



CSIRO

WATER FOR A HEALTHY COUNTRY

National Research Flagship

The Community and Water Reuse: What drives decisions to accept or reject?

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CSIRO Land and Water

What is the issue?



- It seems that we must get used to having less water in the future
 - We will need to better manage and use available water
 - It is a “whole of community” challenge
 - There will be no “one solution”
- Reuse is one logical way to go
 - Reuse of wastewater for indirect potable use is currently being promoted in a number of places throughout Australia
 - *Managed aquifer recharge*
 - *Replenishing dams and other surface storages*
 - *Scientists tell us it can be done and it is safe*

What is the issue?



- Scientifically sound reuse schemes frequently fail throughout the world why?
 - Poor community perceptions and acceptance?
 - *Wastewater reuse is strongly supported by the community as a concept*
 - “Doing it” is the problem
 - *When faced with the actual behaviour, people lose support for the projects*

International literature review



- In the past, public acceptance has been viewed as an “obstacle” to implementing reuse projects
 - therefore the emphasis was on persuasion
- Now generally accepted that social marketing & persuasion are ineffective
- Virtually no research on the different factors that might influence public perceptions or mediate decision-making
 - No systematic social investigations
 - Only limited studies, principally by water agencies.

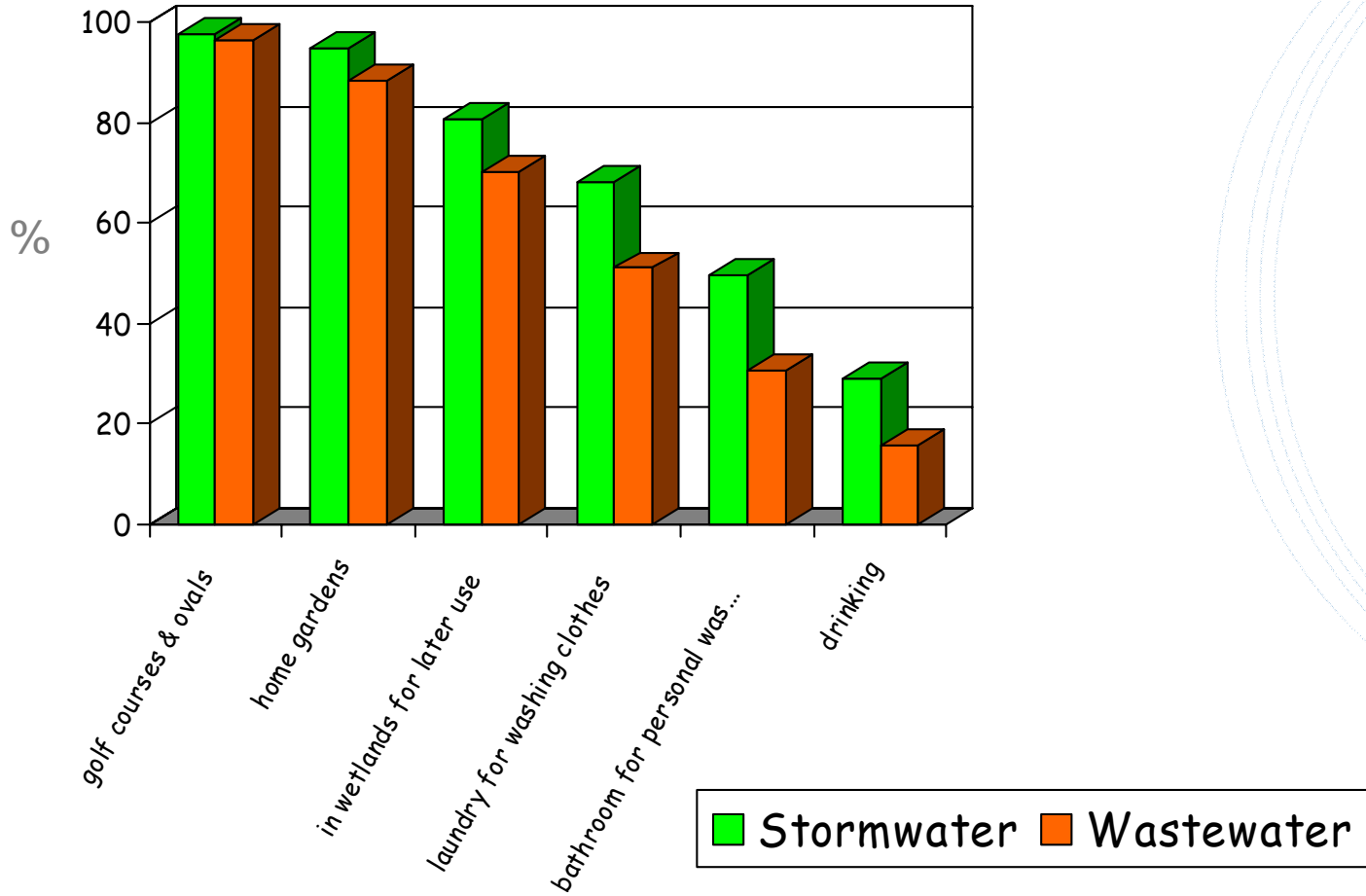
What do we know?



