ERNST MORITZ ARNDT
UNIVERSITÄT GREIFSWALD

Wissen
lockt.
Seit 1456

Snowball

Study on human behaviour in cascading crisis situations

PSCE Conference 2016, Athens

The SNOWBALL Project (FP7)

Lower the Impact of aggravating Factors in cascading Crisis Situations thanks to adaptive Foresight and Decision-Support Tools

- EU FP7, grant agreement no 606742
- 03/2014 – 02/2017
- Consortium
  - 11 partners
  - 8 countries (BEL, BUL, FIN, FRA, GER, ITA, HUN, POL)
  - Research Institutions, Industry, Civil Protection agencies (govt'l & NGO)
- www.snowball-project.eu

The SNOWBALL Project (FP7)

P01 Gedicom	France
P02 FHG	Germany
P03 ISMB	Italy
P04 LUPT	Italy
P05 EMAUG	Germany
P06 UCL	Belgium
P07 INEO	France
P08 SGSP	Poland
P09 ESC	Finland
P10 EP	Bulgaria
P11 HRC	Hungary

- Institute of Psychology, Chair Health and Prevention
- Vast experience in research on human aspects in civil protection, e.g.
  - (Inter-) cultural aspects
  - motivational factors of volunteers and professionals
  - interorganizational cooperation
  - crisis communication under special consideration of social media

CATO

iSAR+

RETTUNG, HILFE & KULTUR

INKA

Bundesministerium für Bildung und Forschung

ERNST MORITZ ARNDT
UNIVERSITÄT GREIFSWALD

Wissen
lockt.
Seit 1456

Snowball

Study on human behaviour in cascading crisis situations

PSCE Conference 2016, Athens

Research Questions

How does human behaviour contribute to conditions of cascading effects?

Which potentially adequate and inadequate behaviours do people show ?

Do specific aspects of crisis communication
(information source and extent) influence this behaviour?

Cascading Effects

- “Cascading effects are the dynamics present in disasters, in which the impact of a physical event or the development of an initial technological or human failure generates a sequence of events, *[… linked or dependent from each other …]*, that result in physical, social or economic disruption. Thus, an initial impact can trigger other phenomena that lead to consequences with significant magnitudes. Cascading effects are complex and multi-dimensional and evolve constantly over time. […]“

adopted from Pescaroli & Alexander

Examples for human behaviour as a cascade trigger

- disaster tourism
- rubbernecks/gawkers; bystanders
- overload of CI networks due to increased usage

→ cumulative individual behaviour

How to study human behaviour in a context of cascading effects?

Literature Review

Interviews

- pan-European
- with experts, leading personnel and first responders
- individual interviews and focus groups

Vignette Study

Virtual Reality Study

Vignette Study

Vignette studies use short descriptions of situations or persons (vignettes) that are usually shown to respondents within surveys in order to elicit their judgments about these scenarios. Important factors are systematically varied. Participants are randomly assigned to one of the experimental conditions.

	Total	Completion rate	Total Completed minus First Responders
Finland	399	46.37%	85
Germany	562	54.80%	207
Hungary	533	39.40%	93
Poland	still running		

Vignette Study

Vignette studies use short descriptions of situations or persons (vignettes) that are usually shown to respondents within surveys in order to elicit their judgments about these scenarios. Important factors are systematically varied. Participants are randomly assigned to one of the experimental conditions.

- Information source (fire brigade/mayor)
- Additional information (yes/no)

	Total	Completion rate	Total Completed minus First Responders
Finland	399	46.37%	85
Germany	562	54.80%	207
Hungary	533	39.40%	93
Poland	still running		

Vignette 1 (t=0)	Vignette 2 (t=1)	Vignette 3 (t=2)
Storm is approaching	Storm is ongoing, blackout	Storm has passed, blackout, no water

- Behavioural intentions
- Usefulness of information
- Information seeking behaviour
- Information distribution behaviour
- …

- Information source (fire brigade/mayor)
- Additional information (yes/no)

ON THE FOLLOWING PAGES A HYPOTHETICAL SCENARIO WILL BE PRESENTED TO YOU. PLEASE IMAGINE YOURSELF IN THE SITUATION DESCRIBED. IT IS IMPORTANT TO READ EVERYTHING CAREFULLY AND THEN ANSWER THE QUESTIONS THAT FOLLOW.

