Physical interventions for increased feelings of safety in public transport

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The Safer Sweden Foundation

• Who are we?
  - Non-governmental organization
  - Not tied to any political party/religious organisation
  - No governmental funding
  - Funded by sponsors
  - No demands on profit generation
  - Board members take no fees/salaries
  - All profits returned to think-tank work and organisational development
  - Evidence based analyses grounded in research and experience

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The Safer Sweden Foundation

• Secure help for those who have been a victim of crime

• Promote crime prevention and safety solutions

How?

1. All crimes should be investigated

2. Zero tollerance for violence at our schools

3. Municipalities have to help, protect and offer support to victims of crime
What we work with

• Safety in ...
  - Housing
  - Schools
  - Commercial places
  - Public places
  - Public transport
  - Construction

Whom we work with

• Municipalities
• Public housing companies
• Private housing companies
• Architecture offices
• Private security companies

• Real-estate developers
• Construction companies
• Public transport agencies
• Insurance companies
• Universities.... Etc.
Study aim

To map the problem picture related to feelings of safety at and in close connection to underground stations in Stockholm, Sweden.

Q1) which types of physical intervention create highest opportunities for underground stations to be perceived as safe by its daily users?

Q2) which crimes are related to a lack of types of physical intervention?
Study scope

• Focus on feelings of safety

• Considering only Stockholm’s underground stations and around (500 meters)

• Based on observational data, interviews and survey data

• Grounded in a theoretical model on aspects relating feelings of safety to physical environment
Study scope

Feeling of safety as part of a bigger scope:

- Sense of control
- Trust in society and other people
- Security of relatives and others
- Individual’s capability to cope with prior-experience and handle risk of victimisation

Perceived safety = “Trygghet” = individual’s perceived own risk of being a victim of crime
Study area
Study area
Study data

35 in-depth analysis of underground stations and their surroundings
- 10 blue line (north-central)
- 13 green line (west-south)
- 12 red line (north-south/southwest)

• Observational studies
  - Assessment of physical environment according to pre-determined safety model
  - At different times of the day, day & night
  - By different observers: men/women, young/old

• Observational studies completed 2015-2017
Study data

• Victimisation and perceived safety reports
  - Stockholm City safety audits in each city district (2015 & 2017)
  - 25 underground stations within Stockholm municipality

• Questions used related to *feelings of safety*:
  - Percentage who feel unsafe or very unsafe in their own
    neighbourhood.
  - Percentage of those who very often worry or fully refrain to *reside at the closest-by station* because of worry of becoming a victim of crime.
  - Percentage of those who very often worry or fully refrain to *walk home evenings/nights from the closest-by station* because of worry of becoming a victim of crime.
Study data

- **Victimisation and perceived safety reports**
  - Stockholm City safety audits in each city district (2015 & 2017)
  - 25 underground stations within Stockholm municipality

- **Questions used related to victimisation:**
  - Total police reported crimes for district
  - Percentage who personally have been subject to physical violence last 12 months.
  - Percentage who have been subject to threat last 12 months.
  - Percentage who have been subject to robbery last 12 months.
  - Percentage there household has been subject to theft last 12 months.
THEORETICAL BACKGROUND
Previous studies on crimes

Ceccato, Uittenbogaard & Bamzar (2011)
Temporal patterns: evening/night, weekends, holidays
Spatial patterns: violence at end-stations & property crimes at central stations
Environmental factors: low visibility, hiding places and disadvantaged neighbourhoods relate to higher crime rates & good lighting and fewer disturbances relate to lower crime rates

Uittenbogaard (2014)
Stockholm 60% of crimes happen within a 500m radius of underground stations (corresponding to 25% of municipality’s area)
Previous studies on feeling of safety

Ceccato, Uittenbogaard & Bamzar (2011)

Spatial patterns: foreign women unsafe at northwest end-stations, elderly unsafe at central stations, youth unsafe at southern stations.

Environmental factors: low social control, violence crimes and disturbance relate to higher unsafe feelings
Situational crime prevention

- **Rutinaktivitetsteorin**
  Cohen & Felson, 1979

- **Broken Windows-teorin**
  Kelling & Wilson, 1982

- **Placemaking**
  Jacobs & Whyte, 1960

- **Hot Spots**
  Ratcliffe m. fl., 2004

- **Prospect, refuge and escape**
  Fisher & Nasar, 1992
Station safety analysis

• Observational studies
  - Assessment of physical environment according to pre-determined safety model
  - Dividing aspects into nine intervention areas

• Interviews
  - In-depth interviews with police, public transport agency (SL/SLL), security companies, municipality, among other relevant actors

• Indexed stations
  - Resulting in an index for each of the intervention areas as well as overall station index
Safety model

- Configuration
- Mix of functions
- Mix of people
- Territoriality
- Social control
- Lighting
- Target hardening
- Management
- Information
Methods of study

• Visual grouping
  - By ranking indexes of the assessed stations a visual interpretation of the situation helps prioritise certain problem areas / stations

• Statistical analysis
  - Using regression analyses the physical environment of the stations could be linked to crime victimisation and feelings of safety.
RESULTS
## Study results

