Adolescents’ exposure to Internet-delivered interventions

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Overview

- **Part 1: Use & User Perceptions**

- **Part 2: The Psychology of Interest**

- **Part 3: A Computer-Tailored Game**
Use & User Perceptions

Part 1
Efficacy and use

- Internet-delivered interventions and behaviour change

- Example
    - 285,146 visitors within 36 months
    - 56.3% left within 30 seconds
Is this typical for Internet-delivered interventions?

- Anonymity versus commitment
- Tracking user behavior
What is needed?

- Experimental research to increase evidence-based insight into effectiveness of factors to prevent attrition/stimulate actual use

User perceptions

- Efficiency
  - easy search of and access to the information provided

- Effectiveness
  - the quality of that information (e.g., in terms of relevance)

- Active trust
  - the confidence in acting on the provided information

- Enjoyment


User control

- User control - covers the voluntary and instrumental actions of the website visitor

- Hypothesis: user control was expected to increase efficiency, but to decrease website use

- Why? Libertarian paternalism: a weak form of paternalism that guides people (e.g., a tunneled version of a website with less user control) without necessarily restricting their choices (e.g., the decision to keep using a website)
Invited: 1044
Response rate: 64%
Randomized: N = 668

Experimental group 1
n = 226

Experimental group 2
n = 228

Control group
n = 214

Pre-test: Hepatitis knowledge questionnaire

Website:
Tunneled

Website:
Freedom of choice

Post-test: user perceptions
Server registrations: website use

Experimental group 1
n = 200 (88%)

Experimental group 2
n = 193 (85%)

Control group
n = 178 (83%)

Follow-up: Hepatitis knowledge questionnaire
### Use, user perceptions, knowledge

<table>
<thead>
<tr>
<th>Measure</th>
<th>Range</th>
<th>Exp. group 1: Tunneled</th>
<th>Exp. group 2: Freedom of choice</th>
<th>$F(1, 452)$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pages visited</td>
<td>0-12</td>
<td>2.3</td>
<td>7.4</td>
<td>171.49</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Efficiency</td>
<td>1-7</td>
<td>4.8</td>
<td>1.7</td>
<td>97.69</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Follow-up</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exp. group 1: Tunneled</td>
<td>5.0</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>Exp. group 2: Freedom of choice</td>
<td>5.4</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Control group</td>
<td>5.4</td>
<td>5.6</td>
<td></td>
</tr>
</tbody>
</table>

$(F(2, 567) = 47.24, P < .001)$
Why?

- Libertarian paternalism
- Interaction design
  - What’s the aim
The Psychology of Interest

Part 2
Enjoyment

- Focus: Affective perceptions, often referred to as enjoyment
- Enjoyment ≠ liking
  - Enjoyment also captures the experience
- Enjoyment ≠ entertaining
  - A website can be enjoyable while not intended to be entertaining
- A more important drive of use than cognitive perceptions (Venkatesh, Thong, & Xu, 2012)
Interest

- Interest can be seen as an emotion (Silvia, 2006) and is strongly related with emotional engagement (Sun & Rueda, 2012).

- Enjoyment is not a necessary condition for interest (Turner & Silvia, 2006).

- Silvia (2008): “Interest stems from events that are new, complex and unfamiliar [novelty-complexity], provided that people feel able to comprehend them and master the challenges they pose [coping potential].”

- Interest proved to have added value in explaining intervention use.

Key research question

- To what extent are interest and enjoyment effective in increasing website use?
- i.e., both a first visit and staying thereafter
Engagement with technology

  - The engagement process is initiated by interest (i.e., point of engagement: first use), which moves people forward into engagement
  - Sustained engagement (i.e., period of engagement: staying) is characterized by positive affect: people enjoy their visit to the website
Congruency

- O’Brien and Toms (2008): different phases of engagement might require different emotions

- Anderson (1973): assimilation-contrast theory

- Additional explorative research question:
  - To what extent does congruency between invitation to visit a website and the actual website result in increased website use?
Full disclosure

- To maximize scrutiny
- To foster accurate replication
- To facilitate future data syntheses
- www.sciencerep.org/13


Study 1

- **Aim**
  - Experimental pre-test

- **Methods**
  - Sample: Panel of a Dutch Internet research agency (N = 645)
  - Primary outcome: Intention to visit

- **Results**
  - Invitation aimed at arousing interest → higher intention to visit
    - $t(342) = -4.36, p < .001, r = .23$
Study 2

■ Aim
  ■ From intention to behaviour?