- The closer the water comes to personal contact – the less acceptable the reuse option.
- The source of water to reuse is important
 - One's own water to reuse is preferable to the neighbour's or the city's

Community acceptability of reuse options

(ARCWIS, 2000)



Possible influential factors

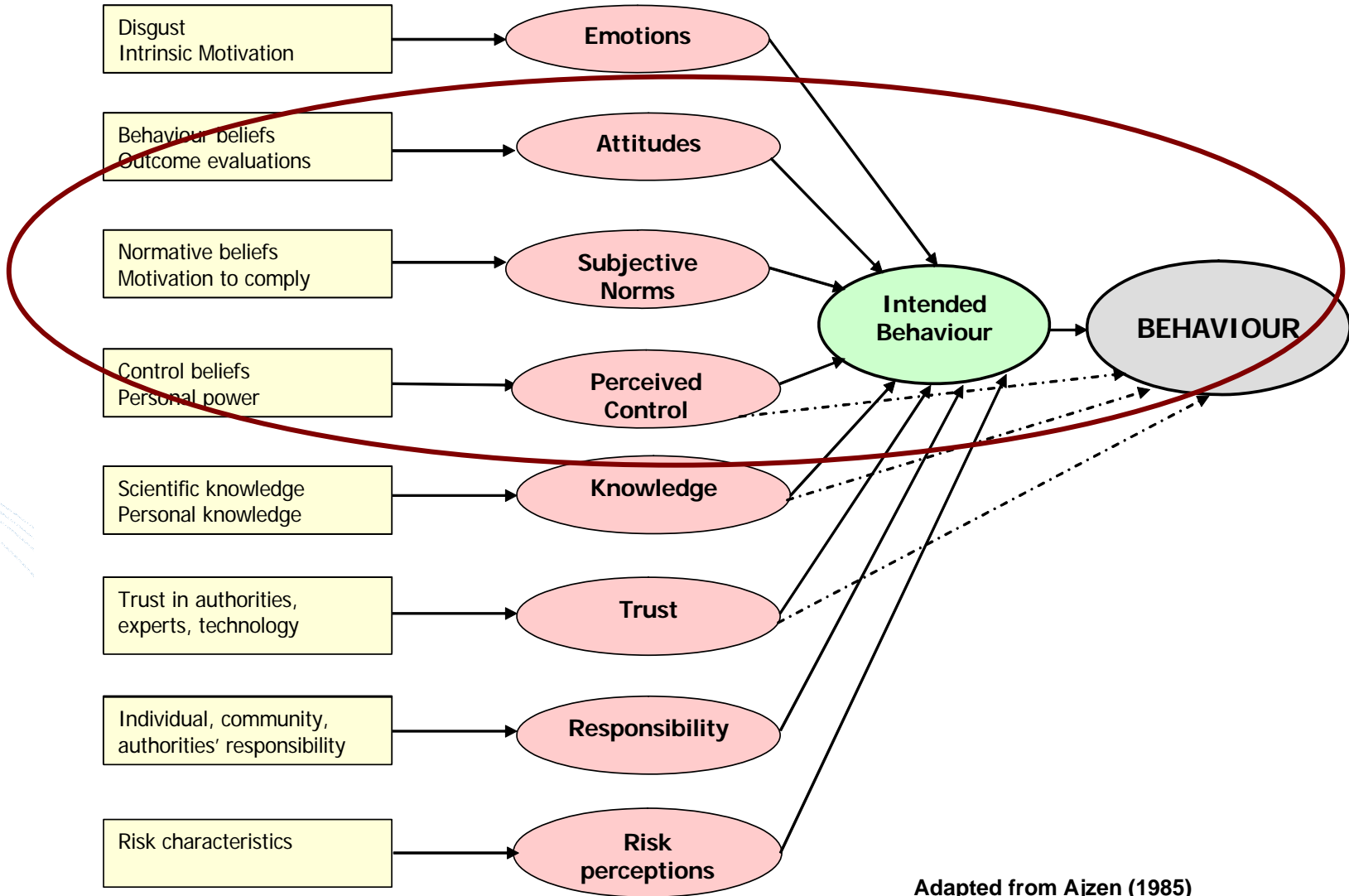


- The **Food Technology literature** suggested factors that ***might*** influence behavioural acceptability of water reuse

- Emotion - “yuck!!”
- Risk perceptions
- Specific uses
- Sources
- Choice
- Trust & knowledge
- Environmental attitudes
- Environmental justice issues
- Cost
- Socio-demographic factors



Theory of Planned Behaviour – adapted & developed



Adapted from Ajzen (1985)

Developmental investigations



- **Social Experiment**

- Community participants faced with “real” situations

(NH&MRC ethics)

- *Develop measures of emotion*
- *Test hypothesised variables & their relationships*
- Eat lettuce, carrots, grapes and oranges “grown with recycled greywater, stormwater & wastewater”
- Drink “recycled greywater, stormwater & wastewater”
- Pre-, during, and post-experiment questionnaires



Developmental investigations



- Results showed

- *Exposure to the experiment seemed to reduce acceptance of reusing treated wastewater*
- *The type of water being reused was important*
- *Degree of personal contact continued to show importance*
- *Trust and emotions were important in people's decisions (trust in CSIRO was a major factor)*
- *Health risks did not significantly affect people's decisions*

