



## ViRMa: Virtual Risk Management

- exploring effects of childhood risk experiences through innovative methods

Ellen Beate Hansen Sandseter from Queen Maud University College is managing the project, which also has partners from the Norwegian University of Science and Technology (NTNU), SINTEF, University of British Columbia, Colorado State University and the Kavay Foundation.

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# Background

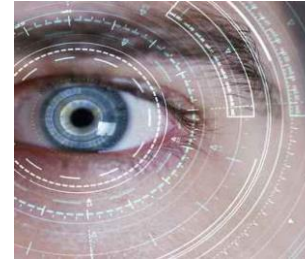
- The existing research on risky play and children's risk management is largely descriptive and there is a gap in research on the possible relationship between risky play and benefits to health, development and learning.
- There are obvious ethical issues with conducting studies designed to let children take risk (with the potential of injury), while restricting children from playing freely and thereby assessing long-term effects of play deprivation would be equally problematic.
- Virtual reality (VR) is as a promising methodological field, but still in an early stage.

# Objectives of the study

- Overall objective:
  - To increase understanding of children's development of risk assessment and risk management skills through risky play.
- Secondary objectives:
  - To develop new virtual reality (VR) tools and software and additional data collection methods that give insight into how children assess and handle real risk situations using ethical study designs.
  - To explore how children's past play experiences are related to their risk assessment and risk management. (To be done later)

# Measures

- Virtual reality (VR) technology
- Eye-tracking technology
- Motion Capturing
- Scales



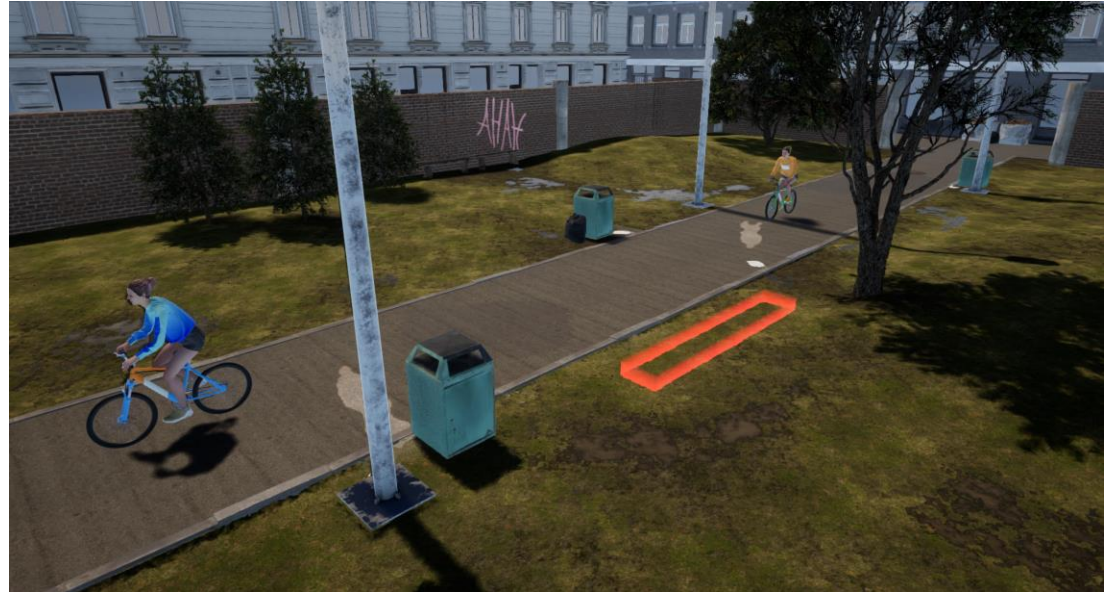
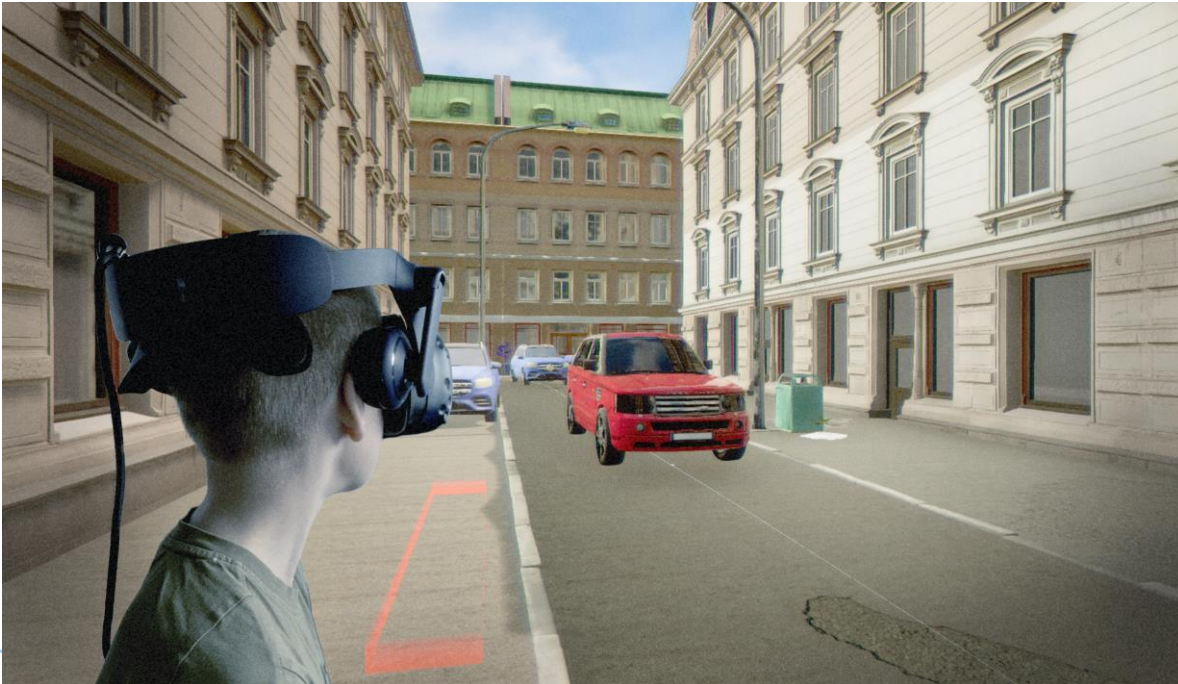
- *Children*
  - The Sensation Seeking Scale for Young Children (SSSYC) (Morrongiello & Lasenby, 2006)
  - The pictorial scale of Perceived Movement Skill Competence (Barnett et al., 2016)
- *Parents*
  - Background information questionnaire to parents
  - The Tolerance of Risk in Play Scale (TRiPS) (Hill & Bundy, 2014)
  - The Challenging Parenting Behavior Questionnaire (CPBQ) (Majdandžić et al., 2018)

