

The acceptability of transport pricing policies



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Transport Pricing Policies (TPP)

PULL MEASURES

aim to make desired behaviour more attractive by decreasing costs for alternatives

PUSH MEASURES

aim to make undesired behaviour less attractive by increasing costs car use/ car ownership

TPP (push) can be very effective...

For example,

- Singapore licence scheme
overall, 15% reductions in traffic volumes ('89-'90)
- London's congestion charge
21% less cars entered the city centre ('03 – '06)
- Stockholm's congestion charge
overall, 22% reduction of car traffic (Jan – Jul '06)

... but are often not acceptable!

Therefore,



- policies may not be implemented (e.g., Edinburgh, Manchester)
- policies may be less effective: reactance



Acceptability of TPP

Acceptability is usually defined as an attitude:

Acceptability reflects a psychological tendency that is expressed by evaluating the outcomes of TPP with some degree of favour or disfavour

Beliefs about TPP

Acceptability is determined by beliefs about outcomes of TPP:

- individual level: short term, negative outcomes (e.g., costs \uparrow , own car use \downarrow)
- collective level: long term, positive outcomes (e.g., congestion \downarrow , environmental quality \uparrow)

Acceptability as a social dilemma

- Each individual will be better off when he/she focuses on individual outcomes
focus on individual outcomes: **acceptability ↓**
- All individuals will be better off when everybody focuses on collective outcomes
focus on collective outcomes: **acceptability ↑**

Greed-Efficiency-Fairness Hypothesis

People are *a-priori* 'greedy', i.e., focus on individual outcomes to maximise self-interests

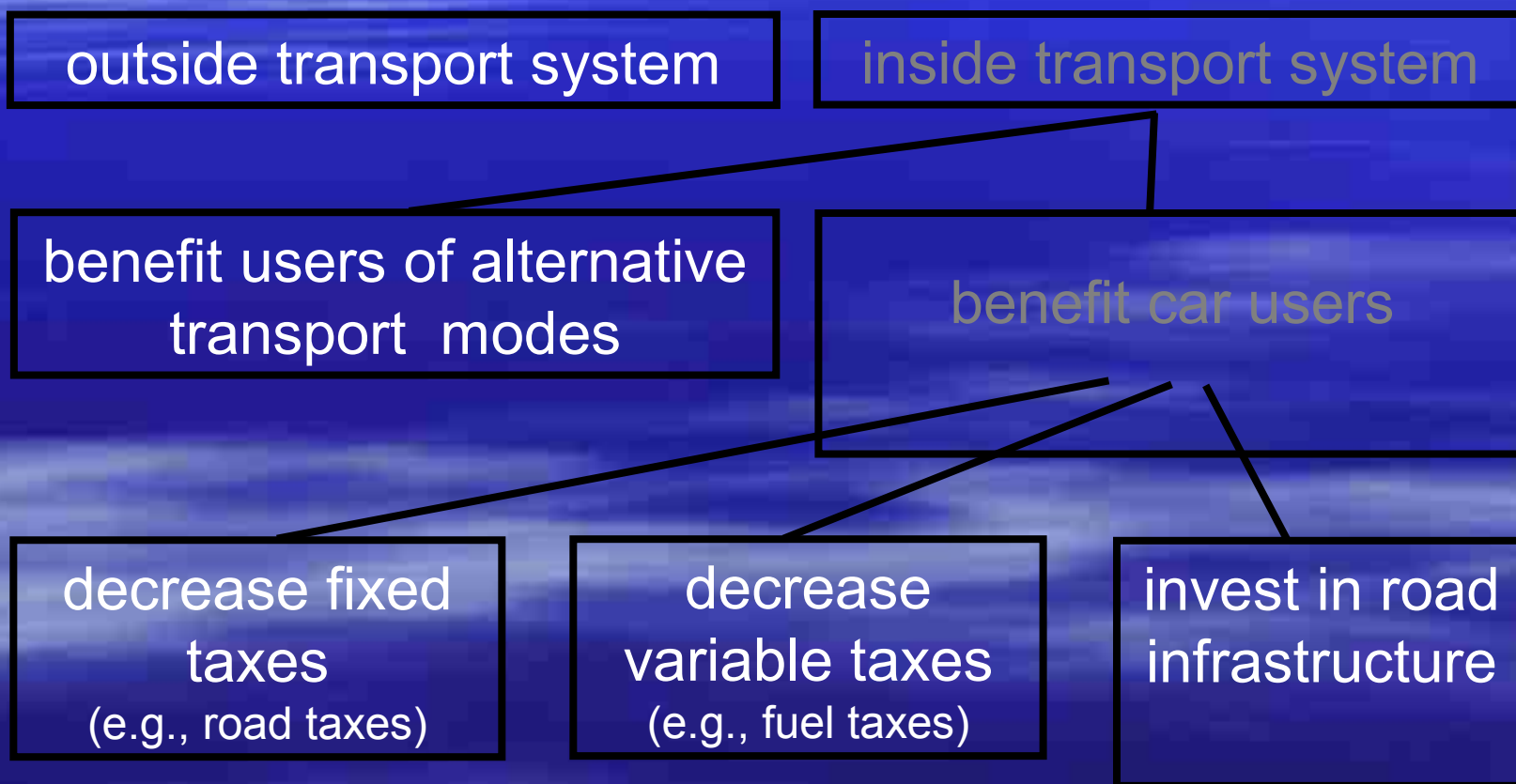
However, people are not always 'greedy', because they also desire

1. efficient use of collective resources ('efficiency')
2. fairly distributed outcomes ('fairness')

Acceptability changes if: ...

- Decrease negative effects for individuals
Study 1: compensate for negative effects with allocation of revenues
- Focus more strongly on collective outcomes
Study 2: perceived individual vs collective outcomes
Study 3: experience positive collective outcomes
- Outcomes are fairly distributed
Study 4: which distribution of outcomes is acceptable & fair?