Saturday, 12th December 2015, 9 am

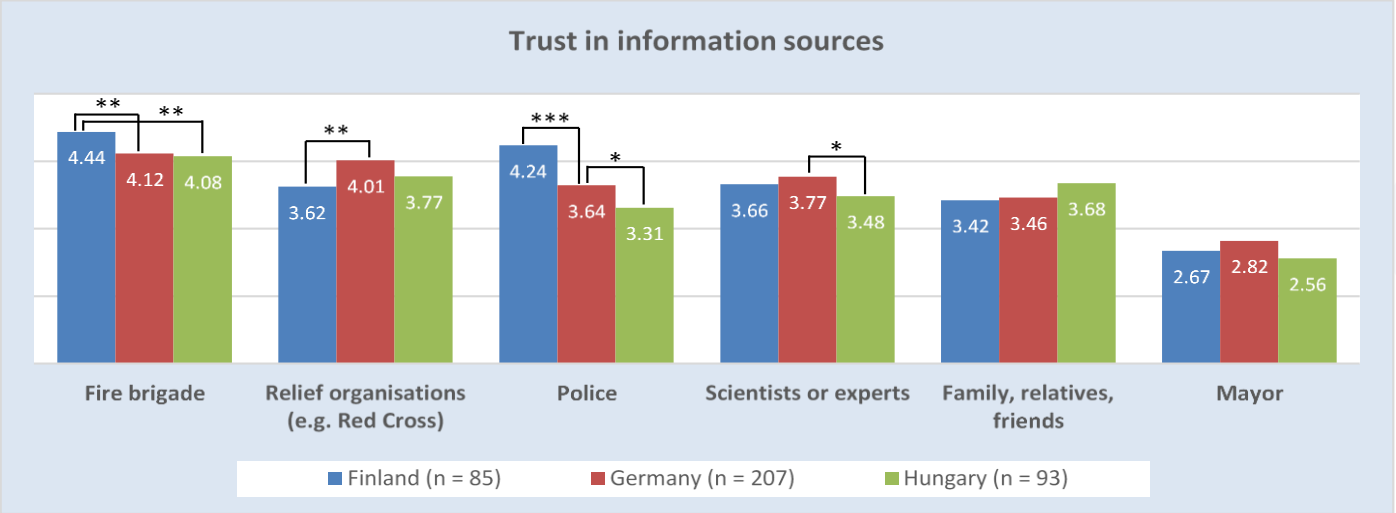
You are at home and receive a phone call. As you pick up the receiver, the following voice message is playing:

Mayor / with explanation *"Attention! The mayor informs that there is a severe storm coming to [REGION] with isolated wind gusts of 140 kilometres per hour. This warning is valid from Saturday 12th December 5 PM until Sunday 13th December 8 PM. Prepare and shelter in place! The storm poses a severe threat to life and property. Power outages are possible."*	**Fire brigade / with explanation** *"Attention! The fire brigade informs that there is a severe storm coming to [REGION] with isolated wind gusts of 140 kilometres per hour. This warning is valid from Saturday 12th December 5 PM until Sunday 13th December 8 PM.Prepare and shelter in place. The storm poses a severe threat to life and property. Power outages are possible."*
Mayor / without explanation *"Attention! The mayor informs that there is a severe storm coming to [REGION] with isolated wind gusts of 140 kilometres per hour. This warning is valid from Saturday 12th December 5 PM until Sunday 13th December 8 PM. Prepare and shelter in place!"*	**Fire brigade / without explanation** *"Attention! The fire brigade informs that there is a severe storm coming to [REGION] isolated wind gusts of 140 kilometres per hour. This warning is valid from Saturday 12th December 5 PM until Sunday 13th December 8 PM.Prepare and shelter in place!"*