# VR Scenarios

- Most common child injuries happens in: traffic, water, playground equipment (falls)
- Three categories of VR Scenarios have been developed:
  1. Traffic, street crossing
  2. River crossing
  3. Balancing (play)

# VR Scenarios – Traffic, street crossing

- 3 crossings of bike lane
- 3 crossings of car street





# VR Scenarios – River Crossing

- 5 crossing on planks
- 2 crossings on stepping stones



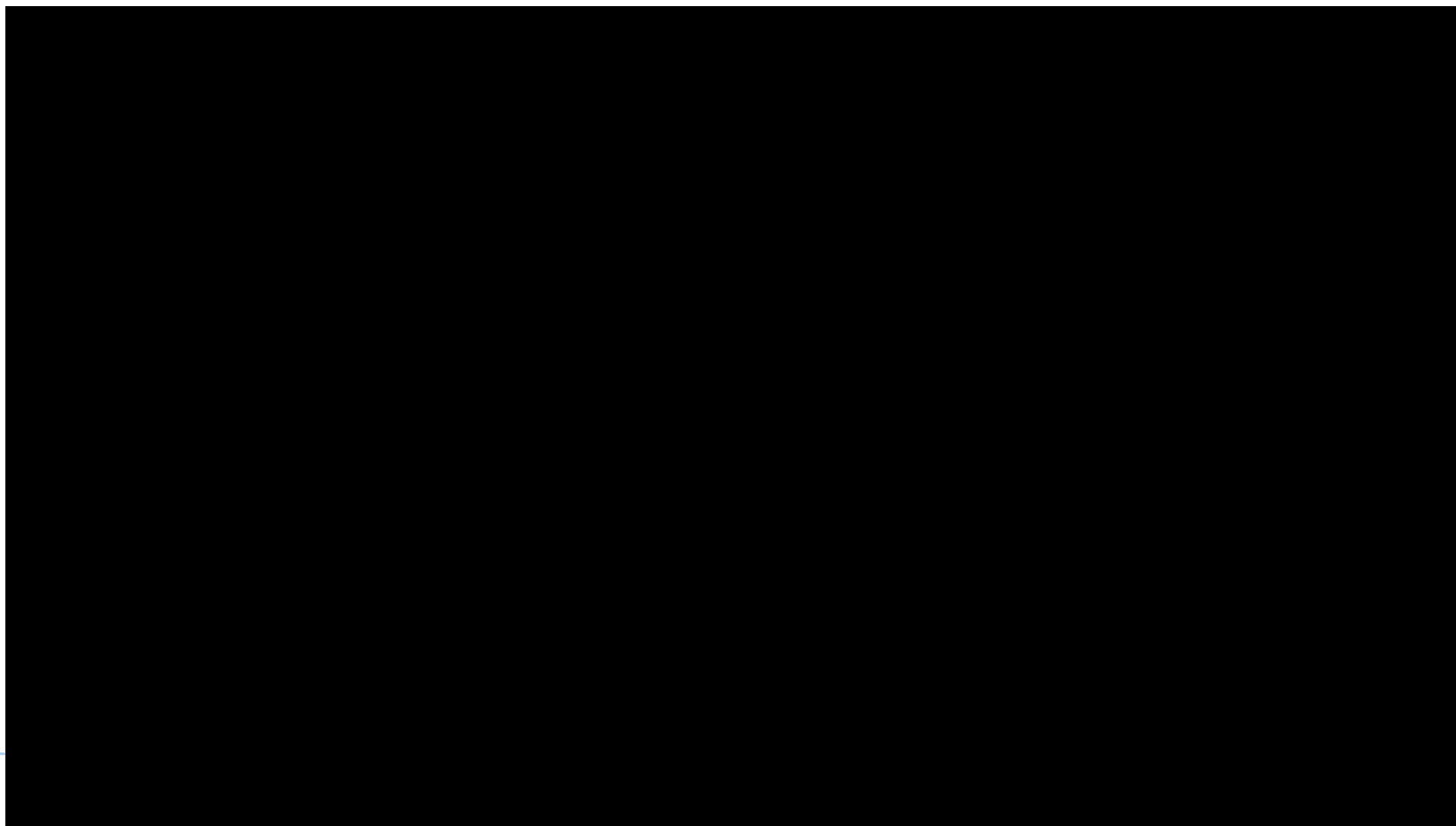


## VR Scenarios – Balancing, play

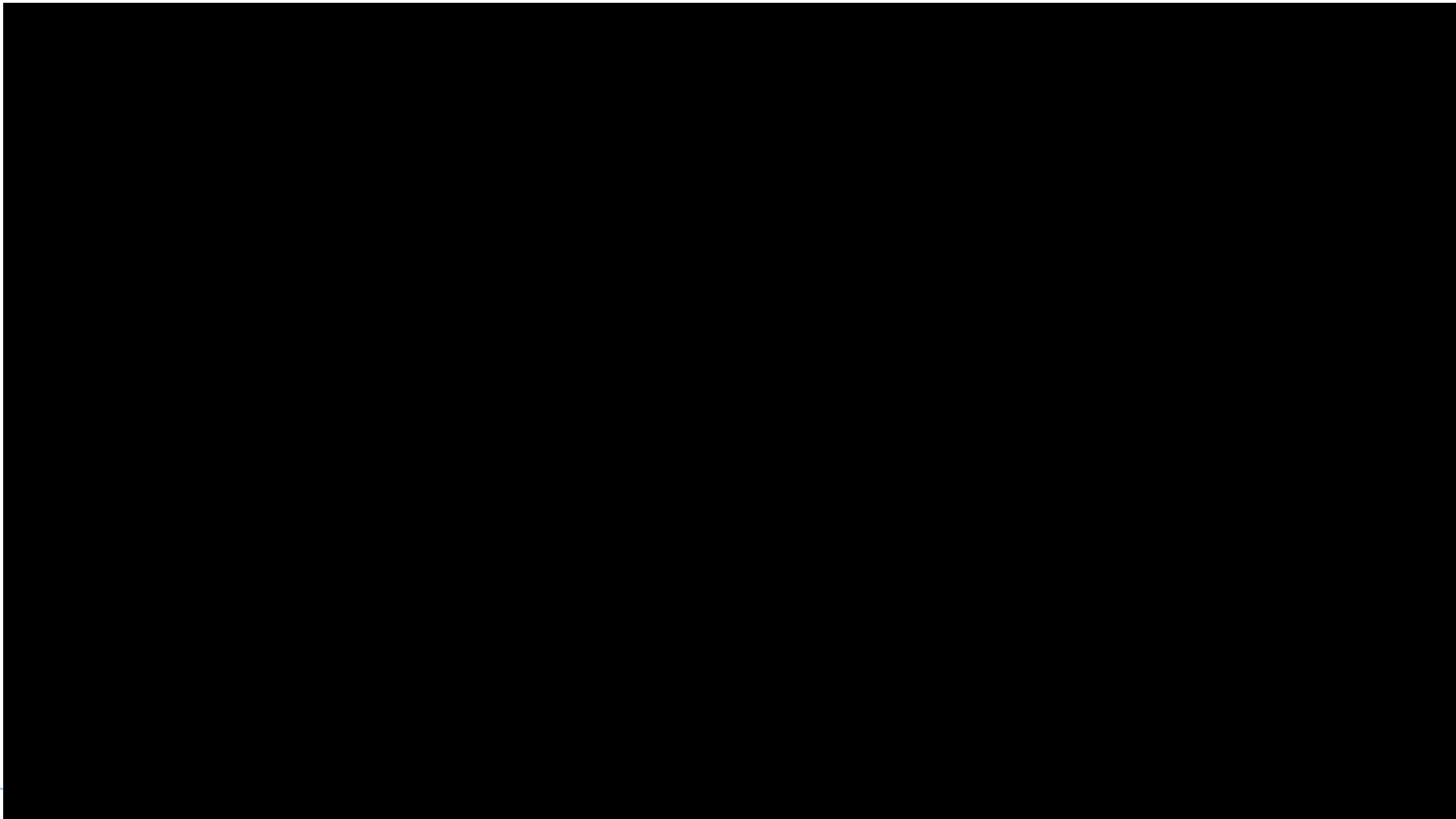




# VR Scenarios – The child's perspective



TRYGG TRAFIKK



# Preliminary findings Traffic





# Pilot sample

- Participants were recruited from a primary school in a rural area in Mid-Norway
- Children in the 2., 3., and 4. grade were invited to take part in the study
- 55 children, 31 boys and 27 girls, completed all six traffic tasks
- Age ranged from 7 to 10 years, with an average age of 8,9 years



# Pilot Analysis Traffic

1. **Dangerous crossings:** number of crossings where the child was hit or almost hit by a vehicle.
2. **Assessment time:** time elapsed from the opening of the task to the child started to cross
