



Elderly cyclists' opinions on safe and joyful cycling

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Five tools for idea generation:

- A literature review
- In-depth crash data analysis
- Questionnaires with senior cyclists
- Experts Questionnaire
- Expert workshop



Literature review revealed Tool nr 1



- significantly more involved in crashes when intending to turn left (Goldenberg 1992)



In-depth crash data analysis revealed Tool nr 2



Elderly bicyclists are:

- significantly more involved in crashes when intending to turn left
- more often impaired by bad sight and/or bad hearing or impaired from taking medication
- less often in a hurry

Elderly bicyclists are not:

- over-involved in crashes where the road surface was damaged
- elderly bicyclists obey traffic rules no more and no less



Questionnaire Tool nr 3



351 respondents. All members of the Swedish Cycling Promotion of age 64+

40% female respondents

Response frequency 61%



Reasons why the elderly bike.

Share of answers (including the reason) (%)

| Reason | Share |
|--------------------------------|-------|
| Easy | 72 |
| Exercise | 94 |
| Cheap | 58 |
| Joyful | 84 |
| Environmentally friendly | 69 |
| Fast | 48 |
| Easy to park | 66 |
| Gives freedom and independence | 73 |
| Other | 19 |
| Total number | 351 |



When the bike is left at home

| | <i>Share</i> (%) |
|---------------------------|---------------------|
| Rain | 34 |
| Darkness | 39 |
| Wind | 23 |
| Snowfall | 77 |
| Temperature below zero | 49 |
| Slipperiness | 81 |
| Bad snow removal | 79 |
| For ex. Saturday night | 19 |
| Rush hour | 16 |
| Other | 5 |
| None of these are crucial | 7 |
| Total number | 351 |



Bike usage would increase if there was a possibility to bring the bike onto the bus or train



Desired equipment

Share of answers (%)

| | Age group | | | | | Total |
|---------------------|-----------|-------|-------|-------|-------|-------|
| | 65-69 | 70-74 | 75-79 | 80-84 | 85-89 | |
| Helmet | | | | | | 6 |
| Reflexes | | | | | | 3 |
| Winter tires | | | | | | 17 |
| Winter bike | | | | | | 15 |
| Lights | | | | | | 3 |
| Reflective vest | | | | | | 15 |
| Bicycle-bag, basket | | | | | | 2 |
| Rear-view mirror | | | | | | 27 |
| Other equipment | | | | | | 3 |
| No opinion | | | | | | 26 |
| Desires nothing | 23 | 30 | 29 | 38 | 43 | 28 |
| Total number | 146 | 79 | 77 | 42 | 7 | 351 |

Sites or maneuvers the respondents avoid. Share of answers (%)

| | 65-69 | 70-74 | 75-79 | 80-84 | 85-89 | Total |
|---|-------|-------|-------|-------|-------|-------|
| No | 47 | 44 | 32 | 29 | 43 | 41 |
| Do not know | | | | | | 5 |
| Roundabouts | | | | | | 23 |
| Left turn | | | | | | 19 |
| Crossing streets without cycle crossing | | | | | | 18 |
| Crossing streets with cycle crossing | | | | | | 8 |
| Cycle track with mopeds | | | | | | 12 |
| Crossing streets at a traffic signal. | | | | | | 2 |
| Other | | | | | | 6 |
| Total number | 146 | 79 | 77 | 42 | 7 | 351 |

| Safety problems | |
|------------------------|-----------|
| | Share (%) |
| Potholes | 76 |
| High curb stones | 60 |
| Slipperiness | 74 |
| Bad snow removal | 70 |
| Bad hearing | 9 |
| Functions of the bikes | 10 |
| Hindrances | 19 |
| Missing road lighting | 25 |
| Cars driving too fast | 52 |
| Bad sight | 4 |
| Medication | 2 |
| Other | 14 |
| Total number | 351 |



Factors increasing traffic safety and security.

Share of answers (%)

| | Women | Men | Total |
|----------------------------------|-------|-----|-------|
| More cycle tracks | 48 | 29 | 36 |
| Separated cycle tracks | 9 | 17 | 14 |
| Consideration between road users | 31 | 10 | 12 |
| Education about traffic rules | 9 | 9 | 9 |
| No mopeds on cycle tracks | 6 | 8 | 7 |
| Better cycle tracks | 8 | 5 | 6 |
| Lower speed among cars | 4 | 4 | 4 |
| No passing too close | 2 | 5 | 4 |
| Use of helmet | 3 | 4 | 4 |
| Maintenance of cycle tracks | 6 | 2 | 3 |
| No pedestrians on cycle tracks | 1 | 3 | 3 |
| Lighting on cycle tracks | 6 | 0 | 3 |
| Broader roadsides | 2 | 2 | 2 |
| Other | 33 | 29 | 29 |
| Total number | 140 | 209 | 351 |

Expert Questionnaire Tool nr 4

The most common preconditions mentioned were:

- safety and a feeling of security when cycling
- the existence of a network of roads for cycling including wide bike paths, good directional signage and appropriate bike parking facilities
- positive attitudes from users and non-users



Jensen (2006)

Elderly bicyclists (65+) had a significant reduction in injuries, of about 55%, when best-practice cycle infrastructure was implemented in Copenhagen, though risk increased by 12% if all age groups were included.

