

# PSYCHOLOGICAL ASPECTS OF THE RISK OF ACCIDENTS FOR MOTORCYCLISTS

Ariane von Below, BASt

Young Researchers Seminar

Rom, June 18th 2015



ECTRI – FEHRL – FERSI  
Young Researchers Seminar 2015

**bast**  
Federal Highway Research Institute

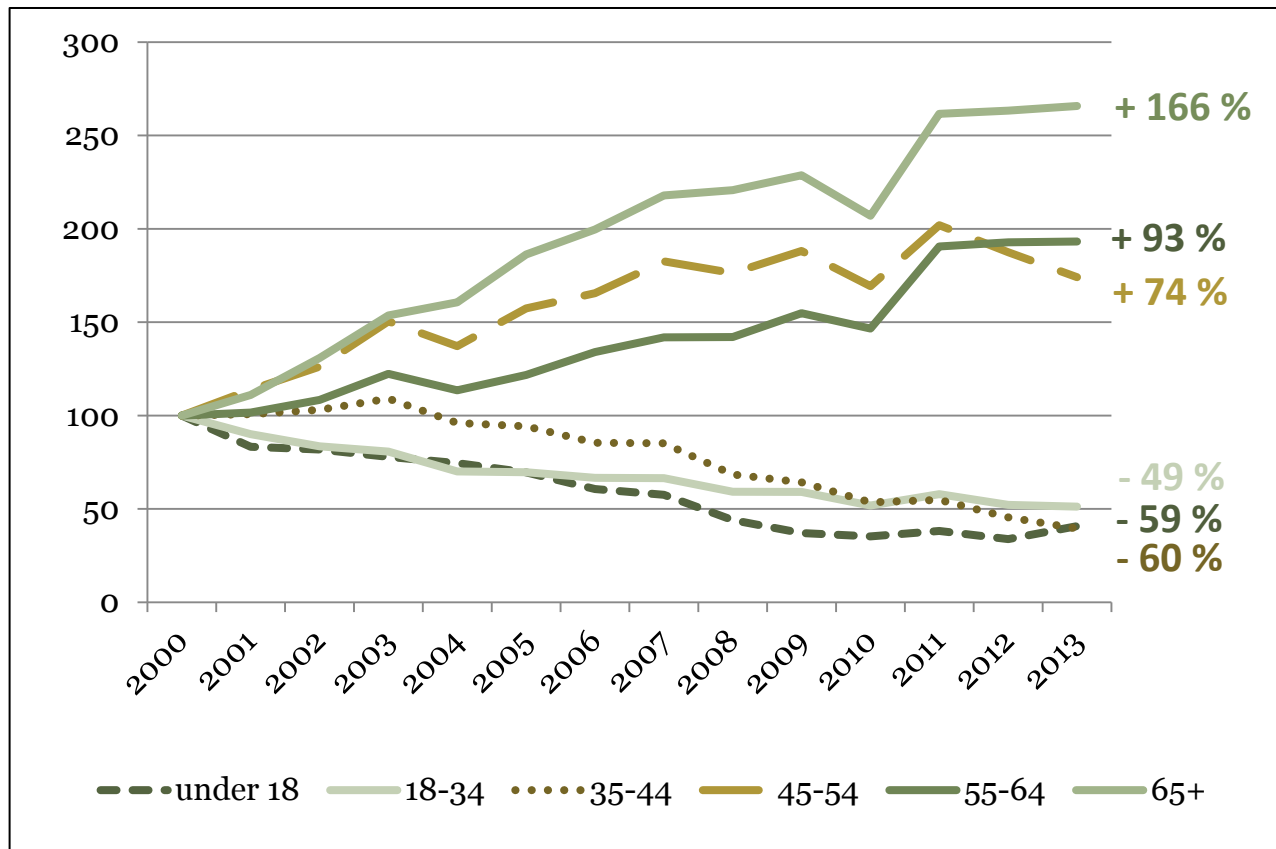
# Introduction - Motorcycle accidents

- More than **27,000** injured motorcyclists
  - 568 fatally and
  - 8,974 seriously injured
- Registered vehicles: **14 killed** /100,000 motorcycles  
→ but only 4 killed/100,000 cars
- Age group: 134 injured/100,000 inhabitants 15 -18 years  
→ highest injury risk

