
Risk communication among children: The effect of a gamified design

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Outline

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

✓ 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]

Research Question

Can gamification improve risk communication among adolescents?

Gamification

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1. Intrinsic motivation

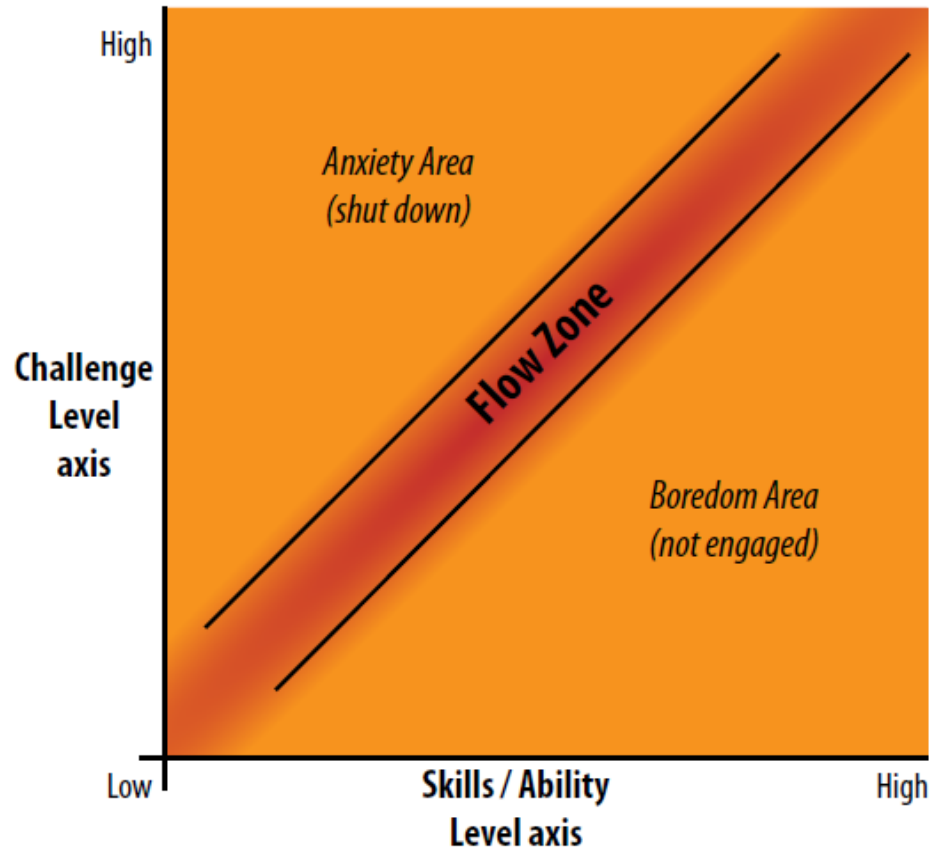
Gamification

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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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4. Narrative

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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

**Traditional
web survey**

N=109

**Gamified
web survey**

N=104

- 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.

Gamification

Это опрос в виде игры:

Ты отобран в гуманитарную миссию в качестве врача на остров Тимон в Тихом Океане.



Тимонцы – жители острова – страдают от множества болезней и мало что понимают в медицине.

Их всего 10 000 человек, но от болезней **умирают 1 000 жителей.**



Ты можешь их спасти!

4 Миссии

МИССИЯ 1.
Обучи тимонцев основам статистики.

Спаси 100 жителей.

МИССИЯ 2.
Покажи, как оценить полезность лекарств.

Спаси 200 жителей.

МИССИЯ 3.
Расскажи о новых лекарствах.

Спаси 300 жителей.

МИССИЯ 4.
Оцени опасность распространения вирусов на острове.

Спаси 400 жителей.