One reason was the reduction of accidents with left-turning senior cyclists.



Proposed ITS safety tools

- lower vehicle speeds (ISA)
- warning signals or warning lights to warn cyclists of approaching motor vehicles
- better guidance for and visibility of bicyclists at night time



Proposed Bike Design

- upright seating position
- low bike frame
- rear-view mirrors
- on-line route guidance
- automatic locking and opening
- automatic gears
- automatic bicycle lamps
- automatic elevating of the saddle



Expert Questionnaire Tool nr 5

- Group discussions structured according to:
- Multiple comfort model
Proposed by Summala (2005)
Adapted for elderly cyclists by Leden (2007)
- Diamond Model (Risser, 2000)



Safety Margins

Behavioral adaptation

Safety effect of raising bicycle crossings implying reduced vehicle speeds, were more or less canceled out by increased bicycle speeds (Leden, Gårder and Pulkkinen, 2000).



Good or expected progress of trips

- gradients, especially downhill, are hazardous especially for cycling children
- cycle infrastructure has to be non-restrictive to be attractive
- detectors well in advance of signalized intersections



Rule following

- clear laws for cyclists

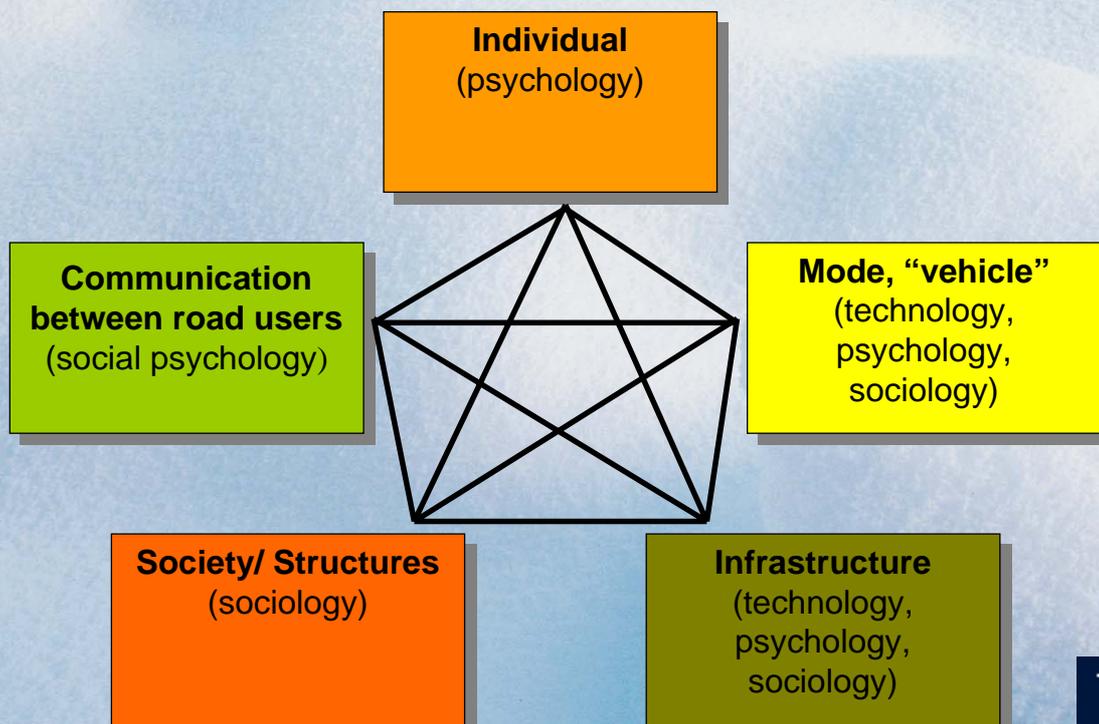


Pleasure of cycling

- 84% of the respondents stated that joyfulness is a reason for them to cycle
- solutions should/can keep or increase the pleasure of cycling



Solution areas Diamond model



Bicycle

- saddle for men and women in different forms
- remote –controlled locks
- telematics (GPS)
- reflectors and other means to improve visibility
- use light materials
- assistance for all kinds of communication: Rear mirrors as a standard in bicycles, side blinkers



To summarize

Preconditions:

- existence of a cycle network including wide bike paths
- a bike design for elderly
- consideration between road users



Conclusions

Solutions should:

- increase the pleasure of cycling
- increase the comfort of senior cyclists
- increase the visibility of cyclists