■ Methods
  ■ Sample: Google AdWords, 11-23 April 2013 (N = 8,612)
  ■ Primary outcome: Clicking on the link to visit the website

■ Results
  ■ Invitation aimed at arousing interest did result in more visits
    ■ 6.91% vs. 4.23%, OR = 1.68, 95% CI = 1.39-2.03, $\chi^2 = 29.29$, $p < .001$
Study 3

Aim
- Replication of Study 2
- From invitation to website use?
- Congruency

Methods
- Sample: Google AdWords, 13-24 August 2013 (N = 34,837)
- Primary outcome: Number of pages visited on the website

Results
- Visits to website:
  - 5.95% vs. 5.54%, OR = 1.08, 95% CI = 0.99-1.18, \( \chi^2 = 2.73, p = .10 \)
- Website arousing interest did result in more page visits
- Main effect of interest: OR = 1.21, 95% CI = 1.15–1.28, $\chi^2 = 52.77$, $p < .001$
If participants received an invitation aimed at arousing enjoyment,
- they visited 37.1% of the pages on the website version in which enjoyment was manipulated, compared to 33.8% of the pages of the website version in which interest was manipulated
- OR = 1.16, 95% CI = 1.04–1.29, $\chi^2_{1} = 6.86$, $p = .009$

If participants received an invitation aimed at arousing interest,
- they visited 43.4% of the pages on the website version in which interest was manipulated, compared to 36.1% of the pages of the website version in which enjoyment was manipulated
- OR = 1.36, 95% CI = 1.23–1.51, $\chi^2_{1} = 32.83$, $p < .001$
Arousing interest might be a promising strategy to increase use.

Statistical significance vs. practical relevance
- 0.41% absolute difference, 7% relative
- 34,837 people were exposed in 12 days, €716.60

Framework by O’Brien and Toms vs. assimilation-contrast theory
- Simple or easily understood products: no congruency
- Complex products: dependent on the information provided
  - Impact on revisiting?
A Computer-Tailored Game

Part 3
Alcohol use among Dutch adolescents

- Before 1\textsuperscript{st} of January 2014: allowed to buy low-strength alcoholic beverages when they turned 16

- 57.4\% of 16 year old and 61.9\% of 17/18 year old engaged in binge drinking in the past month

- Various consequences
  - Physical fighting
  - Being injured
  - Experiencing sexual assaults
  - Decreased school performance
  - Brain damage and cognitive deficits
Role of parents

- Perceived parental permissiveness/disapproval has a protective effect on adolescents’ alcohol use
  - Setting: legally not allowed (e.g., the US)
  - Dutch parents: think their influence is limited, especially when they are not present

- Mixed findings regarding communication about alcohol use

- Direct influence
  - Less engagement in alcohol specific parenting practices?
Weekly consumption

Relevance of rules, regardless of parental alcohol use
Binge drinking

R^2 = 41.6%
Drinking situations

Chi² = 0.01, p = .92

Chi² = 0.23, p = .63

R² = 31.7%

R² = 30.6%
Intervention

- A web-based game for adolescents, with computer-tailored feedback on behavior and motivational determinants
  - Game might be an attractive tool to keep adolescents motivated to use intervention

- Parental component providing information on how to communicate about this topic and how to set appropriate rules concerning alcohol use
Involvement of target group

- Facebook group
  - Panel of potential participants
- Name of the intervention
- Screenshots; look and feel
- Scenarios; appealing and realistic
- Active contributors
- Recruitment & incentives
First lesson at school (January/February)

Baseline

First game scenario

Second lesson at school (January/February)

Second game scenario

Third game scenario

Between February and April at home

Session 4

Session 5

4 months follow-up

First follow-up at school (May/June)

Second follow-up at home (September/October)

8 months follow-up

Game

Red line: routing experimental condition, green line: routing control line, dashed boxes: intervention parts that have to be done at home.
Watskeburt?!
In-game cell phone

ALS IK 4 OF MEER GLAZEN ALCOHOL DRINK HEB IK HET GEVOEL DAT IK DE CONTROLE VERLIES.

