

Insights into experiences and risk perception of riders of fast e-bikes

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1. Background

Definition

E-bikes: „Bicycles“ with electric assistance up to a certain speed

„Slow e-bikes“

- assistance up to 25 kph
- engine power up to 500 W
- legally classified as moped

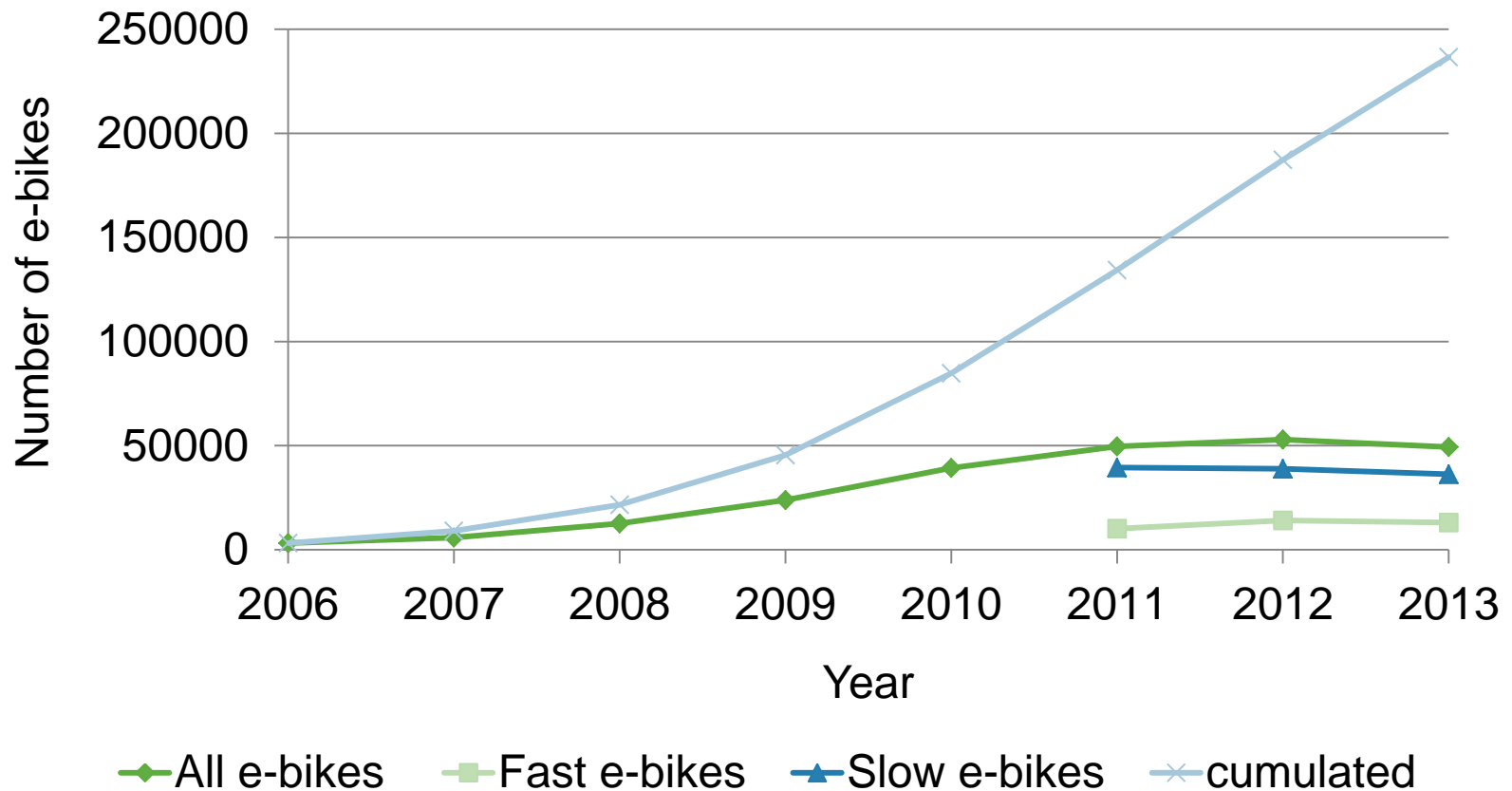


„Fast e-bikes“

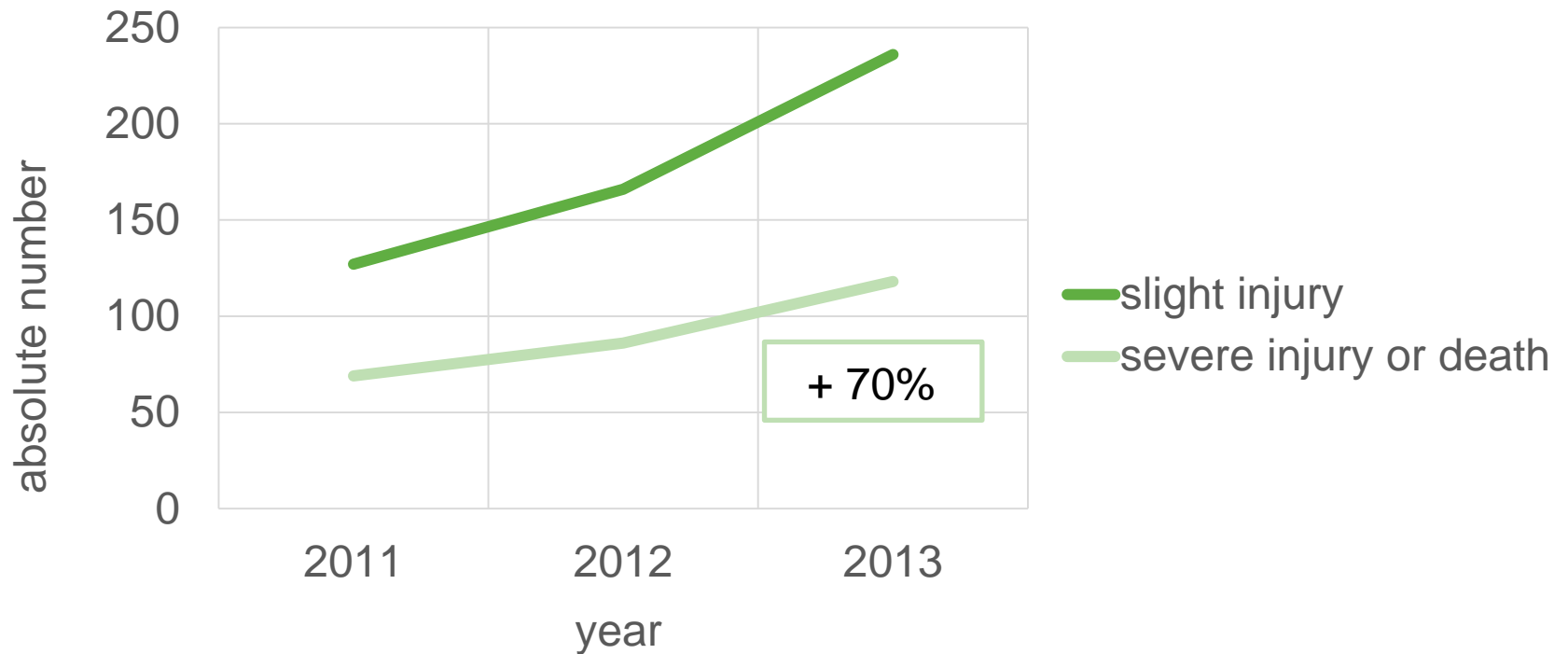
- assistance up to 45 kph
- engine power up to 1000 W
- legally classified as moped



