

Potentials and problems arising from integration - A critical view on the safety effect



Devils Advocate

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The problem

- The biggest safety problem in many cities is accidents with pedestrians and bicyclists

- (Partly) separation gives more accident
 - Crosswalks (without any other measures): + 44 %
 - Cycle tracks: + 7 % (+24 % in intersections)

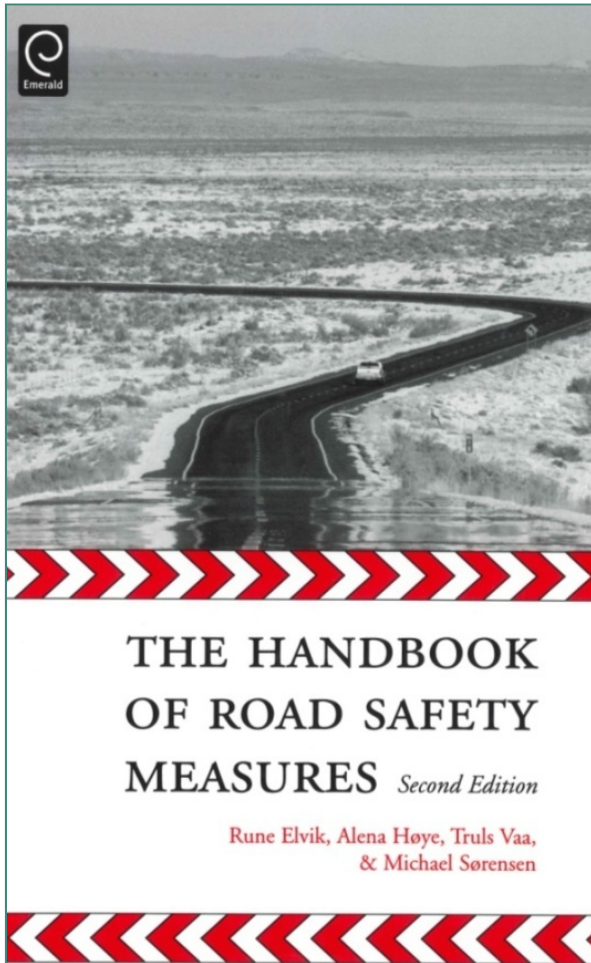
- Integration of cycle and car traffic → less accidents

- Would integrations of all types of traffic (Shared Space) give less accidents?

The discussion

- **Pro Shared Space:** Yes, very positive safety effect
- **Against Shared Space:** No, it is dangerous to use pedestrians as speed bumps
- **Scientists and researchers:** We do not know, people saying that Shared Space is a safety measure have no good evaluation studies to refer to. They should read the books about how to make evaluation studies

Background for presentation



- Safety effect of about 130 measures
- Meta analysis
- Results from about 3.000 studies
- Over 1100 pages
- Continuous updating
- 8-10 measures are updated every year
- **Shared space included in 2010 (Norwegian)**
- Online on tsh.toi.no (Norwegian)
- Norwegian, Finnish, Russian, English, Spanish

Methods

- Literature study (recommendations and effects)
- ≈ 30 reports, articles and www
- Meta analysis of 10 studies
- 24 locations: 7 squares, 5 intersections, 7 road sections, 5 city centres
- 55 effect estimates
- Locations rebuild in 1996-2007
- 6 countries: SE, DK, NL, DE, UK, CH

•Jaredson 2002 (SE)

•Brenner 2006 (SE)

•Quimby og Castle 2006 (NL, DK, UK)

•Swinburne 2006 (UK)

•NHL 2007 (NL)

•Tyréns 2007 (SE)

•Gerlach et al. 2008, 2008a (NL)

•Van der Velde og Bos 2008 (NL)

•Gerlach, Ortlepp og Voss 2009 (NL, DE, CH)

•Reid, Kocak og Hunt 2009 (NL, UK)

Methods (meta analysis)

→ Meta analysis (estimation of total effect)

- Effects are (if possible) estimated by use of meta analysis
- Effects are estimated as odds ratio = $(A/B) / (C/D)$, where
 A/B: Number of accidents in test group, after/before
 C/D: Number of accidents in control group, after/before
- Effects are weighted statistically according to the size of the study
- Total effects are calculated as:

$$\text{Weighted summary effect} = \exp \left(\frac{\sum_{i=1}^g V_i \cdot \text{LN}(\text{effect estimat})_i}{\sum_{i=1}^g V_i} \right)$$

Safety effect

		Percentage changes in the number of accidents		
Location	Accident severity	Accident types affected	Best estimate	95 % confidence interval
All	All accidents	All accidents	-17	(-40; +14)
	Injury accidents, not controlled for publication bias	All accidents	-26	(-42; -6)
	Injury accidents, controlled for publication bias	All accidents	-21	(-40; +5)
Intersection/ square	All accidents	All accidents	-14	(-48; +43)
	Injury accidents	All accidents	-46	(-70; -2)
Section	All accidents	All accidents	-12	(-46; +45)
	Injury accidents	All accidents	-16	(-32; +5)

- No significant safety effect for whole city centres
- Effect in the number of accidents and not for the number of injuries
- **Not possible to estimate the effect for different groups as pedestrians or bicyclists**

Less positive effect

- All studies are very simple before and after studies
 - (1 study had data that made it possible to made some corrections)