3. **Crossing time:** time used to cross the street
4. **Speed of crossing:** the maximum speed obtained while crossing

# Pilot Analysis Traffic

5. **Checking left and right:** number of times the child checked left and right before crossing the street and while crossing the street

6. **Oncoming vehicles:** gaze directed to oncoming vehicles before crossing the street and while crossing the street

7. **Leaving vehicles:** gaze directed to leaving vehicles before crossing the street and while crossing the street



# Pilot Results Traffic

- **Hits and near hits:** Out of the 330 tasks conducted, children were hit in 6% and nearly hit in 18% of cases
- **Assessment time:** Children spent more time assessing traffic before crossing in tasks with higher traffic density. Assessment time were positively associated with safe crossings
- **Crossing time and speed:** Crossing time and maximum speed of crossing were similar for the children who crossed safely and dangerously

# Pilot Results Traffic

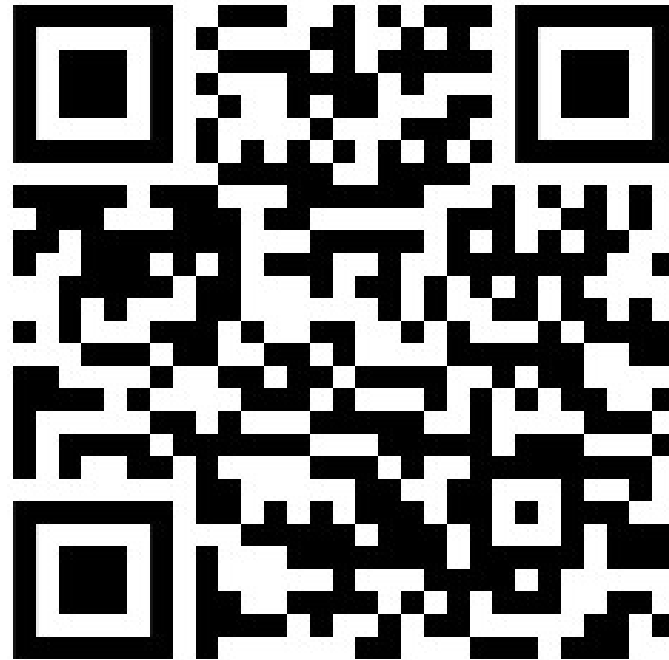
- **Monitoring Vehicles:** Children spent about 60% of their assessment time monitoring oncoming vehicles, showing that they focus on potential threats
- **Attention to Car vs. Bikes:** Children were more attentive to cars than bikes
- **Behaviour While Crossing:** No clear differences were found between children crossing dangerously and safely in crossing behaviour

# Pilot Implications Traffic

- Taking sufficient time to assess and perceive the traffic environment is a successful risk-assessment strategy.
- Safe street crossing is linked to visual search strategies, which help children focus on oncoming traffic during the assessment.
- What about training and education for children aged 7 to 10?
  - Not enough to say: spend time observing oncoming traffic before crossing the street
  - Trygg Trafikk: What to look for? Where to look? Try out a model for risk assessment and risk management ...
  - Combined with The Sensation Seeking Scale for Young Children and Background information questionnaire to parents (etc) we will get new knowledge on how children's past play experiences are related to their risk assessment and risk management.
- We already tried out a new model in CAC that has an effect.



## Publications and more info about ViRMa



<https://app.cristin.no/projects/show.jsf?id=2520722>