Vignette 1 (t=0)	Vignette 2 (t=1)	Vignette 3 (t=2)
Storm is approaching	Storm is ongoing, blackout	Storm has passed, blackout, no water

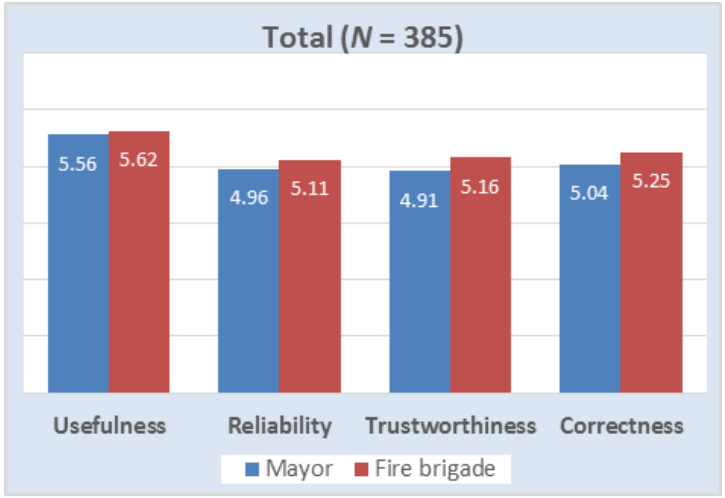
Results

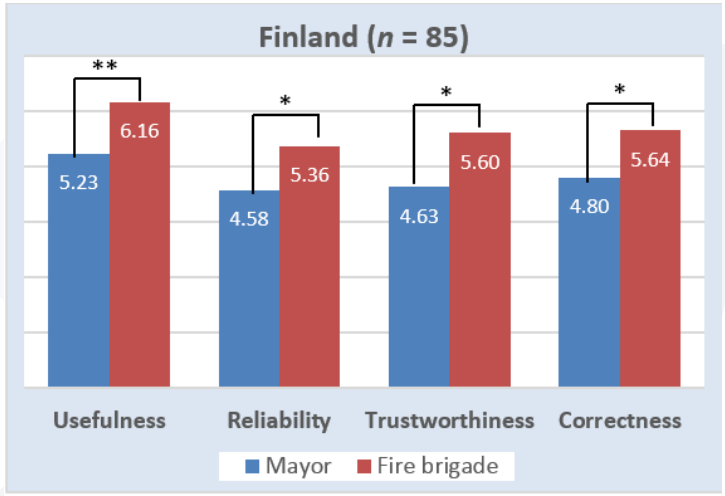
- **General trust and situation-specific trust**
  - **Literature:** Whether information is considered believable or not, is highly dependent on the information source.
  - **General trust:** fire brigade = most trusted, mayor = least trusted
  - **Situation-specific trust** = no difference concerning trustworthiness of fire brigade and mayor (except for the Finnish sample); nearly all participants (96.8 %) want to look for more information



General trust in relation to information source

Note. Values from 1 ("not at all") to 5 ("very much"); *** $p < .001$, ** $p < .01$, *$p < .05$