STUDY 1 compensate for negative outcomes with revenues



Method

part 1 – single revenue use items

Evaluate revenues allocation to

1. general public funds
2. improve public transport (PT)
3. invest in road infrastructure
4. decrease fuel taxes
5. abolish road taxes

Scale: 1 (not very acceptable) - 7 (very acceptable)

N = 507; within subjects design

Results

part 1 - single revenue items



Method

part 2 - km charge based on car weight

Evaluate scenario

1 (not very acceptable) - 7 (very acceptable)

- Price per km depends on weight of car:
 - light car (4 €ct/ km)
 - middle class car (5 €ct/ km)
 - heavy car (6 €ct/ km)
- Costs for an average household were indicated
- Systematically varied 5 revenue allocations
(i.e., general public funds, PT, road infras., fuel and road taxes)

N = 507; between subjects-design

Results

part 2 - km charge based on car weight



Conclusions

Compensation increases acceptability:

- decreasing car-related taxes is most acceptable revenue allocation
- investing in road infrastructure not acceptable, when people realise they have to pay

Acceptability changes if: ...

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STUDY 2 expected individual versus collective outcomes

Previous studies show that:

- Focus on individual outcomes → acceptability ↓
- Focus on collective outcomes → acceptability ↑

However,

- What is relative importance of individual and collective outcomes?
- Is focus on collective outcomes related to policy objective?
- To what extent do people expect individual benefits?

Method

Respondents evaluated 2 scenarios

- Policy 1: toll charge (main aim: congestion ↓)
car users pay when passing bottlenecks in NL
- Policy 2: car-mass-dependent km charge
(main aim: environmental problems ↓)
car users pay per km driven; price level car-mass-dependent

Questionnaire

Both policy measures were evaluated on

- **acceptability**

scale 1 (very unacceptable) – 7 (very acceptable)

- **personal outcome expectations**

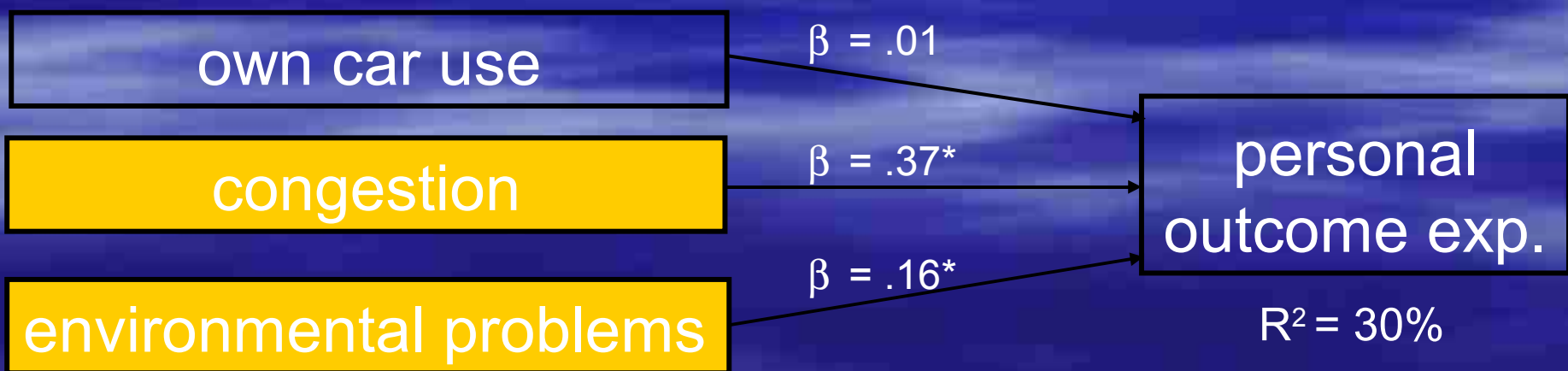
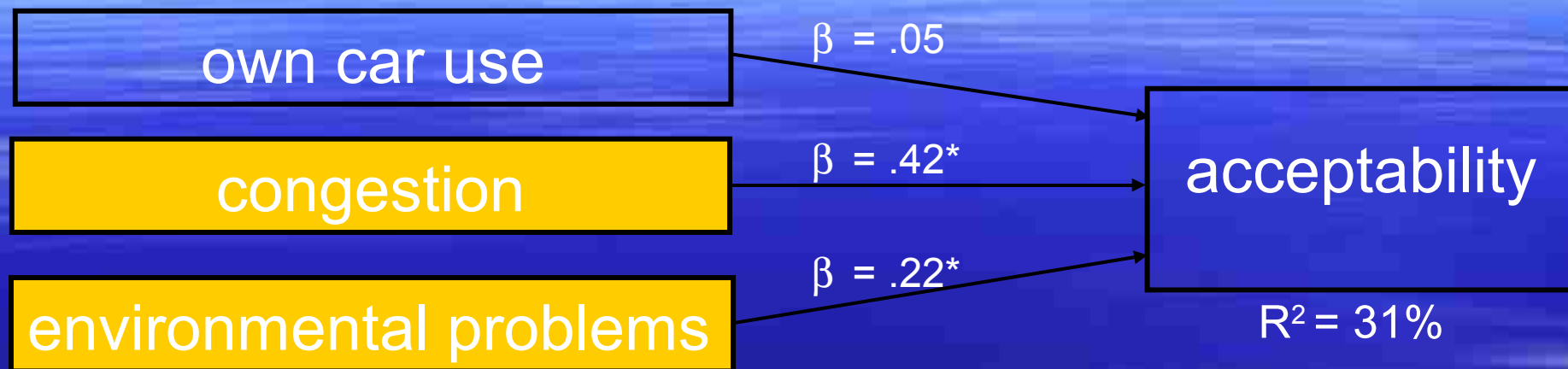
scale 1 (considerably worse off) – 7 (considerably better off)

- **expected effects:**

- reductions in own car use
- reductions in congestion
- reductions in environmental problems