- No control for confounding factors
 1. General trend
 2. Regression to the mean
 3. Traffic volume
 4. Accident migration

- No estimate of risk
 - Reduction in the number of accidents \neq smaller risk, if less traffic

More criticism

1. Discrepancy between idea and actual design

- Only 6 of 24 location may to some extent be defined as “real” Shared Space
- Example: Kensington High Street (London) are often described as shared space, but the road has still a lot of regulations
- Not possible to estimate the effect of “real” Shared Space (big heterogeneity)

2. The evaluations cover at a package of measures

- Effect estimate for the whole package and not the Shared Space idea
- Ensample: Laweiplein (Drachten) seems to have a good safety effect, but a lot of this effect is probably the effect of rebuilding the intersection to a roundabout

3. Small accident numbers

- The estimates are based on small numbers and usually short after periods
- Difficult to show significant effects
- Effect estimate short after the implementation is not the same as the effect long time after the implementation

Probably positive effect after all

→ Speed reduction

- 5 Swedish locations: Speed reduction: 19-39 % (18-28 → 13-22 km/h)
- Projects in Nederland: Speed reduction: Up to 40 %

→ People feeling more unsafe = more attention

- More integration, less distance, uncertainty about the traffic rules
- (The feeling of unsafety become less over time for the average road user)

→ The effect short and long time after implementation (sections)

- Short < long: The effect becomes better over time
- Road users makes mistakes in the beginning but learn how to use it

→ The effect short and long time after (Intersection/squares)

- Short > long: The effect becomes smaller over time
- Road user are feeling insecure in the beginning but are getting more familiar with it (less attention and higher speed)

Other effects - mobility

→ Car traffic

- Objective: lower speed level
 - Critical speed: 30 km/h (energy)
 - Time to “negotiation”: 15-20 km/h
- Speed reduction 20-40 % → reduction mobility
- Less stops → constant speed → shorter travelling time → better mobility

→ Public transport

- No stops for red light: shorter time (Laweiplein, - 24-48 %)
- Yielding for vulnerable road user: longer time (Skvallertorget, + 75-100 %)

→ Vulnerable road user:

- Pedestrian: Direct route and car drivers are yielding (50-90 %)
- Bicyclist: Direct route, but car drivers are yielding to a lesser extent (35-86 %)

Other effects

→ Accessibility

- Car traffic: Better than normal pedestrian streets
- Visually impaired: Worsening (no guidelines and colours)
- Physically handicapped: Worsening (some types of surface)
- Physically handicapped: Improvement (uniform surface, same level)

→ Subjective safety

- Objective safety through subjective unsafety
- Average road user: Feeling more safe after having got used to the design
- Children, elderly, Visually impaired, Physically and mental handicapped are feeling unsafe (difficult to negotiate) → safe space

→ Environment

- Lower/more constant speed and less car traffic (9-34 %) → less noise/pollution
- Other surface → more noise and vibrations

→ Aesthetic and life (main objective): Fulfilled

Conclusions

Parameter	Effect
Safety	(+)
Mobility, car and buss	+ / -
Mobility, pedestrian and bicyclist	+ / (+)
Accessibility, car and buss	+
Accessibility, vulnerable road users	+ / -
Subjective safety, "average" and "weak"	(-) / -
Environment	+
Aesthetic and life	+

Conclusions

→ Potentials

- Maybe a good safety effect (low speed level)
- 100 % separation or 100 % integration – the problems arise when the solutions is neither (pedestrian crossings, cycle tracks)

→ Problems

- No good evaluation in Norway or other countries that document this maybe positive effect

→ **Not a criticism of Shared Space, but more a criticism of the evaluations and the presentation of these studies**

The 10 studies in the meta analysis

- Brenner, André (2006). Shared Space som koncept för planering av det offentlige rummet i Sverige, Thesis 149, Lunds Tekniska Högskola, Institutionen för Teknik och samhälle, trafik och väg, Lund.
- Gerlach, Jürgen, Ortlepp, Jörg og Voss, Heiko (2009). Shared Space – Eine neue Gestaltungsphilosophie für innenstädte? – Beispiele und Empfehlungen für die praxix, Die Unfallforschung der Versicherer (UDV), Gesamtverband der Deutschen Versicherungswirtschaft e. V. (GDV), Berlin.
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- Jaredson, Sofia (2002). Utvärdering av skvallertorget i Norrköping, Examensarbete, LITH-ITN-EX-02/245-SE, Tekniska Högskolan, Linköping Uiversitet, Institutionen för teknikk och naturvetenskap, Norrköping.
- NHL (2007). The Laweiplein – Evaluation of the reconstruction into a square with roundabout, Noordelijke Hogeschool Leeuwarden (NHL), januar 2007.
- Quimby, Allan og Castle, James (2006). A review of simplified Streetscape Schemes, Report PPR292, TRL Limited.
- Reid, Stuart, Kocak, Nazan og Hunt, Laura (2009). DtF Shared Space project – Styage 1: Apprasial of shared Space”, mvaconsultancy, London.
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- Tyréns (2007). Trafiksäkerhet vid shared space, desember 2007.
- Van der Velde, R. R. og Bos, E (2008). Shared Space Haren – evaluatie en integratie, Grontmij, Haren.

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...Questions
and comments

