Risk communication among children: The effect of a gamified design

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Outline

✓ Risk communication
✓ Gamification
✓ Hypotheses and Experimental Design
✓ Results & Discussion
Risk communication

✓ Medical decision-making
  - Patient-centered medicine
  - Involvement of the children

✓ Efficient ways to communicate medical risks:
  - Frequentist format [Cosmides and Tooby, 1996; Gigerenzer, 1991; Zhu & Gigerenzer, 2006]
  - Visual display: bar graphs, pie charts, icon arrays [Cosmides and Tooby, 1996; Galesic and Garcia-Retamero, 2009; Multmeier, 2012]
Can gamification improve risk communication among adolescents?
Gamification

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1. Intrinsic motivation
Gamification

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1. Intrinsic motivation
2. Flow
Flow

[Csikszentmihalyi, 1997; Zichermann and Cunningham, 2011].
Gamification

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1. Intrinsic motivation
2. Flow
3. Game-based mechanics
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3. Game-based mechanics
4. Narrative
Gamification

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1. Intrinsic motivation

2. Flow

3. Game-based mechanics

4. Narrative
   - appeal to emotions
   - clear and short descriptions
   - relevant to the topic
   - focus on what makes the task challenging
   - create a sense of anticipation
Hypotheses and Experimental Design
Hypothesis

Gamification will produce a positive effect:

- A larger number of correct responses in cognitively demanding tasks.

The effect can vary for low risk literacy and high risk literacy adolescents.
Experimental design & Data collection

- School in Moscow, Russia. Completion in computer classes (April-May 2016)
- Children 11-15 years of age. Mean age=13.8 (SD=1.1).
- 58% of the respondents are girls and 42% are boys.
The narrative: respondent was selected as a doctor in a humanitarian mission on an island

• 4 missions

• Rewards: saving lives
Tasks

1) Understanding information about medical drugs and screenings.

2) Calculations of risks while taking and not taking the drugs.

[adapted from Schwartz, Woloshin, and Welch, 2005; Galesic and Garcia-Retamero, 2013; Garcia-Retamero, Galesic, and Gigerenzer, 2010]
Results
ANOVA:
✓ A large effect of risk literacy: F(1, 211)=16.4, p<0.001, η²=0.07
✓ A small effect of gamified condition: F(1, 211)=2.9, p=0.088, η²=0.01
✓ A medium effect of the interaction between risk literacy and the gamification: F(1, 211)=14.7, p<0.001, η²=0.07.
✓ A medium risk literacy effect, $F(1, 211) = 14.5$, $p<0.001$, $\eta^2 = 0.06$.
✓ A small interaction effect between risk literacy and gamification $F(1, 211) = 4.8$, $p<0.05$, $\eta^2 = 0.02$. 

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**Risk calculations**
Tasks on understanding and calculations

✓ No effect in easier tasks
How easy it was to complete the tasks: in most of the tasks gamification was helpful for the respondents ($d = 0.20-0.37$).
Main Findings

(1) Gamification can be helpful in risk communication among adolescents.

(2) Gamification increased the understanding of information about risks and risk calculations in more cognitively demanding tasks.

(3) Gamification did not increase the accuracy in easier tasks.

(4) The effect sizes are small.
Thank you for your attention!

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