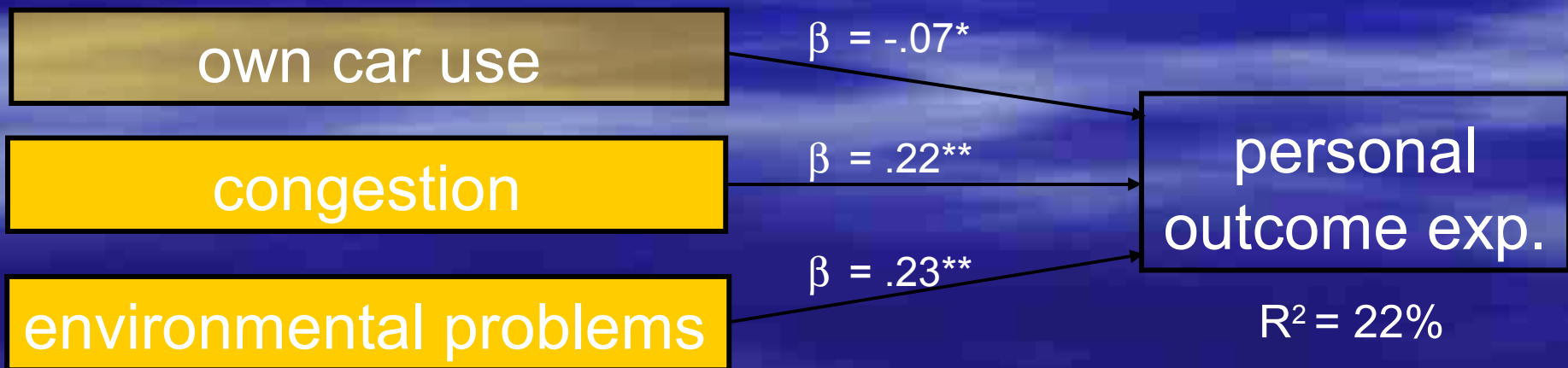
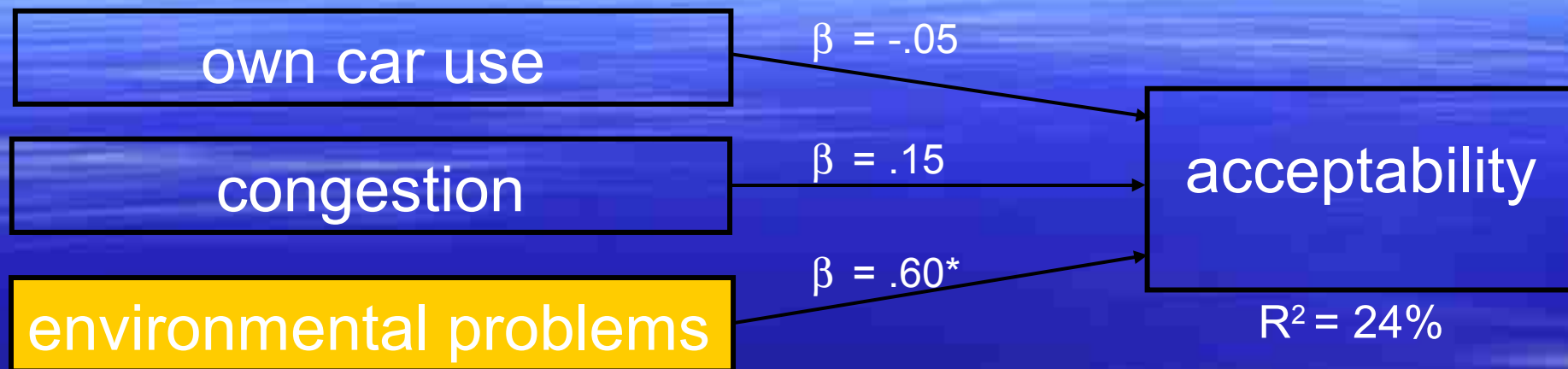
scale 1 (very unlikely) – 7 (very likely)

Results – toll charge



* $p < .001$

Results – km charge



* $p < .05$; ** $p < .001$

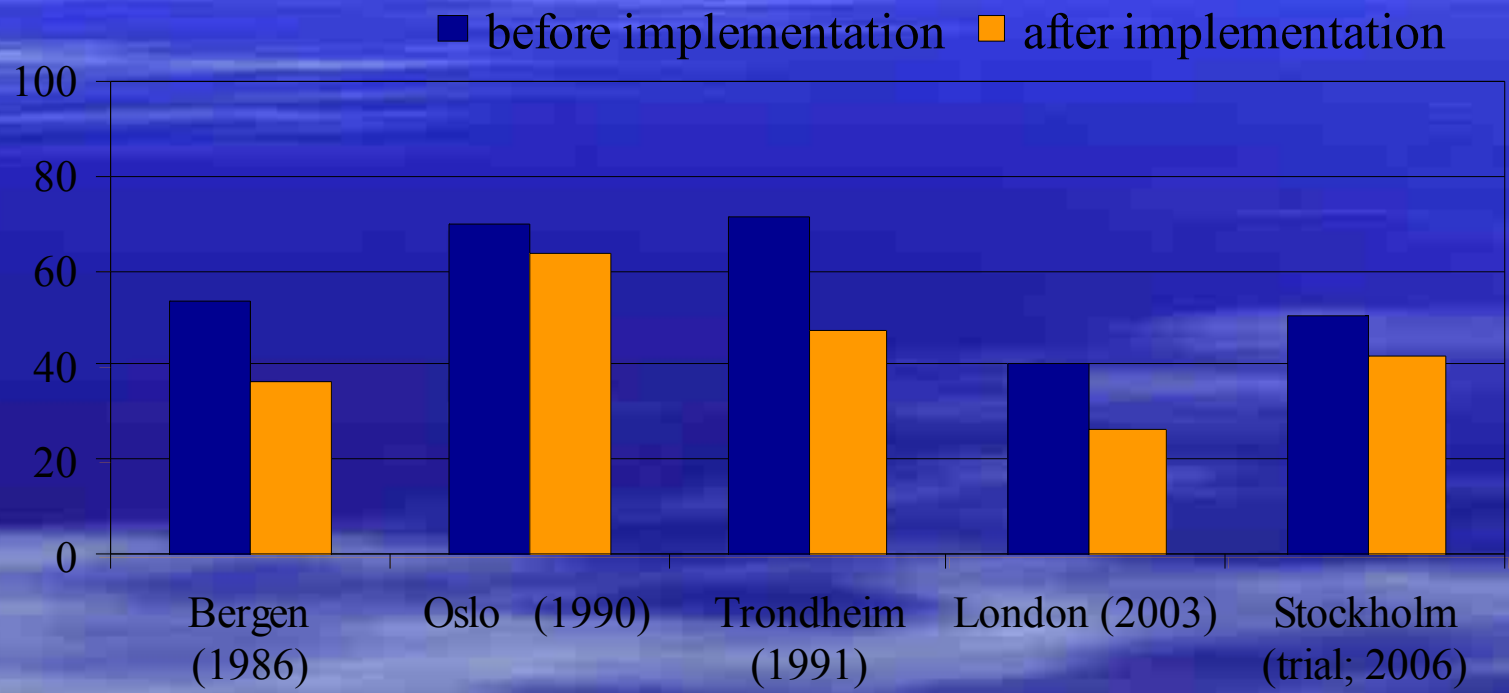
Conclusions

- Acceptability is not related to expected effects on own car use
- Acceptability \uparrow if people expect problems \downarrow
 - because people expect to benefit personally from reduced problems
 - in case aim is environmental problems \downarrow , collective considerations seem to play a role as well
- People focus mainly on collective problem that is targeted by policy measure

Conclusions

- Acceptability is low, because no reductions in collective problems are expected
- Does acceptability \uparrow if people *experience* positive effects of TPP?

