Gaming and gaming addiction in adolescence: Possible consequences

Geir Scott Brunborg, Ph.D.
Norwegian Institute for Alcohol and Drug Research
% of Norwegian adolescents who play video games

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily or almost daily</td>
<td>41 %</td>
<td>6 %</td>
</tr>
<tr>
<td>Several days per week</td>
<td>33 %</td>
<td>12 %</td>
</tr>
<tr>
<td>One day per week</td>
<td>12 %</td>
<td>16 %</td>
</tr>
<tr>
<td>1-3 days per month</td>
<td>9 %</td>
<td>30 %</td>
</tr>
<tr>
<td>Never or almost never</td>
<td>4 %</td>
<td>37 %</td>
</tr>
</tbody>
</table>

100 % 100 %

Frøyland, Hansen, Sletten, Torgersen & von Soest, 2010
«Gaming addiction»

• Is not a diagnostic category in the ICD or DSM
  – Foot in the door in DSM-V: «Internet use disorder» included as a subject of further empirical inquiry.

• Nevertheless, excessive gaming is associated with a host of different problems (Griffiths, Kuss & King, 2012)
Defining «gaming addiction»

“The persistent inability to control excessive gaming habits despite associated social or emotional problems”

(Lemmens, Valkenburg, & Peter, 2011, p. 38).
Strong engagement vs. addiction
Engagement vs. addiction

• Gaming engagement = peripheral addiction criteria, e.g.
  – Cognitive salience
  – Tolerance
  – Euphoria

• Gaming addiction = core addiction criteria, e.g.
  – Conflict
  – Withdrawal symptoms
  – Relapse and reinstatement
  – Behavioral salience

Charlton & Danforth, 2007
Gaming Addiction, Gaming Engagement, and Psychological Health Complaints Among Norwegian Adolescents

GEIR SCOTT BRUNBORG
Norwegian Social Research, Oslo, Norway

RUNE AUNE MENTZONI
Faculty of Psychology, University of Bergen, Bergen, Norway

OLE ROGSTAD MELKEVIK
The Norwegian Institute of Public Health, Oslo, Norway

TORBJØRN TORSHEIM, ODDRUN SAMDAL, JØRN HETLAND, CECILIE SCHOU ANDREASSEN, and STÅLE PALLESSEN
Faculty of Psychology, University of Bergen, Bergen, Norway

Distinguishing high engagement with games from gaming addiction has been a challenge for researchers. We present evidence that an established self-report instrument can be used to distinguish...
Data

• Data from the WHO survey Health Behavior in School-Aged Children (HBSC) 2009/10 (Currie et al., 2009).

• A nationally representative sample of Norwegian eight graders

• N= 1,320 (688 girls, 632 boys), mean age = 13.6 (SD D 0.32) years
Game addiction scale for adolescents (Lemmens et al. 2009)

<table>
<thead>
<tr>
<th>How often…</th>
<th>Engagement items</th>
<th>Addiction items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salience</strong></td>
<td>Did you think about playing a game all day long?</td>
<td></td>
</tr>
<tr>
<td><strong>Tolerance</strong></td>
<td>Did you spend increasing amounts of time on games?</td>
<td></td>
</tr>
<tr>
<td><strong>Mood Modification</strong></td>
<td>Did you play games to forget about real life?</td>
<td></td>
</tr>
<tr>
<td><strong>Relapse</strong></td>
<td>Have others unsuccessfully tried to reduce your game use?</td>
<td></td>
</tr>
<tr>
<td><strong>Withdrawal</strong></td>
<td>Have you felt bad when you were unable to play?</td>
<td></td>
</tr>
<tr>
<td><strong>Conflict</strong></td>
<td>Did you have fights with others (e.g., family, friends) over your time spent on games?</td>
<td></td>
</tr>
<tr>
<td><strong>Problems</strong></td>
<td>Have you neglected other important activities (e.g., school, work, sports) to play games?</td>
<td></td>
</tr>
</tbody>
</table>
Gaming categories

• 1) **Addicted gamers** endorsed all four addiction items
• 2) **Problem gamers** endorsed two or three addiction items
• 3) **Highly engaged gamers** endorsed all the three engagement items, and 0 or 1 addiction item
• (4) Other adolescents = non-addicted/non-problem/non-highly engaged
Psychological health complaints

• Six items from the Health Behavior in School-Aged Children Symptom Checklist (Haugland & Wold, 2001)

• “How often have you experienced the following”:  
  – Feeling low  
  – Being irritable or in a bad mood  
  – Feeling nervous  
  – Difficulties sleeping  
  – Tired and exhausted  
  – Afraid.