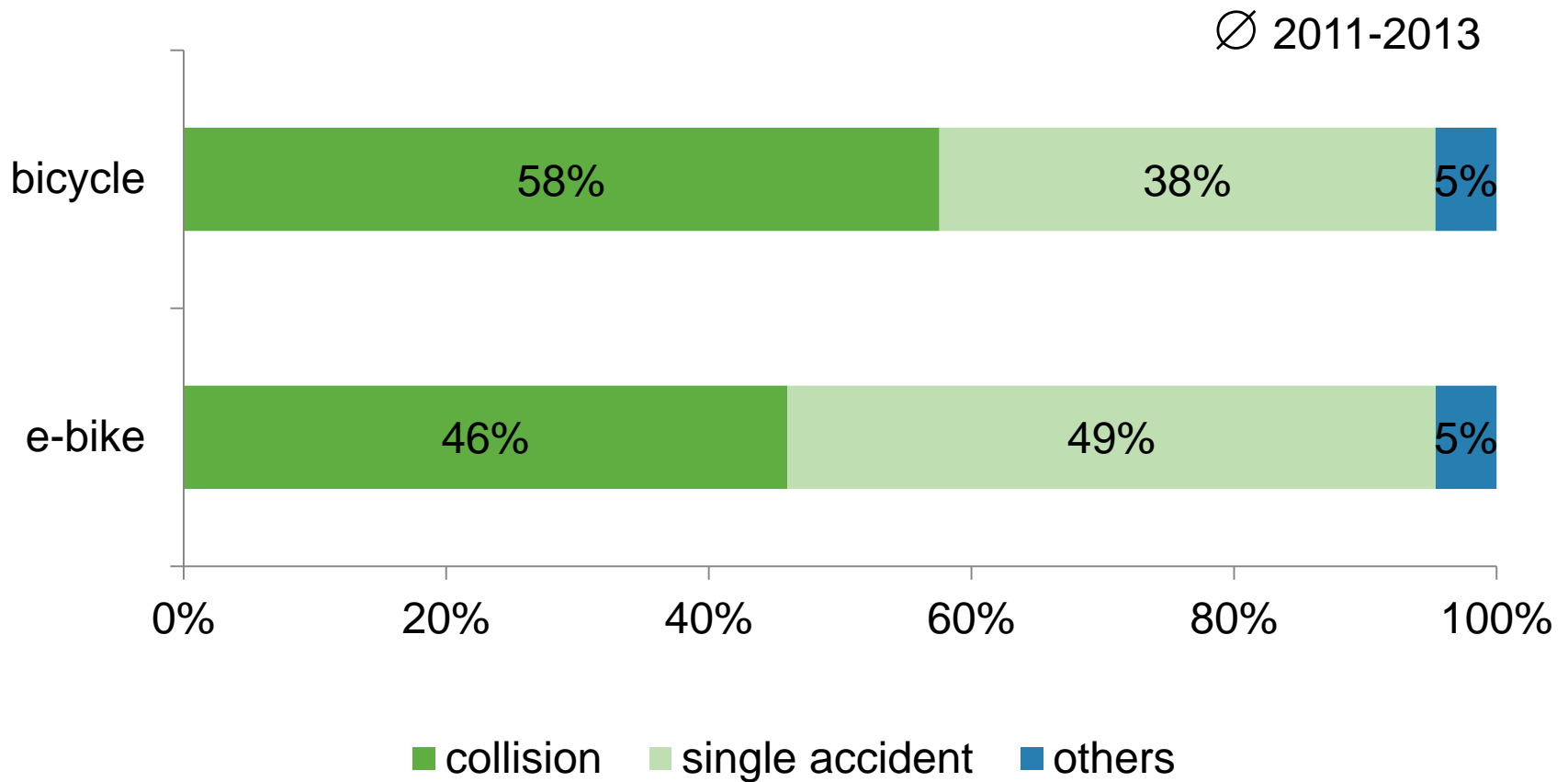
Number of sales in Switzerland



Development of crash data



Types of accidents



2. Survey

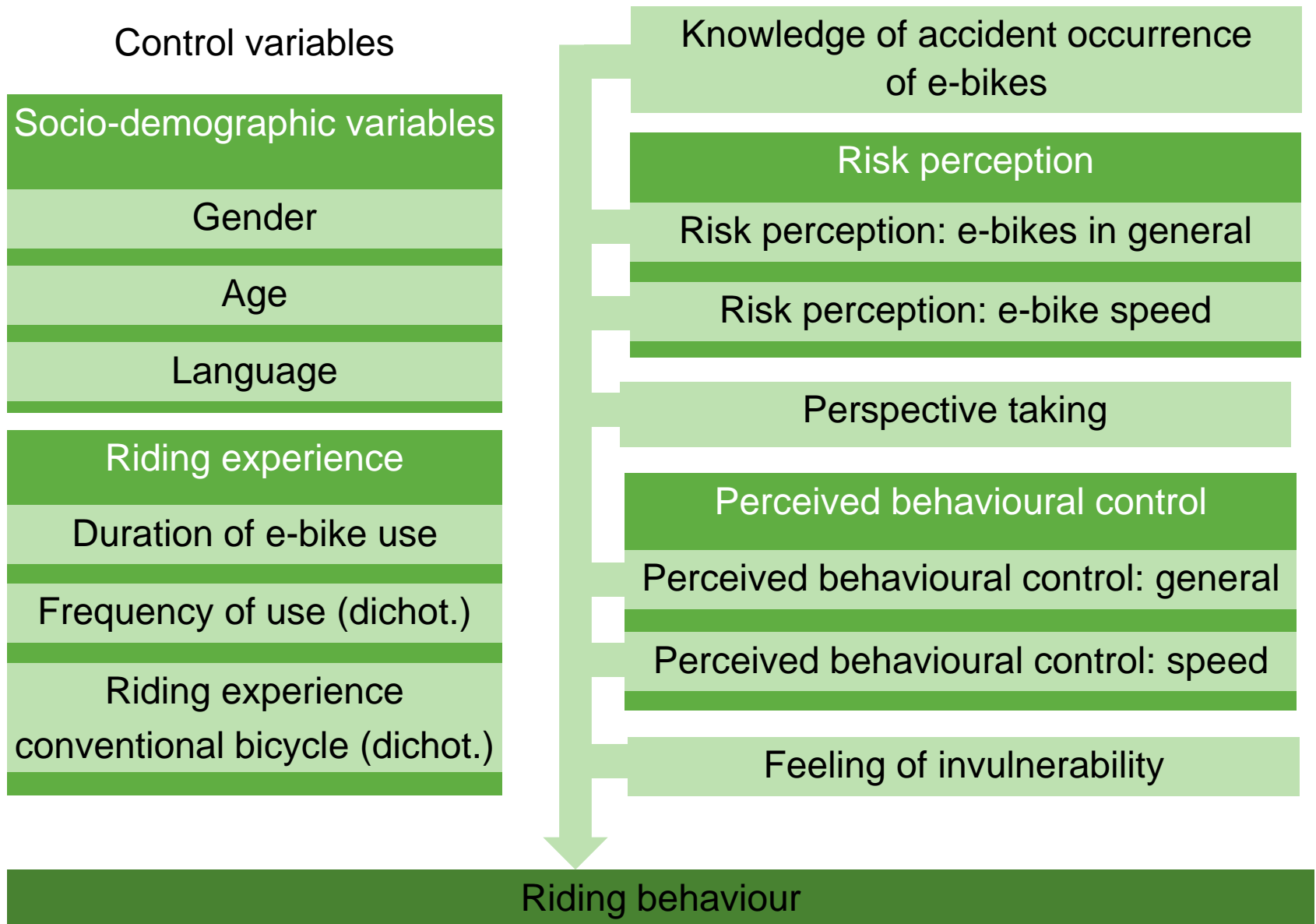
Theoretical Background

- **Road user behaviour**
 - Important determinant for road safety (Horswill & Helman, 2003; Näätänen & Summala, 1976)
 - Significant correlations with involvement in accidents or near misses (Iversen & Rundmo, 2004)
- **Psychological predictors for (safety-oriented) driving behaviour**
 - Perception of risk (Ranney, 1994)
 - Perceived behavioural control (Paris & Broucke, 2008; Wallén et al., 2008)