Acceptability ↑ after implementing TPP



STUDY 3 experiencing positive outcomes of TPP

Hypotheses:

If acceptability of TPP is higher after implementation than before,

4. after the implementation of charge, ***beliefs about the outcomes are more favourable or less unfavourable*** than beforehand
2. after implementation of charge, ***acceptability after the charge is more strongly related to favourable beliefs/ less strongly to unfavourable beliefs*** than acceptability before the charge

The Stockholm trial

Jan 3 - Jul 31, 2006

- Congestion charge: Vehicles were charged for entering or leaving the city centre
- Price levels depended on time of day (ranging from 0 - 20 SEK; max. daily charge 60 SEK)
1 SEK \approx € 0.11 \approx £0.09
- Automatically payments most common
- Before the trial: public transport was expanded and improved
- Main objectives: congestion ↓, environmental quality and accessibility ↑ in city centre

Method

- Questionnaire study:
 - before trial in Dec 2005; N=444
 - after trial in Aug 2006; N=143
- Longitudinal study: same respondents filled out Q1 and Q2
- Respondents lived in city centre (13%) and outside city centre (87%)

Questionnaires

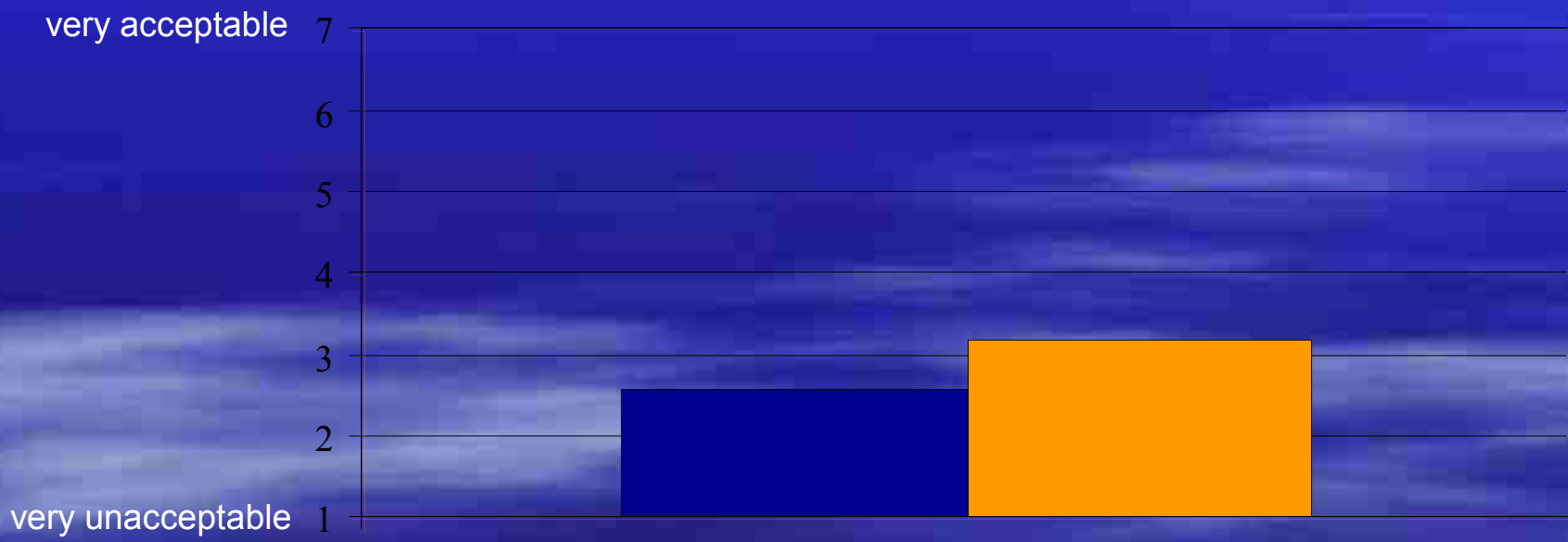
- Acceptability*
- Expected (Dec 05) and perceived (Aug '06) effects on:
 - costs for charge during typical week (open question)
 - reductions in own car use*
 - reductions in congestion in city centre*
 - reduction in pollution in city centre*
 - reductions in parking problems in city centre*
 - increasing crowdedness in PT*

* scale from 1 (very unacceptable/ very unlikely) – 7 (very acceptable/ very likely)