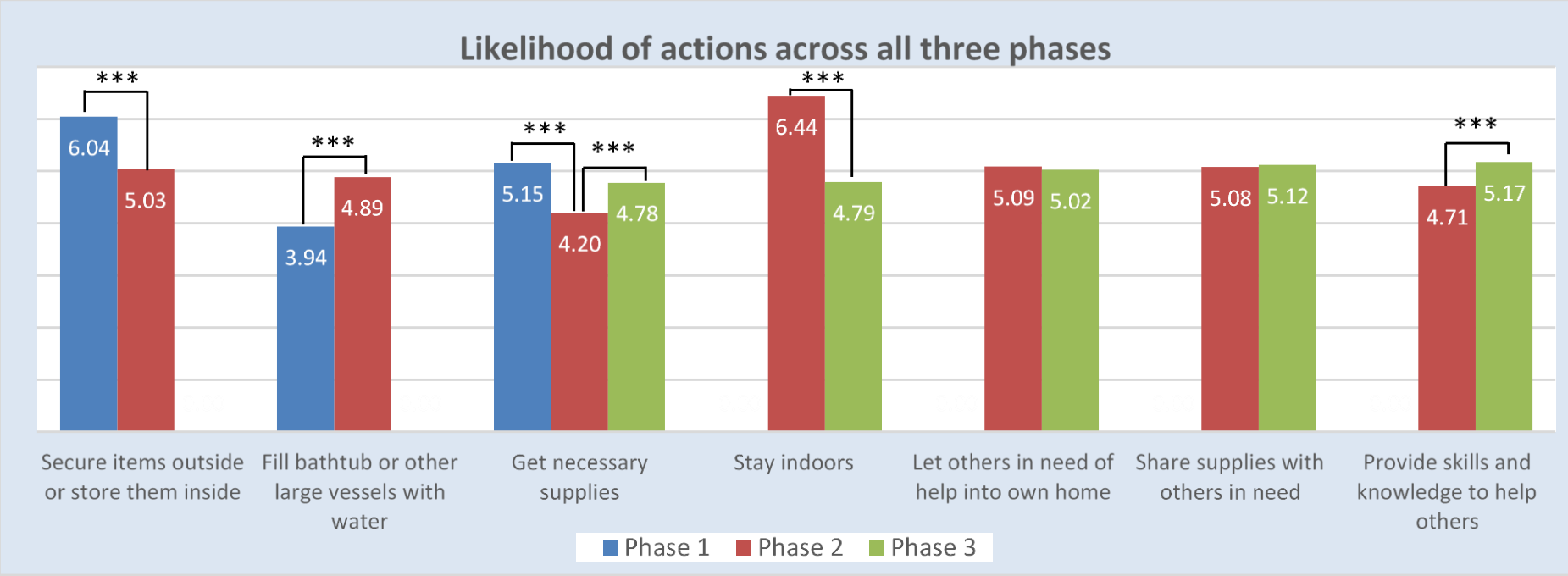


Perceived helpfulness in relation to information source

Note. Values from 1 to 7, higher values indicate better rating; ** $p < .01$, *$p < .05$;

Which potentially adequate and inadequate behaviours do people show ?

- **Intended actions (1/3)**
  - **Literature:** Population acts rather rational; importance of „disaster myths“ for crisis management
  - Changes concerning **intended behaviours:**

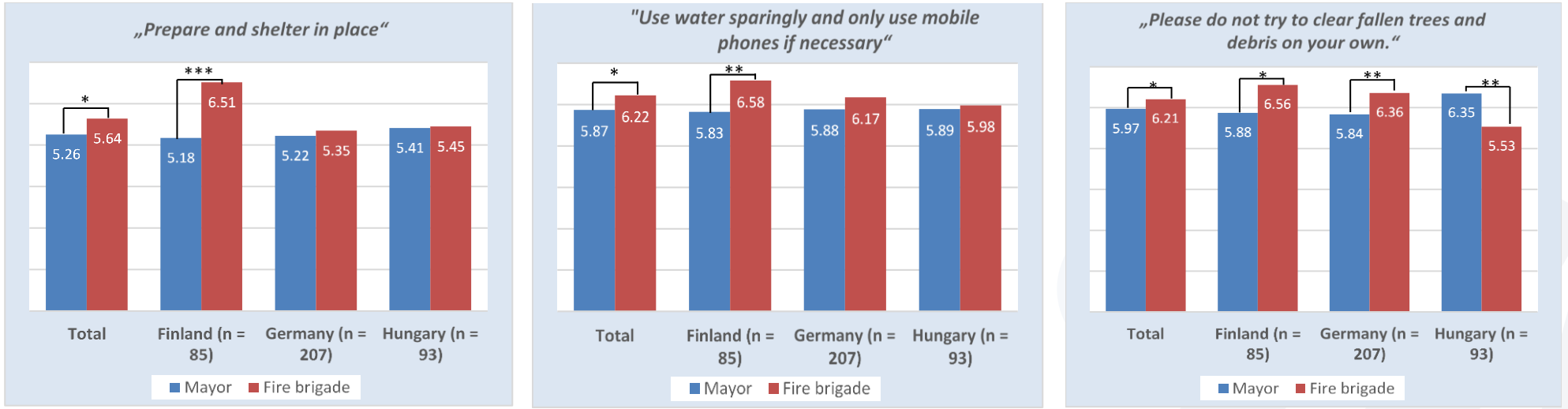


Change of likelihood of actions in the three phases of the scenario

Note. Values from 1 (“very unlikely”) to 7 (“very likely”)

Do specific aspects of crisis communication (information source and extent) influence this behaviour?