Research questions

- Which **psychological factors** are associated with **riding behaviour** among riders of fast e-bikes in Switzerland?
- Additionally:
 - Is there a correlation between (self-reported) **riding behaviour and accident rates**?
 - **Descriptive statistics** such as knowledge of legal regulations and helmet usage rate

Model for predicting (self-reported) riding behaviour



Method

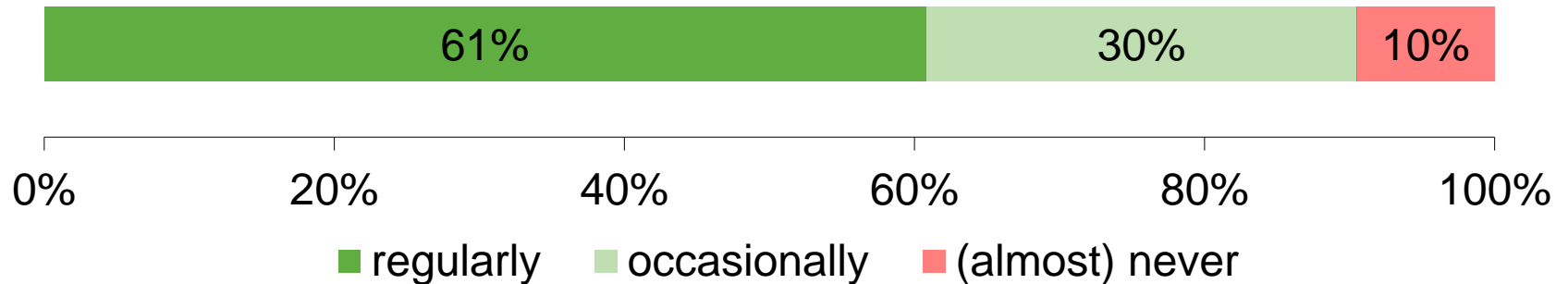
- Survey, paper questionnaire
- Sample
 - $N = 2,158$
 - Riders of fast e-bikes, at least 1 month's riding experience
 - $M = 50$ years ($SD = 11.4$), Min = 14 years, Max = 87 years
 - 50,3% men, 49,7% women
 - Riding experience: $M = 37$ months ($SD = 33$)

- Questionnaire:
 - Model: predictors & control variables
 - For each predictor 2-5 items
 - e.g. risk perception: e-bikes in general:
 - „*Riding an e-bike is more dangerous than riding a regular bike.*“
 - 1 = strongly disagree, 4 = strongly agree
 - Internal consistencies of scales low (Cronbach's alpha from $\alpha = .340$ to $\alpha = .656$)