Results

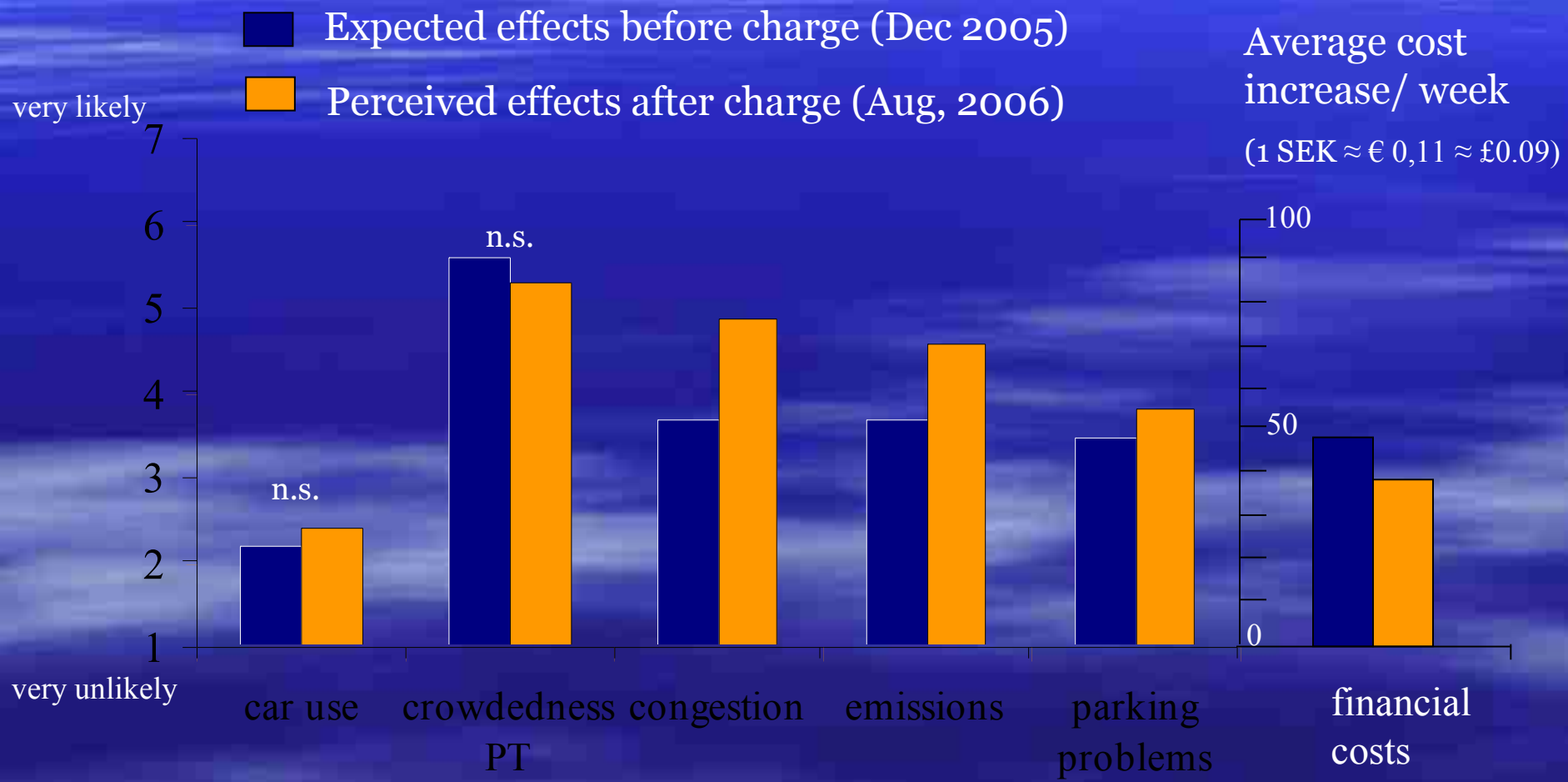
acceptability increased after implementation