BEETJE ONEENS
Scenarios

This figure illustrates how the game scenario and second text message is influenced by the answers given in the baseline questionnaire. Colored lines indicate a flexible sequence, black boxes are fixed.
### Binge drinking at follow-up

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>P</th>
<th>95% CI</th>
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<tbody>
<tr>
<td><strong>Condition (experimental)</strong></td>
<td>2.53</td>
<td>.014</td>
<td>1.21–5.29</td>
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<tr>
<td><strong>Condition x Age</strong></td>
<td></td>
<td></td>
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<tr>
<td>Age 15</td>
<td>2.13</td>
<td>.025</td>
<td>1.10–4.12</td>
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<tr>
<td>Age 16</td>
<td>1.80</td>
<td>.069</td>
<td>0.96–3.38</td>
</tr>
<tr>
<td>Age 17</td>
<td>1.51</td>
<td>.217</td>
<td>0.78–2.92</td>
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<tr>
<td>Age 18</td>
<td>1.28</td>
<td>.516</td>
<td>0.61–2.65</td>
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<tr>
<td>Age 19</td>
<td>1.07</td>
<td>.868</td>
<td>0.46–2.50</td>
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## Dose-response

<table>
<thead>
<tr>
<th>At least...</th>
<th>1 session</th>
<th></th>
<th></th>
<th>2 sessions</th>
<th></th>
<th></th>
<th>3 sessions</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>P</td>
<td>95% CI</td>
<td>OR</td>
<td>P</td>
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<td>Condition (experimental)</td>
<td>3.24</td>
<td>.003</td>
<td>1.51-6.96</td>
<td>7.27</td>
<td>.000</td>
<td>2.71-19.54</td>
<td>7.89</td>
<td>.000</td>
<td>2.70-23.07</td>
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<tr>
<td>Condition x Age</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Age 15</td>
<td>2.42</td>
<td>.01</td>
<td>1.24-4.73</td>
<td>4.10</td>
<td>.001</td>
<td>1.77-9.51</td>
<td>4.60</td>
<td>.001</td>
<td>1.86-11.40</td>
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<tr>
<td>Age 16</td>
<td>1.81</td>
<td>.07</td>
<td>0.96-3.41</td>
<td>2.31</td>
<td>.04</td>
<td>1.05-5.08</td>
<td>2.68</td>
<td>.02</td>
<td>1.15-6.27</td>
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<tr>
<td>Age 17</td>
<td>1.35</td>
<td>.38</td>
<td>0.69-2.63</td>
<td>1.30</td>
<td>.54</td>
<td>0.56-3.03</td>
<td>1.56</td>
<td>.34</td>
<td>0.62-3.91</td>
</tr>
<tr>
<td>Age 18</td>
<td>1.01</td>
<td>.984</td>
<td>0.47-2.16</td>
<td>0.74</td>
<td>.54</td>
<td>0.27-1.99</td>
<td>0.90</td>
<td>.86</td>
<td>0.31-2.70</td>
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<tr>
<td>Age 19</td>
<td>0.75</td>
<td>.53</td>
<td>0.31-1.84</td>
<td>0.42</td>
<td>.15</td>
<td>0.13-1.38</td>
<td>0.53</td>
<td>.34</td>
<td>0.14-1.99</td>
</tr>
</tbody>
</table>
Discussion

- Small effects, but they increase with use
  - Broad target group; change of law
  - Differential attrition; participation of schools

- Game as a tool to keep adolescents motivated to use intervention?
  - Observational versus experimental research
  - Integration between content and delivery mode
Thank you for your attention!

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