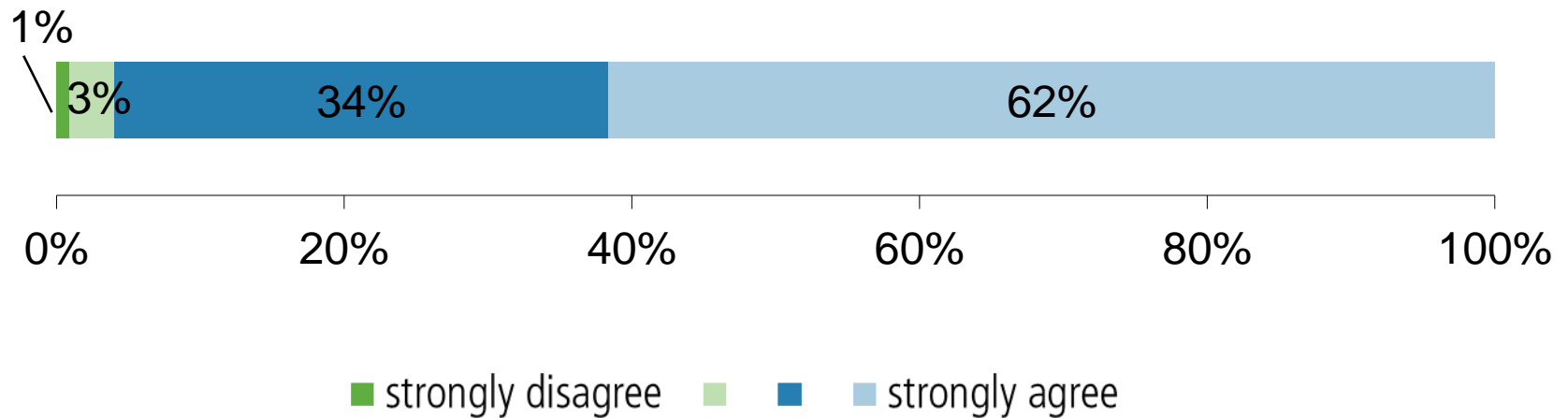
Results

- **Descriptive statistics (selection)**

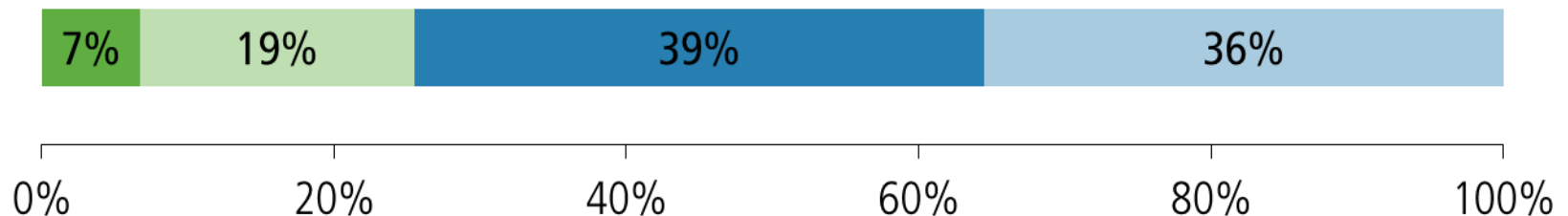
Riding experience conventional bicycle (n = 2153)