■ before implementation - Dec '05
■ after implementation - Aug '06



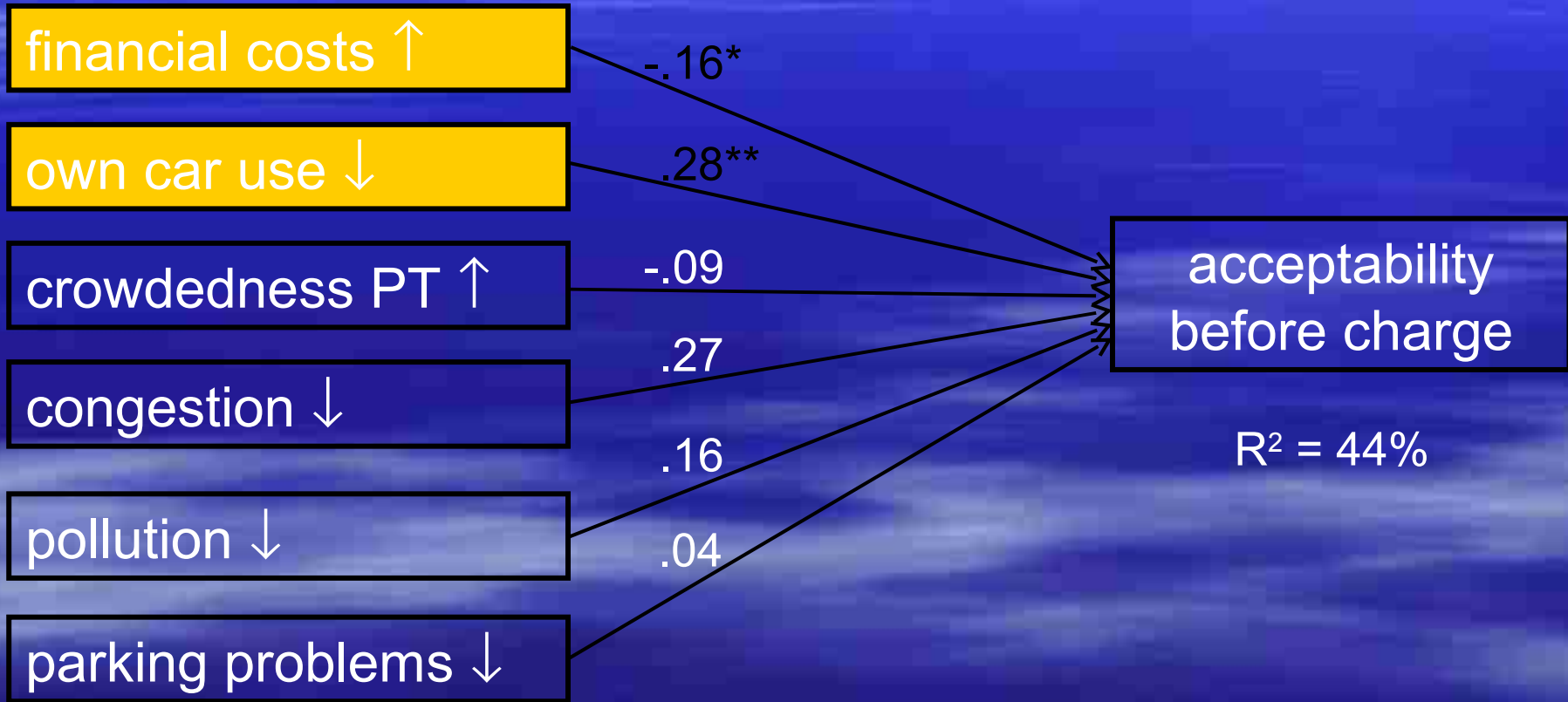
$t(140) = 4.4, p < .001$

Results



Results

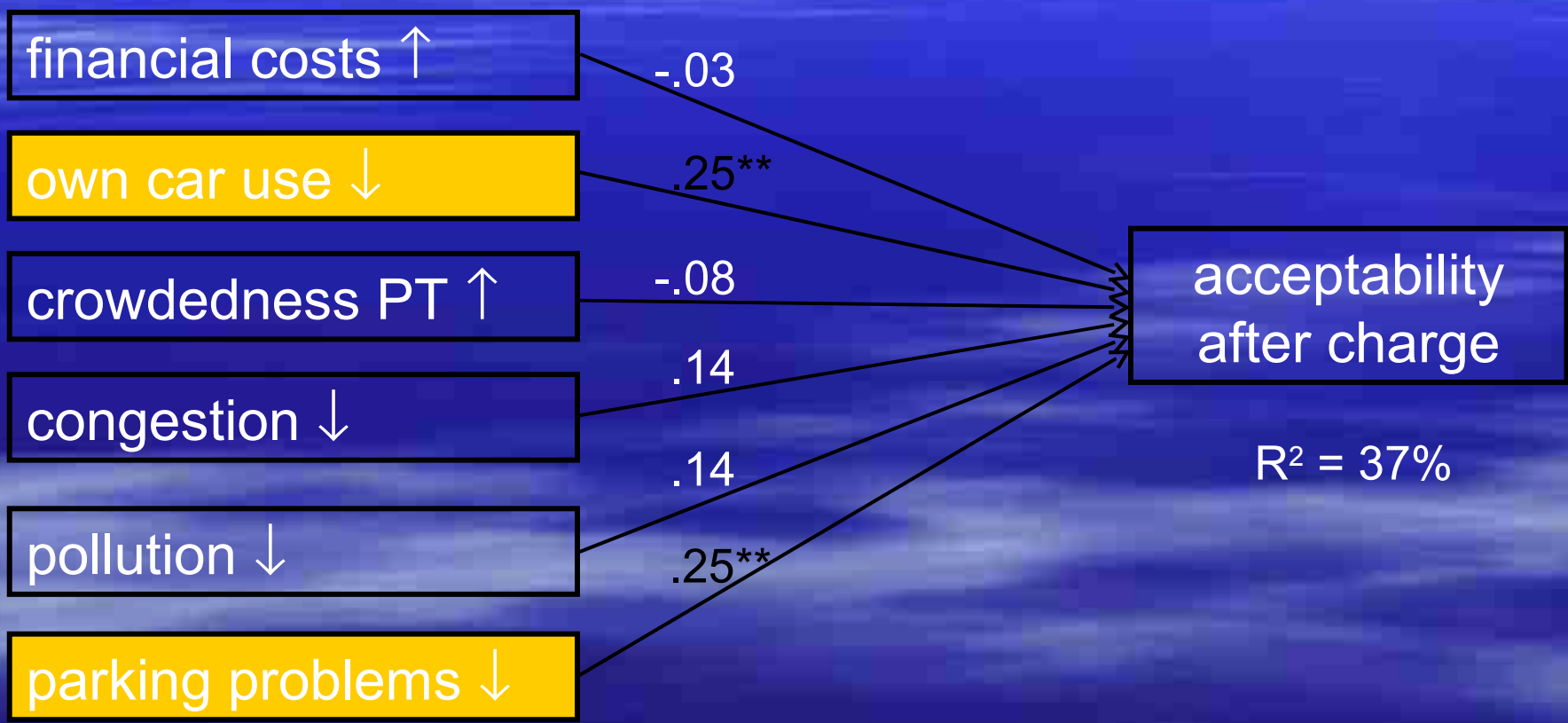
before implementation



*p<.05; **p<.001

Results

after implementation



*p<.05; **p<.001

Conclusions

Overall, after charge...

- more favourable beliefs about the charge
 - Acceptability more strongly related to favourable beliefs about the charge
- Acceptability - when reductions in car-related problems are perceived

Acceptability changes if: ...

- Decrease negative effects for individuals
Study 1: compensate for negative effects with allocation of revenues
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Study 2: perceived individual vs collective outcomes
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Study 4: which distribution of outcomes is acceptable & fair?

STUDY 4 acceptability and fairness

acceptability: an evaluation of the expected costs and benefits of transport pricing

(distributive) fairness: an evaluation of the *distribution* of expected costs and benefits of transport pricing

which distribution of outcomes is fair and acceptable?