• Scored 1 = regularly, 0 = not regularly
Research question

• Do the groups of gamers differ in terms of psychological health complaints?
Gaming engagement, gaming addiction and psychological health complaints

<table>
<thead>
<tr>
<th></th>
<th>Feeling low</th>
<th>Irritability or bad mood</th>
<th>Nervous</th>
<th>Trouble sleeping</th>
<th>Tired and exhausted</th>
<th>Afraid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contrast group</strong></td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Highly engaged gamers</strong></td>
<td>1.25 (0.56-2.76)</td>
<td>1.56 (0.95-2.55)</td>
<td>1.40 (0.66-2.95)</td>
<td>0.93 (0.50-1.74)</td>
<td>1.47 (0.92-2.36)</td>
<td>1.11 (0.16-7.87)</td>
</tr>
<tr>
<td><strong>Problem gamers</strong></td>
<td>1.69 (1.18-2.43)**</td>
<td>1.56 (1.16-2.11)**</td>
<td>1.91 (1.32-2.77)**</td>
<td>1.95 (1.49-2.54)**</td>
<td>1.89 (1.47-2.44)**</td>
<td>4.29 (2.42-7.61)*****</td>
</tr>
<tr>
<td><strong>Addicted gamers</strong></td>
<td>2.13 (1.25-3.63)**</td>
<td>2.93 (2.16-3.98)**</td>
<td>4.59 (3.06-6.88)*****</td>
<td>1.90 (1.21-2.99)**</td>
<td>2.95 (2.16-4.03)*****</td>
<td>8.33 (4.53-15.32)*****</td>
</tr>
</tbody>
</table>

Adjusted for gender and physical exercise; *P<0.05, ** P<0.01, ***P<0.001.
Conclusion

“...the risk of psychological health complaints was greater for gaming addicts and problem gamers compared to adolescents without problems and with high engagement.”

“The current study supports the growing notion that gaming addiction and strong engagement with games are qualitatively different phenomena.”
Study II

«Possible consequences of video gaming and gaming addiction: A first differencing approach»
Previous studies

• Studies have shown that game playing is:
• Positively associated with depression (Lemona et al., 2011)
• Negatively associated with academic performance (Gentile et al., 2004; Anand, 2007)
• Positively associated with drinking (Ream et al., 2011).
• Positively associated with conduct problems (Holtz & Appel, 2011)
Previous studies

• Studies have shown that video game problems are:
  • Positively associated with depression
    – (Gentile et al., 2011; Mentzoni et al., 2010),
  • Negatively associated with academic performance
    – (Chang & Law, 2008; Hawi, 2012; Skoric et al., 2009),
  • Positively associated with drinking
    – (Ream et al., 2011).
• Positively associated with conduct problems (Jeong et al., 2010; Rebein et al., 2010)
Research questions

• Are both the amount of gaming and the amount of problems related to
  • 1) Depression?
  • 2) School achievement?
  • 3) Binge drinking?
  • 4) Conduct problems?
Data

• “Young in Norway 2010-2012” Longitudinal school based survey of adolescents.

• Representative sample of Norwegian adolescents (8 490) aged 12 to 17 collected spring 2010. Response rate 73%

• A subsample of 2 450 participated twice, in 2010 and 2012.
  – 29% response rate
  – About 30% of attrition was due to declining second survey in 2010
  – The rest of the attrition was mainly due to refusal at the school level + missing addresses.

• Those aged 12 (elementary school) not included in analysis (different questionnaire)

• Some selection bias: Gender, age and school grades predicted attrition.
• Data were weighted for gender, age and school grades.

• Analyses based on N=1928, 55.5% female
Measures

• Gaming amount: quantity x frequency per month
• Game addiction scale for adolescents (Lemmens et al., 2009). Continuous, range 1-5
• School grades: Average of Norwegian, Maths and English.
• Depression: 6 items from SCL-90 (Derogatis et al., 1974)
• Frequency of alcohol intoxication
• Conduct problems...
Conduct problems (Pedersen et al., 2001).