- **Intended actions (2/3)**
  - **Intent to follow advice given** (separated by **information source**):



Likelihood of following advice, separated by information source and country

Note. Values from 1 (“very unlikely”) to 7 (“very likely”); ***$p < .001$, **$p < .01$, *$p < .05$

Results

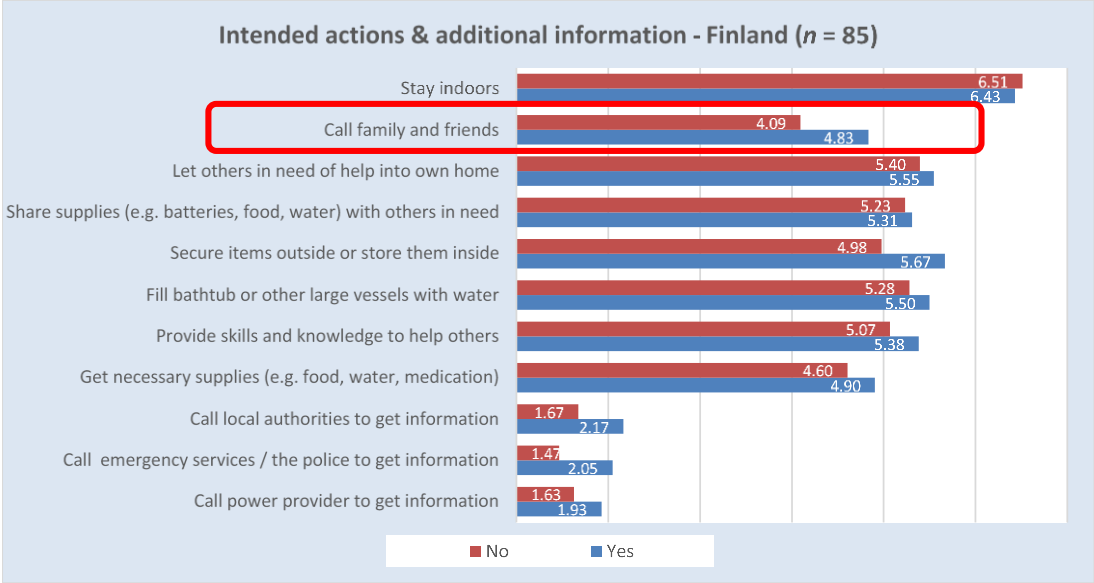
- **Intended actions (3/3)**
  - Despite **high willingness** to follow advice („use water sparingly and only use mobile phones if necessary“)
    - Relatively high likelihood of calling family and friends (*M* = 5.23) and filling bathtub (*M* = 4.89)
    - Possible **overload of communication systems and water supply**
  - Possible importance of **information source** and **content:**

Fire brigade / with explanation

The fire brigade advises to use water sparingly and to only use mobile phones if necessary. Many electric water pumps in the region have stopped working so that the water supply is scarce. Also, due to several damaged mobile base stations the network may become overloaded easily.

Fire brigade / without explanation

The fire brigade advises to use water sparingly and to only use mobile phones if necessary.