*(Source: German accident statistics, 2013)*



# Introduction - Motorcycle accidents



Trend in number of injured motorcyclists by age group starting from 2000 (100%)



# Introduction - Personality traits and traffic behaviour

- Correlations between personality traits and road safety relevant aspects (Elander et al., 1993)

→ **What is personality**



# Excurs - What is Personality

*A fairly **stable disposition** that describes and **predicts** **specific behavioural** aspects of one person in a **specific class of situation**.*

- Big Five Personality Model assessed by NEO-PI-R (Costa & McCrea, 2003)
- Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness
- Six sub facets for each of the dimensions



# Introduction - Personality traits and traffic behaviour

- Sensation seeking is a good predictor for safety relevant behaviour
  - (Herzberg & Schlag, 2003 ; Iversen & Rundmo, 2002; Schulze, 1999; Watson et al., 2007; Wong et al., 2010)
- Altruism, anxiety, hostility and normlessness have an impact on attitudes and risky traffic behaviour
  - (Ulleberg, 2002; Machin & Sankey, 2008)



# Introduction - Subtypes based on personality traits

- Personality used to build subtypes of road user groups
- e.g. Ulleberg (2002), Brandau et al. (2011)
  - First group:
    - tend to search for new or exciting experiences,
    - have problems to control their emotion in context with driving
    - and do not care for social norms and the wellbeing of others
  - Second group:
    - characterized by higher scores of anxiety
    - and aggression



# Research topics

- Gain detailed information about motorcyclists in Germany
  - Who is using the motorcycle how often, for what purpose etc.
- Identify subgroups based on personality traits
  - Allows the development of safety measures that are directly targeting these groups



# Method

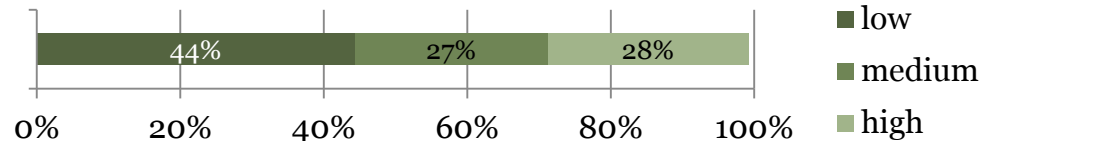
1. Telephone survey with 10,000 people 16 years and above
  - 1,000 hold a motorcycle driving license (A1, A2 or A) and use a motorcycle with an engine size above 50ccm
  - sample structure build the base for the survey quotation plan
  
2. Face-to-face-interviews with 1,039 motorcyclists
  - Representative for German motorcyclists in respect to gender, age, level of education, federal state, size of town and engine size of used motorcycle



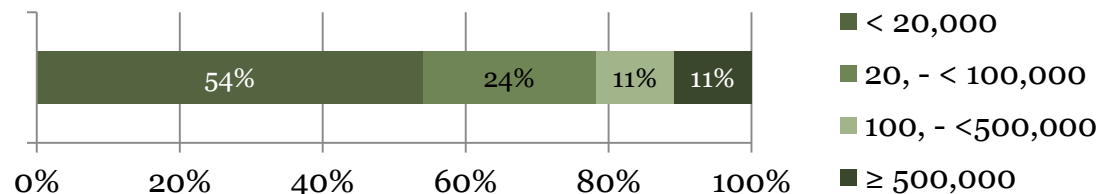
# Method - Sample

- Motorcyclists: 1,039
- Age: 16-76 years (Ø 43.7 years)
- Gender: 85% male, 15% female

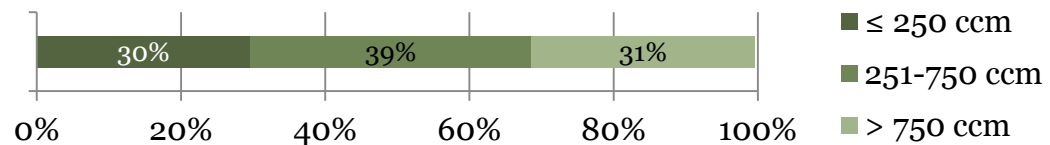
- Level of education:



- Size of town:



- Engine size:



# Method - Analyses

1. Factor analyses of psychological scales
2. Descriptive analyses (ANOVA or Chi-Square-Tests)
3. Cluster analysis with personality traits
4. Group comparisons (ANOVA or Chi-Square-Tests)



# Results - Factor analyses

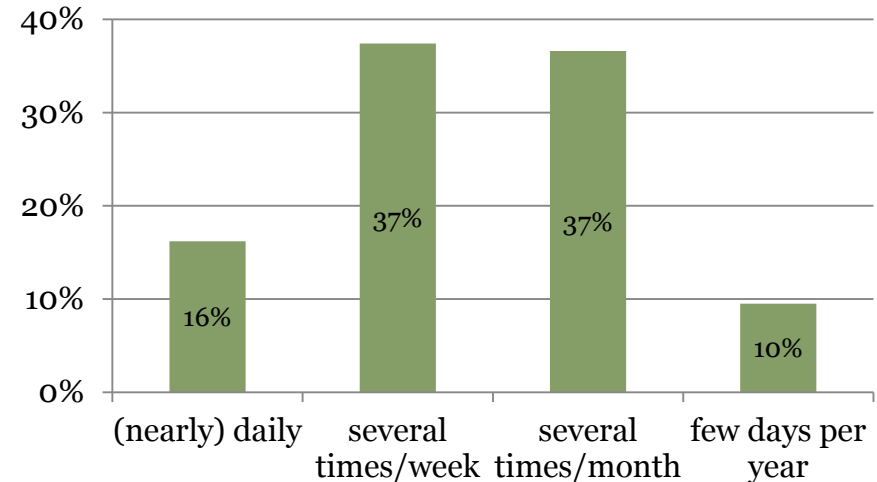
	Mean (SD)	Min	Max	Number of items	Cronbach's Alpha
<b>Attitude to speeding</b>	21.5 (10.14)	0	51.0	17	.92
<b>Attitude to drink driving</b>	2.9 (3.38)	0	16.8	6	.83
<b>Attitude to aggressive riding behaviour</b>	20.6 (17.12)	0	84.0	10	.89
<b>Riding errors</b>	1.0 (1.76)	0	11.0	11	.94
<b>Competition</b>	0.9 (1.39)	0	6.0	6	.91
<b>Quickly getting ahead</b>	1.6 (1.50)	0	5.0	5	.87
<b>Braking traffic rules</b>	2.7 (0.97)	0	6.0	6	.88
<b>Self identification</b>	7.5 (4.12)	0	15.0	5	.89
<b>Anxiety</b>	11.3 (5.53)	0	32.0	8	.77
<b>Hostility</b>	10.9 (5.37)	0	30.0	8	.73
<b>Altruism</b>	23.2 (5.46)	0	32.0	8	.83
<b>Excitement seeking</b>	15.6 (6.59)	0	31.0	8	.78
<b>Normlessness</b>	7.2 (3.29)	0	16.0	4	.62