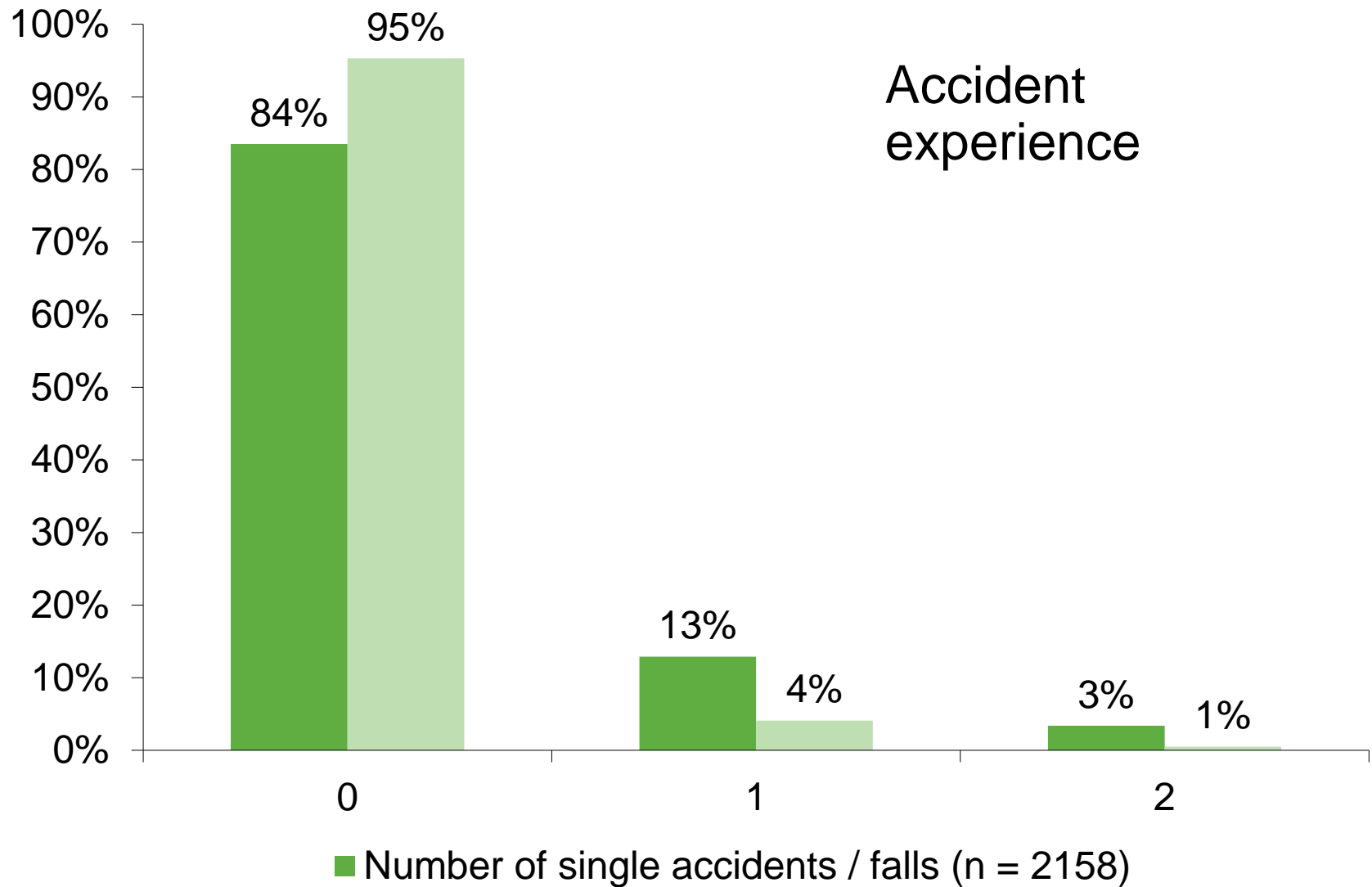


Other road users underestimate speed of e-bike riders (n = 2118)