Likelihood of actions (phase 2), separated by presence of additional information - Finland

Note. Values from 1 (“very unlikely”) to 7 (“very likely”)

Summary

- Willingness to follow advices and intended behaviour diverge sometimes
- Cumulative individual behaviour can have a mitigating and an aggravating impact on cascading effects
- Trust in specific information sources appears to be context-sensitive

→ Deeper understanding of counterintuitive phenomena envisaged

→ Virtual reality study in order to measure actual behaviour

The VR Study

The VR Study

Introduction and first survey

Practice Scenario

purpose: familiarize with controlling, virtual reality and mobile phone app

Experimental scenario

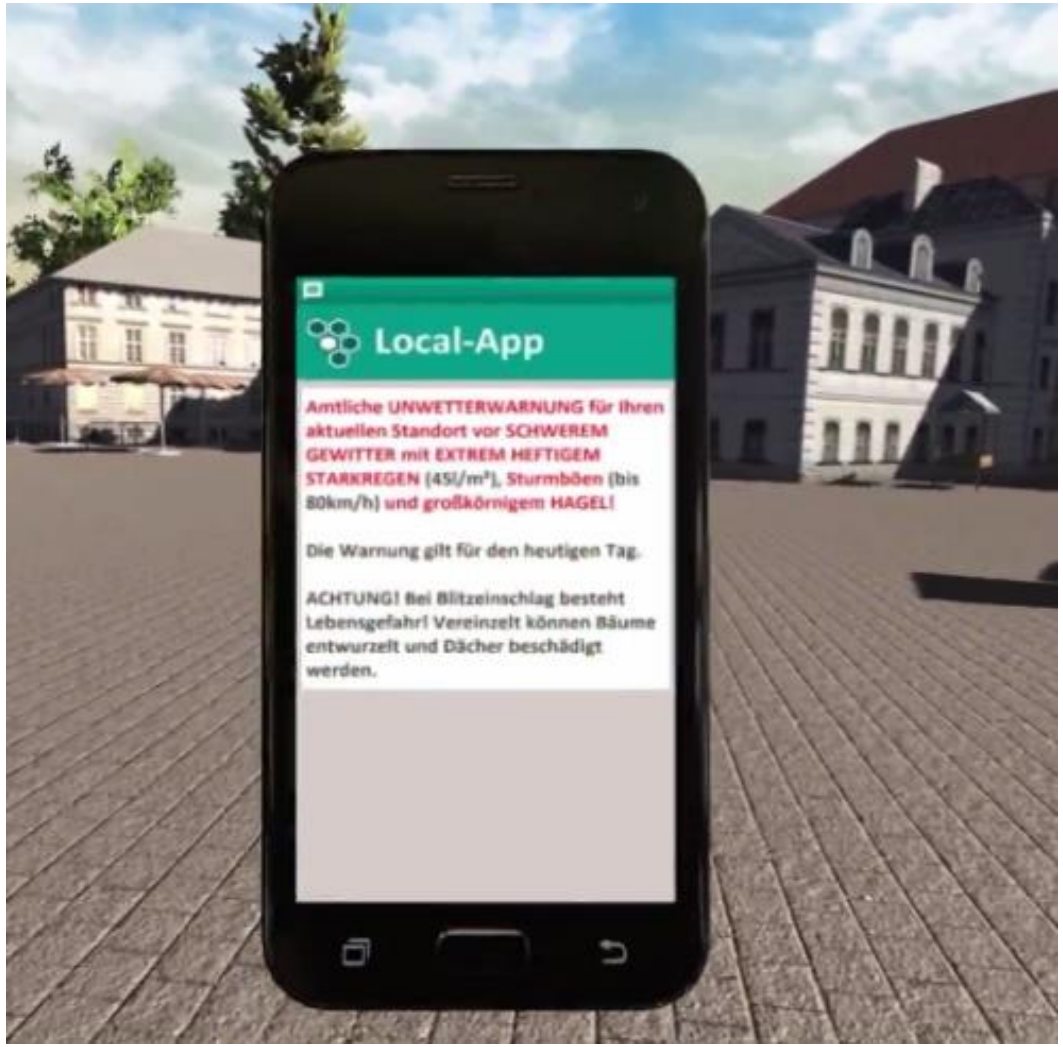
Condition 1: Warning

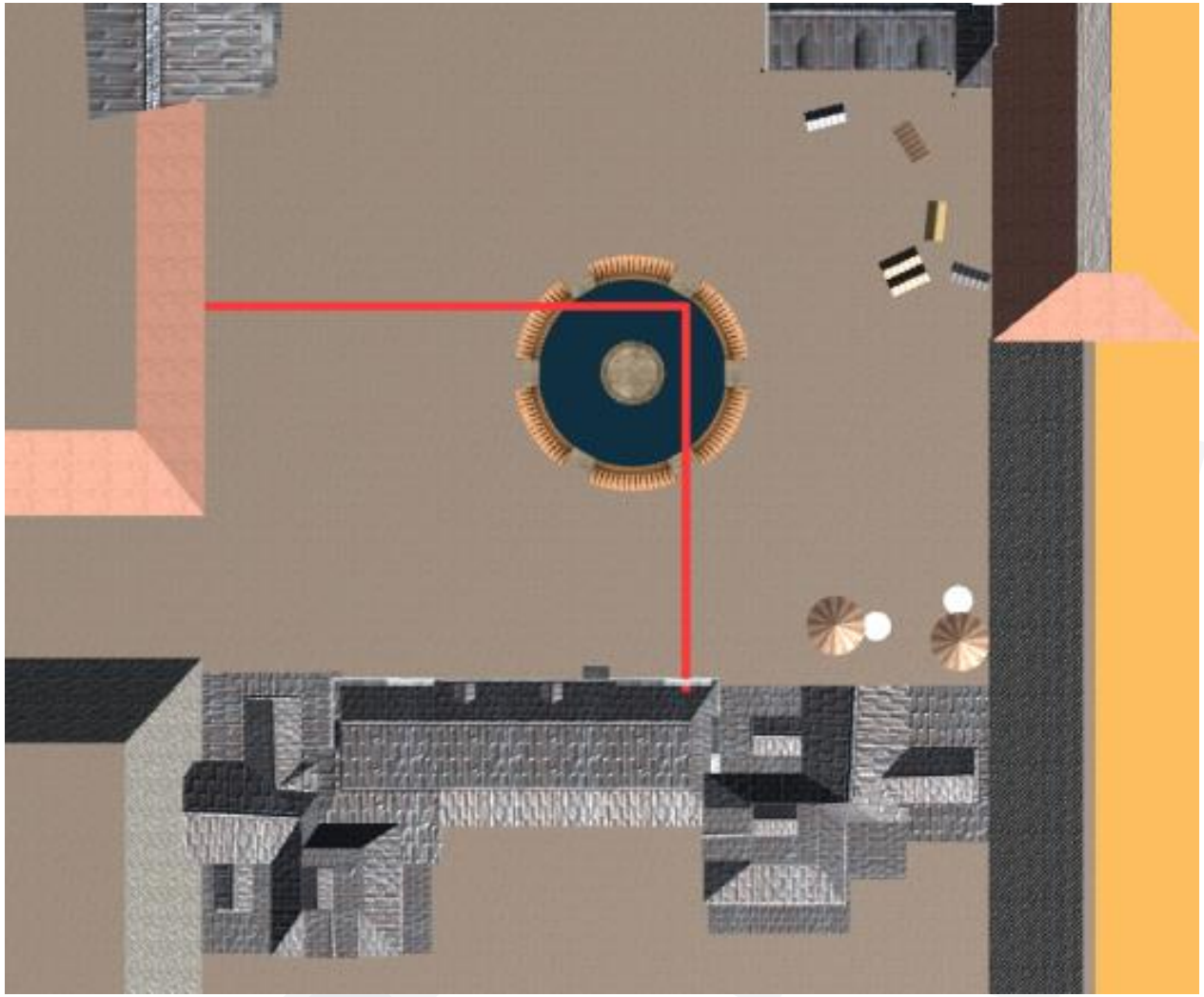
Condition 2: No Warning

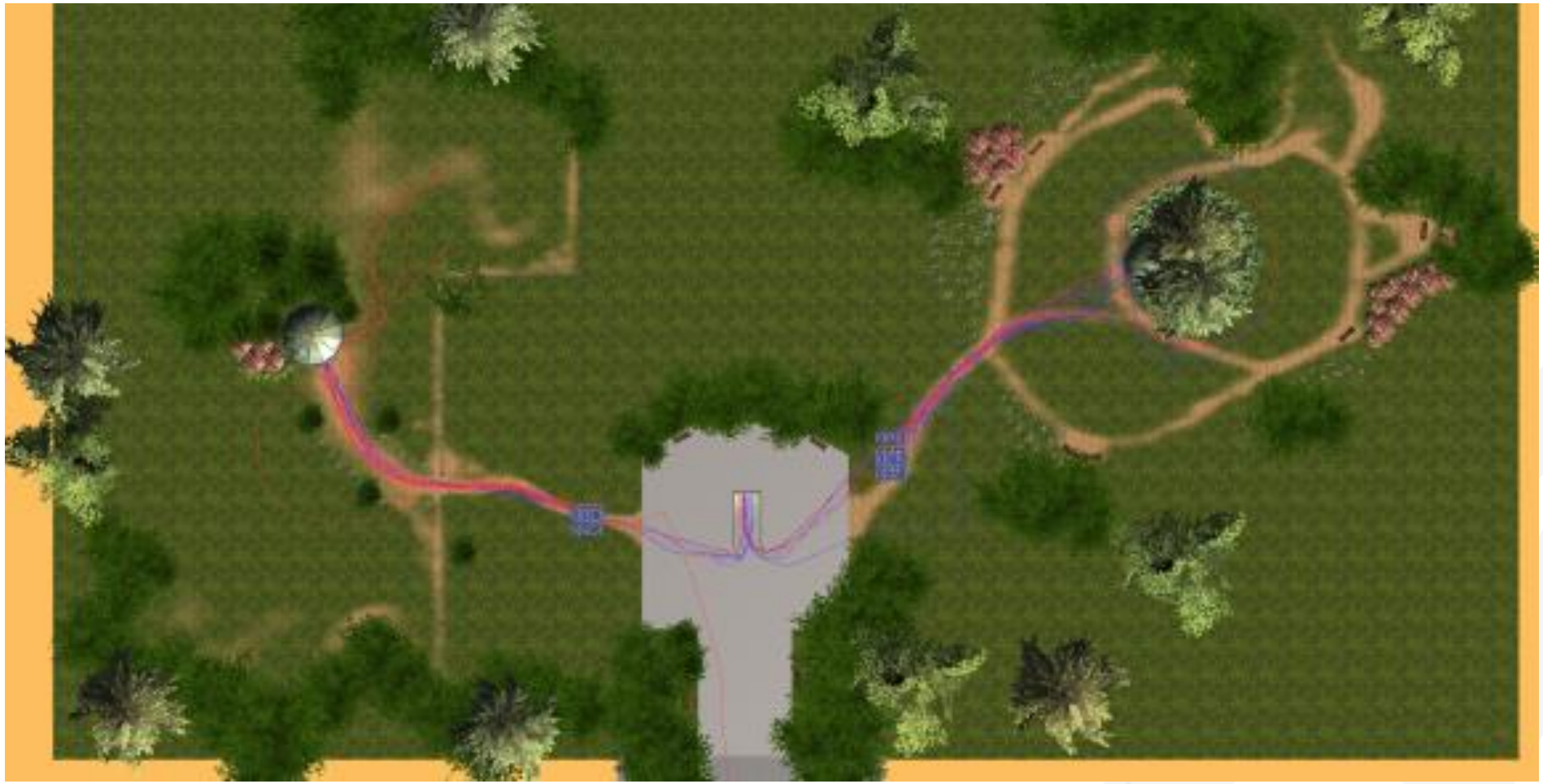
Survey about subjective experiences of the virtual reality

Video

The Experimental Scenario







Preliminary Summary VR

- ~ 30 participants, average 26 yrs old
- analyses are going to be included in SNOWBALL deliverables
- publications envisaged

Final Conference

- 2-day conference in March 2017
- Joint conference with CASCEFF, FORTRESS and PREDICT

-> contact:

pierre.ponsar@europroject.bg

Thank you for your attention