Для **успешного** выполнения миссий тебе придётся много считать.
Твоя **внимательность** поможет тебе лучше справиться с миссиями

- The narrative: respondent was selected as a doctor in a humanitarian mission on an island
- 4 missions
- Rewards: saving lives

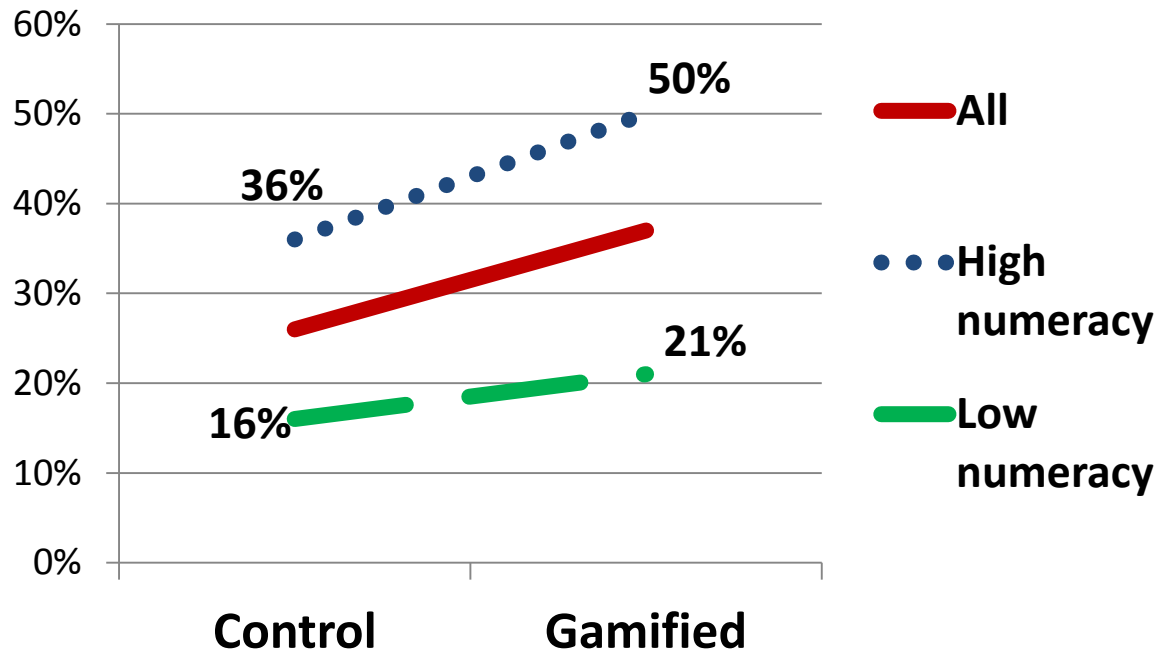
Tasks

- 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

Tasks on understanding of information



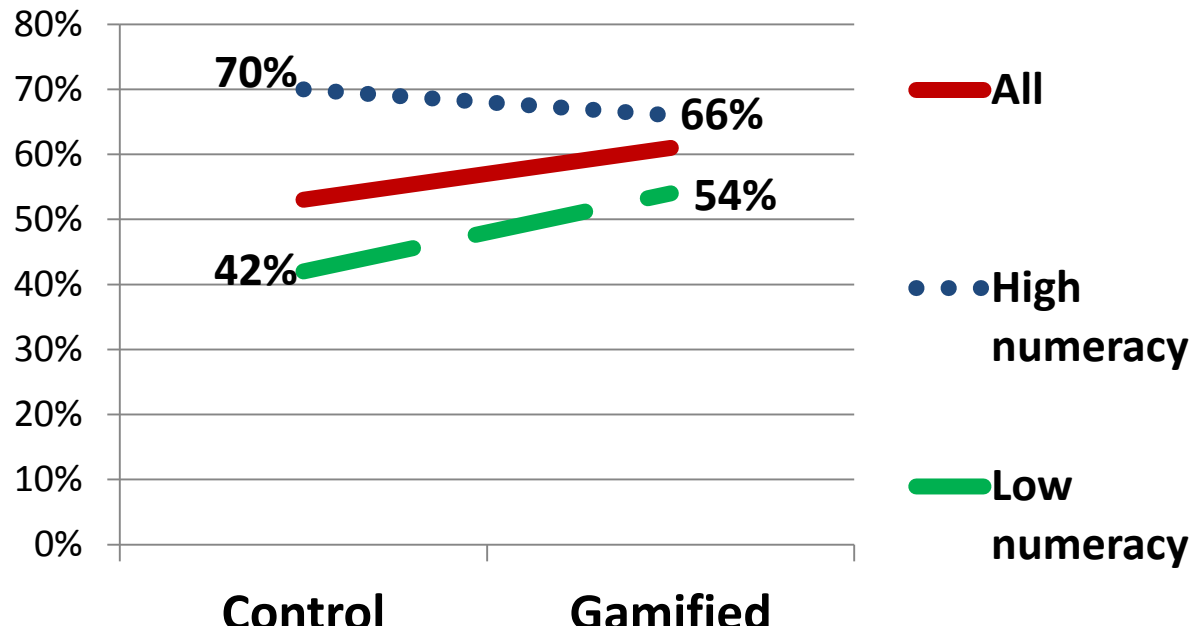
ANOVA:

✓ A large effect of risk literacy: $F(1, 211)=16.4$, $p<0.001$, $\eta^2=0.07$

✓ A small effect of gamified condition: $F(1, 211)=2.9$, $p=0.088$, $\eta^2=0.01$

✓ A medium effect of the interaction between risk literacy and the gamification: $F(1, 211)=14.7$, $p<0.001$, $\eta^2=0.07$.

Risk calculations



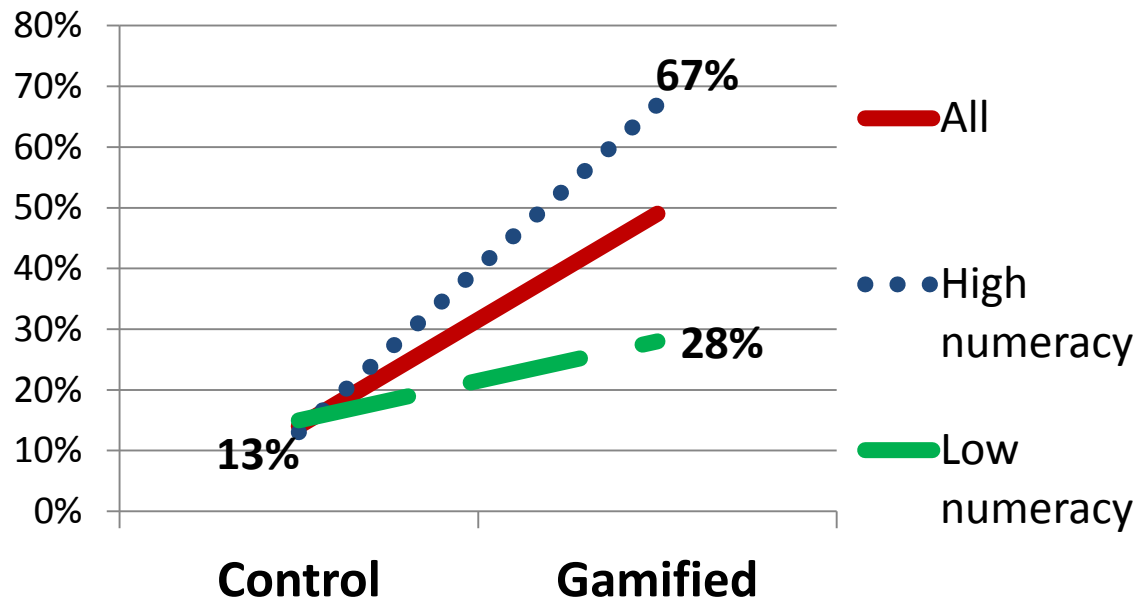
- ✓ A medium risk literacy effect, $F(1,211)=14.5$, $p<0.001$, $\eta^2=0.06$.
- ✓ A small interaction effect between risk literacy and gamification $F(1,211)=4.8$, $p<0.05$, $\eta^2=0.02$.

Tasks on understanding and calculations

✓ No effect in easier tasks

Evaluation of a gamification

Survey evaluation (highest score)



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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