Rank-ordered stations according to overall index

<table>
<thead>
<tr>
<th></th>
<th>TOP 5</th>
<th>BOTTOM 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kista (blue)</td>
<td>Vårby gård (red)</td>
</tr>
<tr>
<td></td>
<td>Västra Skogen (blue)</td>
<td>Norsborg (red)</td>
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<tr>
<td></td>
<td>Universitetet (red)</td>
<td>Hjulsta (blue)</td>
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<tr>
<td></td>
<td>Rinkeby (blue)</td>
<td>Västertorp (green)</td>
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<tr>
<td></td>
<td>Fridhemsplan (green/blue)</td>
<td>Högdalen (green)</td>
</tr>
</tbody>
</table>
## Study results

### Rank-ordered underground lines according to indexes

<table>
<thead>
<tr>
<th></th>
<th>Index</th>
<th>Functions</th>
<th>People</th>
<th>SocialControl</th>
<th>Territoriality</th>
<th>Lighting</th>
<th>Target hardening</th>
<th>Management</th>
<th>Info</th>
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</thead>
<tbody>
<tr>
<td>RODA</td>
<td>12.08</td>
<td>14.36</td>
<td>13.06</td>
<td>8.37</td>
<td>10.50</td>
<td>15.92</td>
<td>10.44</td>
<td>13.34</td>
<td>10.95</td>
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<td>(12)</td>
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<td></td>
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<tr>
<td>GRONA</td>
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<td>14.70</td>
<td>13.70</td>
<td>10.30</td>
<td>9.60</td>
<td>16.50</td>
<td>12.20</td>
<td>13.30</td>
<td>8.3</td>
</tr>
<tr>
<td>(13)</td>
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## Study results

### Rank-ordered stations according to indexes

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<th>Management</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOP 5</strong></td>
<td>Kista (3)</td>
<td>Husby (18, 4)</td>
<td>(19, 5)</td>
<td>(6)</td>
<td>(19, 5)</td>
<td>(2)</td>
<td>(10)</td>
<td>(17, 8)</td>
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<td>(15, 0)</td>
<td>(11)</td>
<td>(15)</td>
<td>(12)</td>
<td>(14)</td>
<td>(18)</td>
<td>(9)</td>
<td>(15)</td>
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<tr>
<td><strong>BOTTOM 5</strong></td>
<td>(9)</td>
<td>(3)</td>
<td>(1)</td>
<td>(1)</td>
<td>(18)</td>
<td>(1)</td>
<td>(7)</td>
<td>(11)</td>
</tr>
<tr>
<td></td>
<td>(5)</td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
<td>(17)</td>
<td>(16)</td>
<td>(4)</td>
<td>(9)</td>
</tr>
</tbody>
</table>
Study results

Comparing feelings of unsafety with each intervention area

Feelings of unsafety:
- Unsafe in neighbourhood
- Unsafe at nearby station
- Unsafe on the way from nearby station

- Highly significant negative relationship with *target hardening*:
  - less integrated target hardening relates to higher perceived unsafety

- Significant positive relationship with *management*:
  - better management relates to higher perceived unsafety.
Study results

Comparing feelings of unsafety with each intervention area

Feelings of unsafety:
- Unsafe in neighbourhood
- Unsafe at nearby station
- Unsafe on the way from nearby station

Target hardening is a rather dominating variable (71% of model explanation), so what if we exclude it?

- Significant negative relationship with mix of functions:
  lower mix of functions relates to higher perceived unsafety.

- Significant positive relationship with mix of people:
  better mix of people related to lower perceived safety.
Study results

Comparing crime rates with each intervention area

• Reported crimes/1000 inhabitants
  
  - Significant negative relationship with management: worse management relates to higher reported crimes
Study results

Comparing victimisation with station indexes

• The overall station index shows
  - a strong positive relation with robbery self-reports, while
  - a weak negative relation with violence self-reports

• We can also see a significant relation between ”having been subject to threat” and the feeling of unsafety at and on the way to public transport. (Yet, neither of the other types of victimisation.)
Study results

Comparing victimisation with each intervention area

• Interestingly, it seems each intervention area is linked to different types of victimisation:

  - Mix of functions ---- positively robbery
  - Mix of people ---- positively threat + negatively theft
  - Territoriality ---- negatively theft
  - Lighting ---- negatively violence
  - Target hardening ---- positively theft
  - Management ---- negatively violence + positively threat

Social Control and Information do not show any significant relationships
CONCLUSIONS
Conclusions

A1) - The overall station index is fairly equally explained by all its aspects, yet highest contribution is given by mix of functions, social control, territoriality and management.

- We see a clear lack of certain intervention areas at current stations: social control, territoriality and information

- Working on areas target hardening, management, mix of functions and people in the right way should increase feelings of safety at stations
Conclusions

A2) - Overall crime rates are explained by broken windows theory

- Victimisation of violence seems related to stations with low possibilities of high perceived safety; lack of social control

- Physical interventions in the design may reduce victimisation of violent crimes

- Interventions related to the perception of the area may reduce victimisation of property crimes

- The stations use and location in the city may affect both feelings of safety as well as victimisation risks!
Recommendations

• **Feelings of safety vary during the whole journey** and are subject to a stations location in the city and surrounding environment.

• In general, priority intervention areas should be to increase **social control**, **territoriosity** and **information** at and around the stations.

• Moreover, for increased feelings of safety at the underground stations more effort should be put in **creating attractive, lively and inclusive urban places** by means of **integrating target hardening**, **offering a variety of functions**, **controlling flows** of people and carrying out **place management** from a whole-journey perspective.

• All intervention areas should be tackled by a **common effort** to increasing feelings of safety and customer satisfaction.

• We suggest a focus on those **stations in need** while applying adequate interventions for just that station.