Table: Results of factor analyses



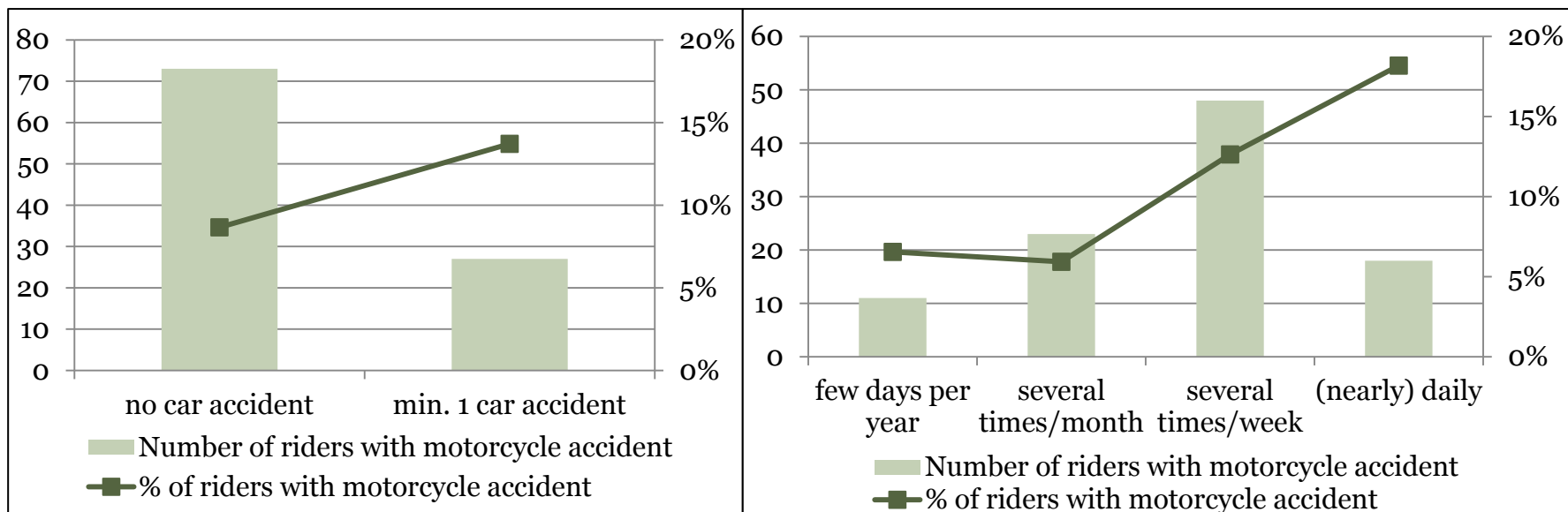
# Exemplary descriptive Results

- Frequency of use:



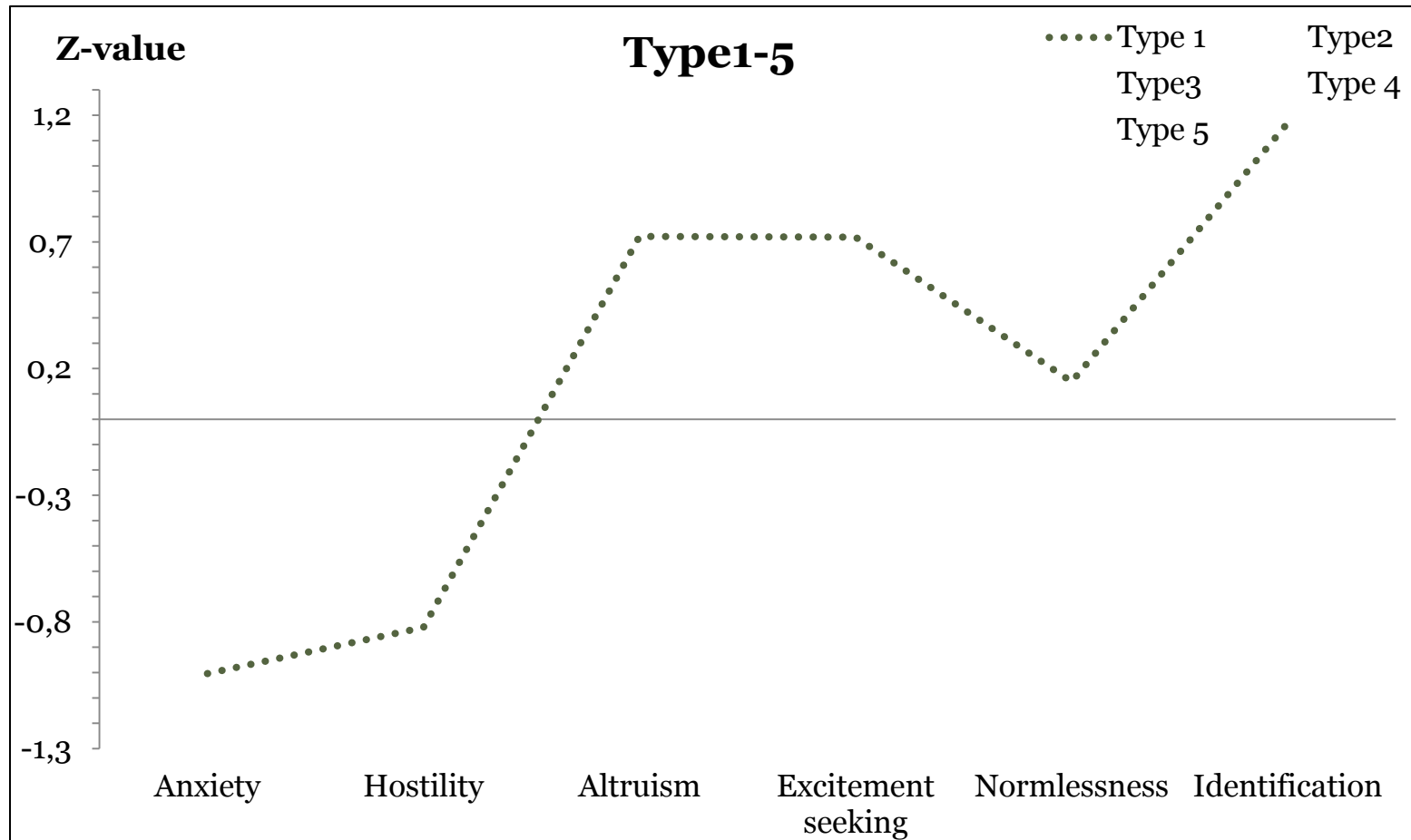
- Driving licence:  $\emptyset$  23 years
- Distance travelled:  $\emptyset$  5,163 km/year
- Accident involvement: 10%
  - Highest accident rate: 18-24 years (17%)