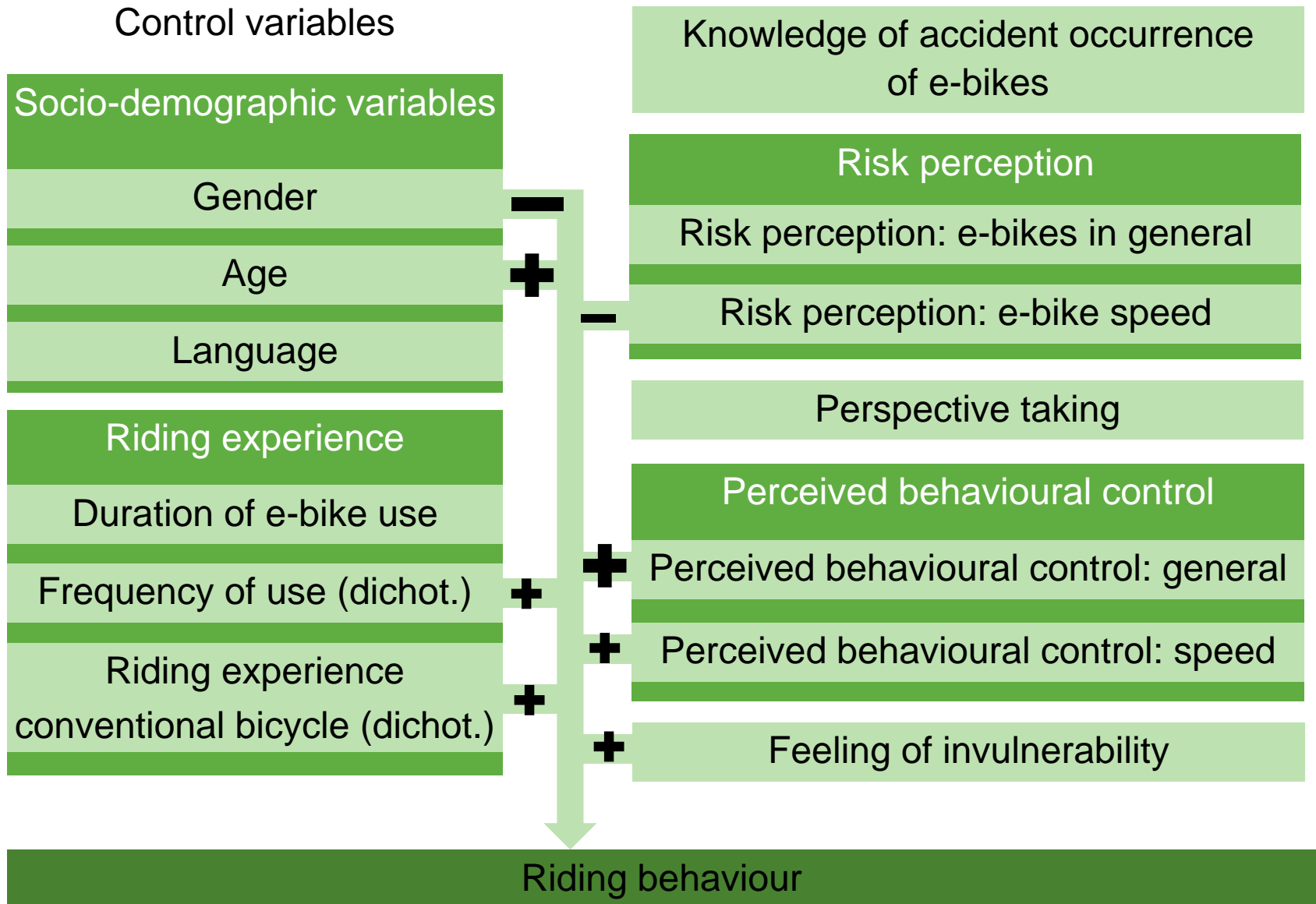
Longer braking distances in comparison to regular bikes (n = 2149)





Model verification

$R^2=.17$



- **Relationship between riding behaviour and accident rate**

Accident rate = Accidents per year (no data of exposure available)

- No significant correlation for single accidents
- Significant but weak correlation for collisions

Discussion

- Riders of fast e-bikes don't misjudge risk factor speed
- High awareness of underestimation of e-bike speed by other road users
- But: risk perception regarding speed only weak correlation with riding behaviour and in unexpected (negative) direction
- Best predictors for self-reported riding behaviour: age & gender
- Psychological predictors: risk perception e-bike speed, perceived behavioural control (general & speed), feeling of invulnerability

- Generally surprising directions of associations
- Cognitions tend to reflect behaviour shown rather than to influence behaviour
 - E.g. Feeling of control because of cautious riding
 - E.g. Risk perception (speed) because of risky riding
- No significant relationship between riding behaviour and accident rate for single accidents
- Significant but weak correlation between riding behaviour and accident rate for collisions

3. Conclusions

Conclusions

- Initial insight into experiences and risk perception of riders of fast e-bikes
- Identification of various cognitive factors related to riding behaviour
- No statements on any interventions possible (cognitions tend to reflect behaviour)
- Limitations:
 - Riding behaviour measured by means of self-reporting
 - No exposure data to calculate accident rate

- Future research:
 - Validate results by objective measurements of riding behaviour
 - Factors associated with accident experience (including cognitive variables and riding behaviour)
 - Longitudinal studies for examination of directions of relationships and assumptions of causality

Questions?