Fairness principles

COMPARISON

intrapersonal

interpersonal

intergenerational

FARINNESS PRINCIPLES

Fairness principles

COMPARISON

intrapersonal

interpersonal

intergenerational

current personal outcomes
compared to
expected personal outcomes



FARINESS PRINCIPLES

1. my financial situation will get worse

Fairness principles

COMPARISON

intrapersonal

interpersonal

intergenerational

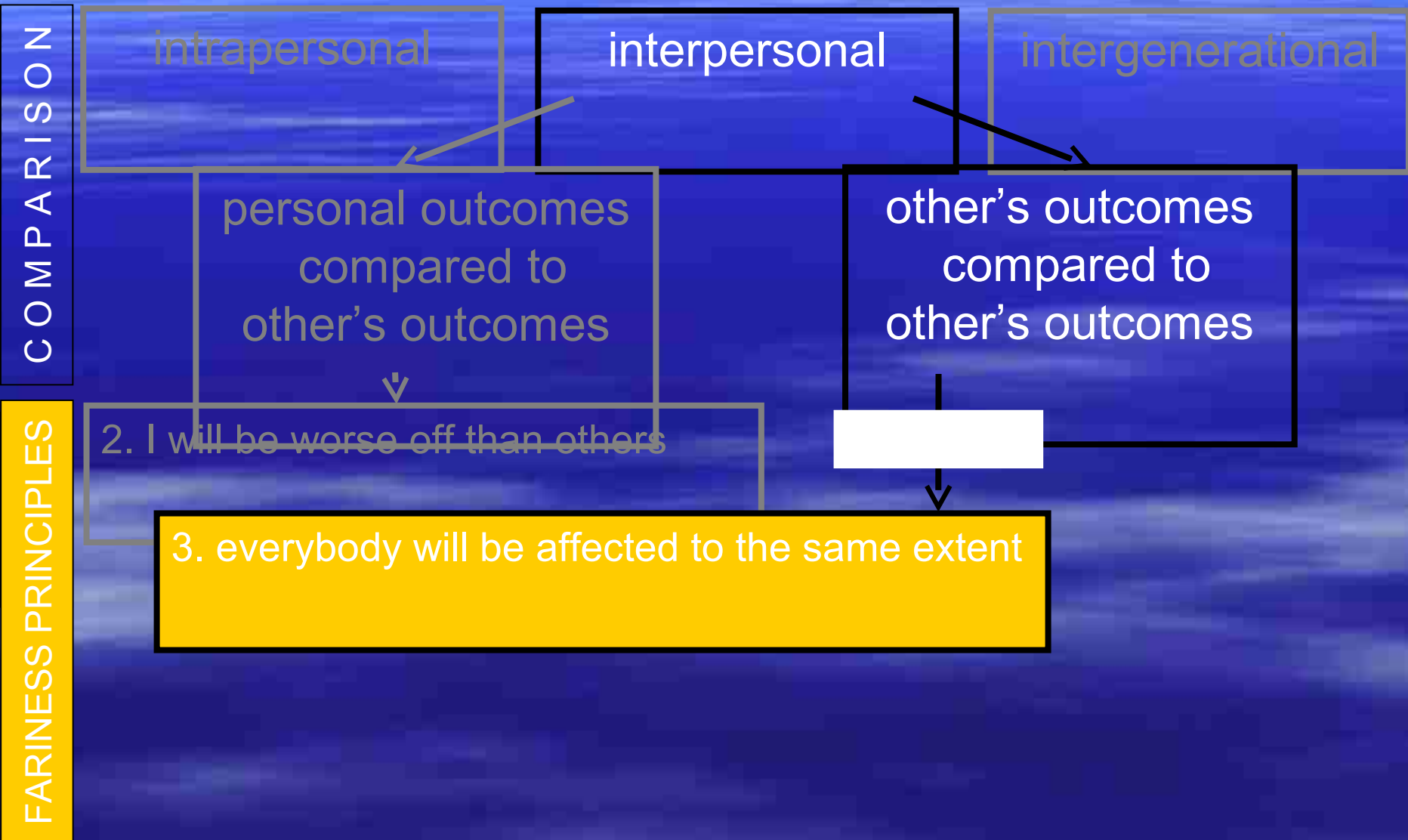
personal outcomes
compared to
other's outcomes