# Exemplary descriptive Results

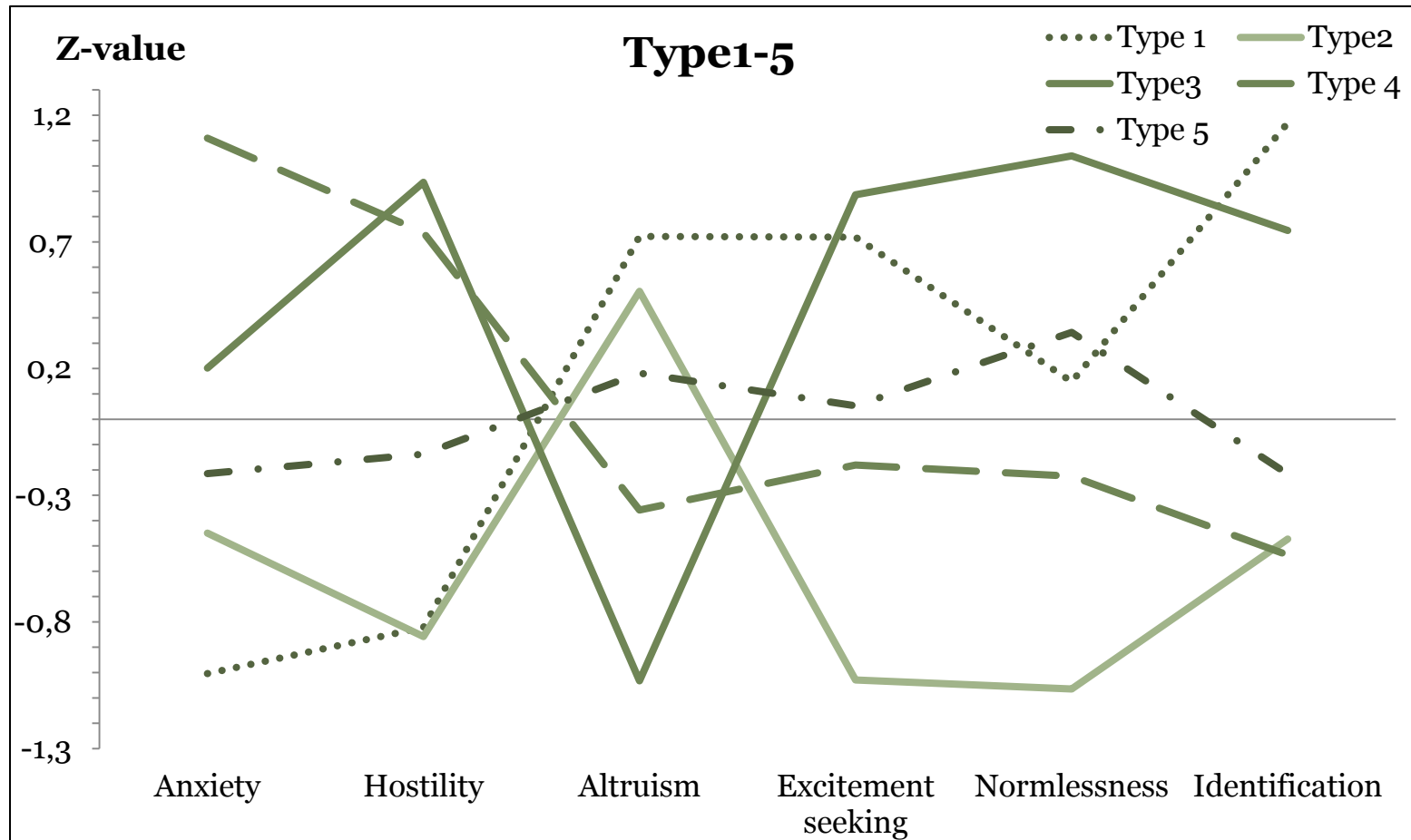


Number and rate of accident involved motorcyclists by involvement in car accident (left) and by frequency of motorcycle use (right)

# Results - Personality cluster



# Results - Personality cluster



Standardised values of personality traits and identification scale per type



# Results - Group differences

	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5
<b>Mean age</b>	42.1 (12.82)	47.2 (12.56)	38.3 (11.88)	43.8 (12.31)	43.9 (12.87)
<b>Accident involvement</b>	9 %	9 %	23 %	9 %	4 %
<b>Traffic offences</b>	13 %	5 %	22 %	7 %	8 %
<b>Yearly distance in km</b>	7,595 (4,824)	4,263 (3,049)	6,535 (4,476)	3,822 (4,047)	4,026 (3,347)
<b>Attitude to speeding</b>	25.3 (8.77)	14.7 (7.24)	30.6 (9.28)	19.9 (9.54)	20.6 (8.58)
<b>Attitude to drink driving</b>	1.7 (2.50)	1.3 (2.04)	6.2 (4.26)	2.9 (3.08)	2.7 (2.71)
<b>Attitude to aggressive riding behaviour</b>	18.4 (17.72)	10.0 (10.46)	36.7 (20.54)	22.1 (14.78)	19.0 (12.47)
<b>Riding errors</b>	0.5 (0.91)	0.4 (0.78)	1.4 (1.75)	2.0 (2.62)	0.7 (1.40)
<b>Competition</b>	1.1 (1.40)	0.2 (0.52)	2.0 (1.95)	0.8 (1.26)	0.6 (1.03)
<b>Quickly getting ahead</b>	1.8 (1.30)	0.8 (1.09)	2.3 (1.63)	1.6 (1.63)	1.5 (1.38)
<b>Braking traffic rules</b>	2.9 (1.05)	2.2 (0.61)	3.3 (1.17)	2.7 (0.95)	2.6 (0.89)

Mean age, accident involvement, traffic offences, yearly distance in kilometres, attitude and behaviour scales per personality type



# Discussion

- First study that found motorcyclist subtypes based on personality characteristics
- Clustering was successful and in line with previous research
- Substantial differences in personality structure  
→ but also with regard to road safety relevant criteria
- One high-risk group (Type 3)  
→ this group should be main focus for previous road safety measures





Thank you for your attention



Source all pictures: German Road Safety Council (DVR)



Ariane von Below

Young Researchers Seminar 2015

18.06.2015