• «Serious»
  – Theft > NOK 1000
  – Vandalizing > NOK 1000
  – Breaking windows etc.
  – Burglary
  – Fighting with weapon

• «Aggressive»
  – Violent quarrel with teacher
  – Cursing in front of teacher
  – Summoned to school principal
  – Sent out of classroom

• «Covert»
  – Sneaking into bus, cinema, without paying
  – Playing truant
  – Theft< NOK 500
  – Being away whole night
## Descriptives

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming amount (h)</td>
<td>23,56</td>
<td>46,51</td>
<td>0</td>
<td>210</td>
</tr>
<tr>
<td>Gaming addiction</td>
<td>1,37</td>
<td>0,61</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Depression</td>
<td>1,89</td>
<td>0,73</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Grades</td>
<td>3,98</td>
<td>0,80</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Binge drinking</td>
<td>1,50</td>
<td>1,60</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Serious CP</td>
<td>0,13</td>
<td>0,51</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Aggressive CP</td>
<td>0,32</td>
<td>0,32</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Covert CP</td>
<td>0,66</td>
<td>0,93</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
**Cross sectional results**
*(everything measured at t2)*

<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Grades</th>
<th>Binge drinking</th>
<th>Serious CP</th>
<th>Aggressive CP</th>
<th>Covert CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming amount</td>
<td>-0.01**</td>
<td>-0.01***</td>
<td>-0.03**</td>
<td>0.03***</td>
<td>0.06***</td>
<td>0.03*</td>
</tr>
<tr>
<td>Gaming problems</td>
<td>0.16***</td>
<td>-0.08***</td>
<td>-0.22*</td>
<td>0.35***</td>
<td>0.62***</td>
<td>0.50***</td>
</tr>
</tbody>
</table>

Coefficients are elasticities: 1% change in IV = X% change in DV.
The third variable problem...

- Impulsivity, «addictive personality», SES, home town?
First differencing

• Is used to address the problem of omitted variables in regression analysis.
• Requires panel data
• By regressing change in a dependent variable on change in an independent variable, the confounding influence of time-invariant third variables is removed (e.g. gender, birthyear, SES-background, personality, ability).

Allows for...

Gaming

Drinking
Controlling for time invariant 3rd variables: First difference method

<table>
<thead>
<tr>
<th></th>
<th>ΔDepression</th>
<th>ΔGrades</th>
<th>ΔBinge drinking</th>
<th>ΔSerious CP</th>
<th>ΔAggressive CP</th>
<th>ΔCovert CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔGaming amount</td>
<td>0.00</td>
<td>-0.00</td>
<td>-0.02</td>
<td>0.01</td>
<td>0.05**</td>
<td>0.03*</td>
</tr>
<tr>
<td>ΔGaming problems</td>
<td>0.25***</td>
<td>-0.05***</td>
<td>-0.01</td>
<td>0.19*</td>
<td>0.51***</td>
<td>0.57***</td>
</tr>
</tbody>
</table>

Coefficients are elasticities: 1% change in IV = X% change in DV.
Conclusions

Gaming amount is weakly (negligibly) associated with depression, school achievement, binge drinking and conduct problems.

Gaming problems are weakly (negligibly) associated with binge drinking.

...but associated with depression
   - A 10% increase in gaming problems = 2.5% increase in depression.

...and conduct problems.
   - A 10% increase in gaming problems =
     • 1.9% increase in «serious» CP
     • 5.1% increase in «aggressive» CP
     • 5.7% increase in «covert» CP
Limitations

• Attrition
• Direction of causality
• Time *variant* confounders not controlled for
• Self report bias
• Blind to game content/category
Implications for research

• Should focus on problems associated with gaming, not on the amount of gaming
• Come to an agreement concerning definitions and on which measures to use (King et al., 2013)
• Continue efforts to establishing causal relationships and directionality
  • Experimental studies
  • Longitudinal studies
Implications for treatment

• Adolescents who have problems with gaming, probably have other problems too
  • A broad focus may be necessary

• If problems with gaming goes untreated, or treatment is delayed, it could lead to more problems, which makes treatment more complex.
Thanks for your attention!