/GAS-P in a randomized subsample of the population-based sample of adolescents and parents
- 6) Sex differences in aims 2-5

Results indicate that GAIT and GAIT-P show promising psychometric results within this population

- High internal consistency of GAIT and GAIT-P ($\alpha = .906$, $\alpha = .946$)
- High concordance in adolescent-parent ratings (Spermans rho .704)
- 12-months prevalence of IGD with monotheitic approach
1.3% (23 boys), 2.4% (43 adolescents, 4 girls)
- High agreement in adolescent-parent rating IGD (PABAK = .950)
- High factor loadings in EFA and unidimensionality, however poor model fit
- High concurrent validity with GAIT/GAS (Spermans rho .834) and GAIT-P/GAS-P (Spermans rho .884)

Results

self-rated prevalence of symptoms

Community sample

Clinical sample

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46.4% (22.2%, 57.9%)

Depr. **12.5%** (7%, 16.9%)

64.3% (36.1%, 77.6%)

Anx. **13.3%** (6.5%, 18.8%)

57.7% (28.6%, 71.1%)

PLE **23%** (18.6%, 26.6%)

37.5% (25%, 43.3%)