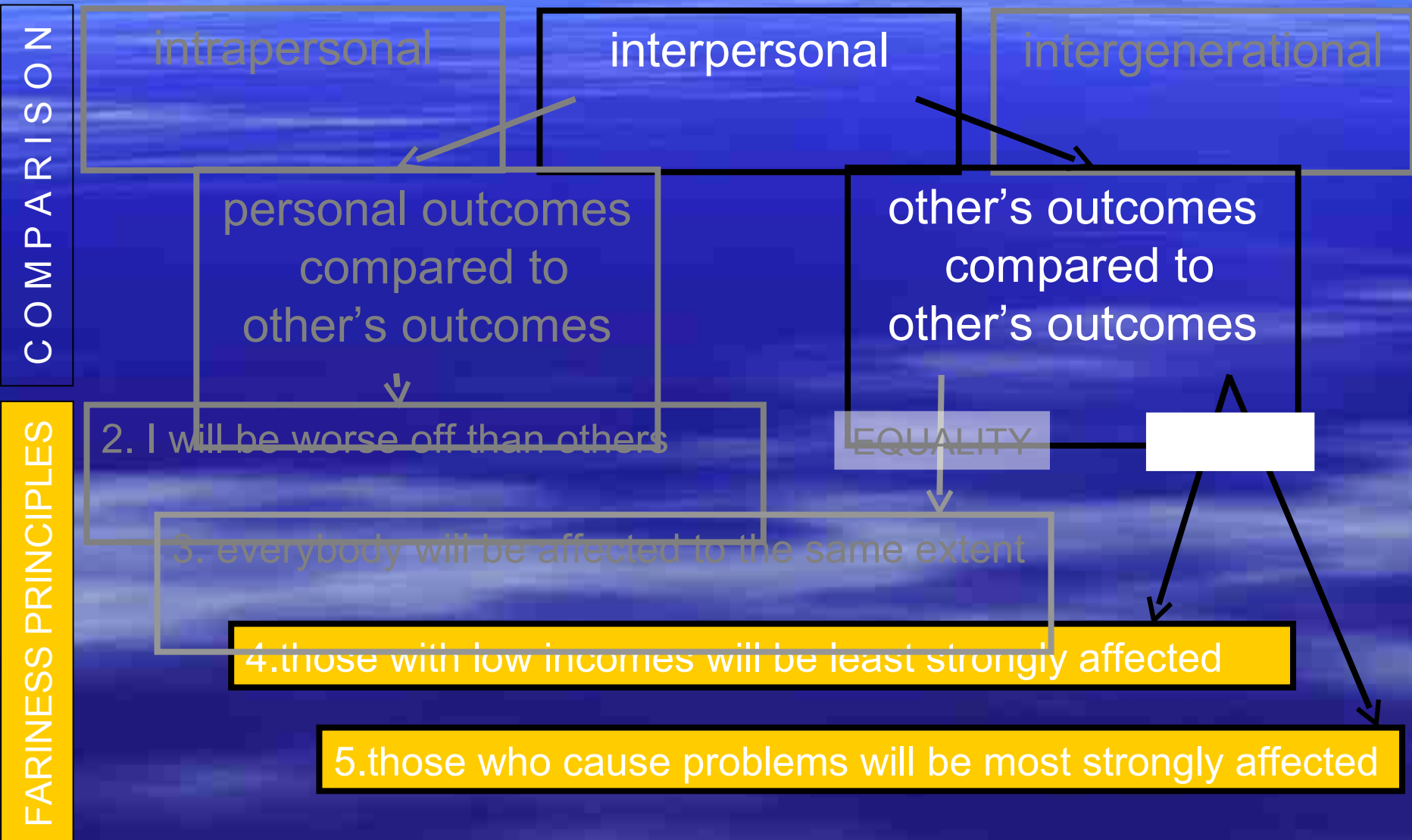
FARINESS PRINCIPLES

2. I will be worse off than others

Fairness principles



Fairness principles



Fairness principles

COMPARISON

intrapersonal

interpersonal

intergenerational

current outcomes
compared to
future outcomes

6. nature, the environment and future generations will be protected

FARINESS PRINCIPLES

Six fairness principles

Financially worse off
Worse off than others

*focus on
individual
outcomes*

Equality

Proportional to income
Proportional to contribution
to problems

*focus on
collective and
individual
outcomes*

Environmental justice

Method

6 policies were evaluated

Policy aimed at reducing car use

	annual kilometrage	road tax
1. <i>push</i>	> 16,000 km	€500 extra per year
2. <i>pull</i>	< 16,000 km	€500 discount per year
3. <i>combi</i>	combination of 1 and 2	

Policy aimed at changing car ownership

	fuel use	tax on purchase of new cars
4. <i>push</i>	< 13 km : 1 litre fuel	€1,000 extra tax
5. <i>pull</i>	> 17 km : 1 litre fuel	€1,000 tax discount
6. <i>combi</i>	combination of 4 and 5	

Questionnaire

- Do fairness principles apply to policies?
1 (strongly disagree) – 7 (strongly agree)
- How acceptable is this policy?
1 (very unacceptable) – 7 (very acceptable)
- How fair is this policy?
1 (very unfair) – 7 (very fair)

N = 101; inhabitants of city of Groningen
within subjects design

Results

	Policy aimed at car use ↓			Policy aimed at car ownership ↓		
	push	pull	comb	push	pull	comb
	β	β	β	β	β	β
1. financially worse off	.09	-.06	-.11	-.03	-.35	.02
2. worse off than others	-.35	-.23	-.23	-.16	-.02	-.24
3. equality	.20	.19	.30	.33	.36	.35
4. proport. to income	-.02	-.18	.06	.02	.26	.03
5. proport. to contr. to probl.	.26	.18	.21	.08	.08	.10
6. environmental justice	.44	.38	.40	.50	.46	.45
R2 (%)	56	40	47	47	44	44

Regression of perceived acceptability of 6 policy measures on 6 fairness principles
 Bold β -coefficients $p < .05$

Results

	Policy aimed at car use ↓			Policy aimed at car ownership ↓		
	push	pull	comb	push	pull	comb
	β	β	β	β	β	β
1. financially worse off	.09	-.06	-.11	-.03	-.35	.02
2. worse off than others	-.35	-.23	-.23	-.16	-.02	-.24
3. equality	.20	.19	.30	.33	.36	.35
4. proport. to income	-.02	-.18	.06	.02	.26	.03
5. proport. to contr. to probl.	.26	.18	.21	.08	.08	.10
6. environmental justice	.44	.38	.40	.50	.46	.45
R2 (%)	56	40	47	47	44	44

Regression of acceptability of 6 policy measures on 6 fairness principles
 Bold β -coefficients $p < .05$

Results

	Policy aimed at car use ↓			Policy aimed at car ownership ↓		
	push	pull	comb	push	pull	comb
	β	β	β	β	β	β
1. financially worse off	.10	.01	-.29	-.11	-.35	.01
2. worse off than others	-.43	-.26	-.01	-.08	.07	-.27
3. equality	.18	.09	.23	.37	.37	.36
4. proport. to income	-.13	-.25	-.06	.14	.20	.04
5. proport. to contr. to probl.	.23	.14	.22	-.11	.09	.05
6. environmental justice	.31	.39	.30	.52	.39	.49
R2 (%)	43	34	35	46	37	45

Regression of overall fairness of 6 policy measures on 6 fairness principles
 Bold β -coefficients $p < .05$

Results

	Policy aimed at car use ↓			Policy aimed at car ownership ↓		
	push	pull	comb	push	pull	comb
	β	β	β	β	β	β
1. financially worse off	.10	.01	-.29	-.11	-.35	.01
2. worse off than others	-.43	-.26	-.01	-.08	.07	-.27
3. equality	.18	.09	.23	.37	.37	.36
4. proport. to income	-.13	-.25	-.06	.14	.20	.04
5. proport. to contr. to probl.	.23	.14	.22	-.11	.09	.05
6. environmental justice	.31	.39	.30	.52	.39	.49
R2 (%)	43	34	35	46	37	45

Regression of overall fairness of 6 policy measures on 6 fairness principles
 Bold β -coefficients $p < .05$

Conclusions

- Overall fairness and acceptability of TPP is systematically and consistently related to
 - environmental justice
 - equality
- Environmental justice is related to preserving natural resources → solving car-related (environmental) problems are important
- For other 4 fairness principles no systematic pattern → less relevant for overall fairness and acceptability

Overall conclusions

Acceptability of TPP increases when:

1. individuals are compensated for negative consequences (*study 1*)
2. people expect and perceive that collective problems decrease (*study 2 and 3*)
3. if the distribution is protects nature, the environment and future generations or is equal (*study 4*)

Discussion

compensate for negative consequence?

Compensate negative outcomes for car users

- Focus on self-interest:
unstable basis for attitude change, because strongly affected by changes in personal situation (e.g., De Groot & Steg, 2009)
- Questionable if problems will reduce

unstable & short term acceptability change

Discussion

focus on positive and fair outcomes?

Focus on positive and collective outcomes

- stable basis for attitude change, because hardly affected by changes in personal situations (e.g., De Groot & Steg, 2009)
- benefits both the collective and individuals in the long term

stable & long term acceptability change

Practical implications

if the aim is to increase acceptability of TPP

- Stress positive effects rather than limited negative effects of policies
- Stress that individuals and the collective both benefit if problems are reduced
- Positive effects must be realistic
 - implement policies in areas that face serious traffic problems
 - trials may result in experience of positive effects
 - facilitate behaviour change: provide alternatives

Questions?

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