Testing the Model



- 2 reuse scenarios presented as real and immediate projects and people asked their behavioural intentions
 - 2 surveys
 - Indirect potable, Perth (Managed Aquifer Recharge - MAR) (400 random sample)
 - Horticultural irrigation, Melbourne (Werribee) (400 random sample)

After a short introduction to the scheme, would you.....



- buy vegetables that have been grown in Werribee with recycled wastewater?

- Yes 35%
- Not sure 56%
- No 10%

- drink water that was provided from this reuse scheme? (managed aquifer recharge - MAR)

- Yes 31%
- Not sure 51%
- No 18%

Risks



Melbourne Horticulture

- 73% thought there was or could be a possibility of something going wrong ... of this group:
 - *22% thought it was likely or highly likely*
 - *32% thought it could be extremely serious*
 - *52% thought there would be at least some control through to a high level of control*

Perth Indirect Potable

- 81% thought there was or could be a possibility of something going wrong ... of this group:
 - *43% thought it was likely or highly likely*
 - *50% thought it could be extremely serious*
 - *44% thought there would be at least some control through to a high level of control*

Risks



Melbourne Horticulture

- 55% thought the experts had a high level of knowledge about the safety

Perth Indirect Potable

- 38% thought the experts had a high level of knowledge about the safety

Benefits



Melbourne Horticulture

- 57% thought that Melbourne would benefit greatly from the scheme

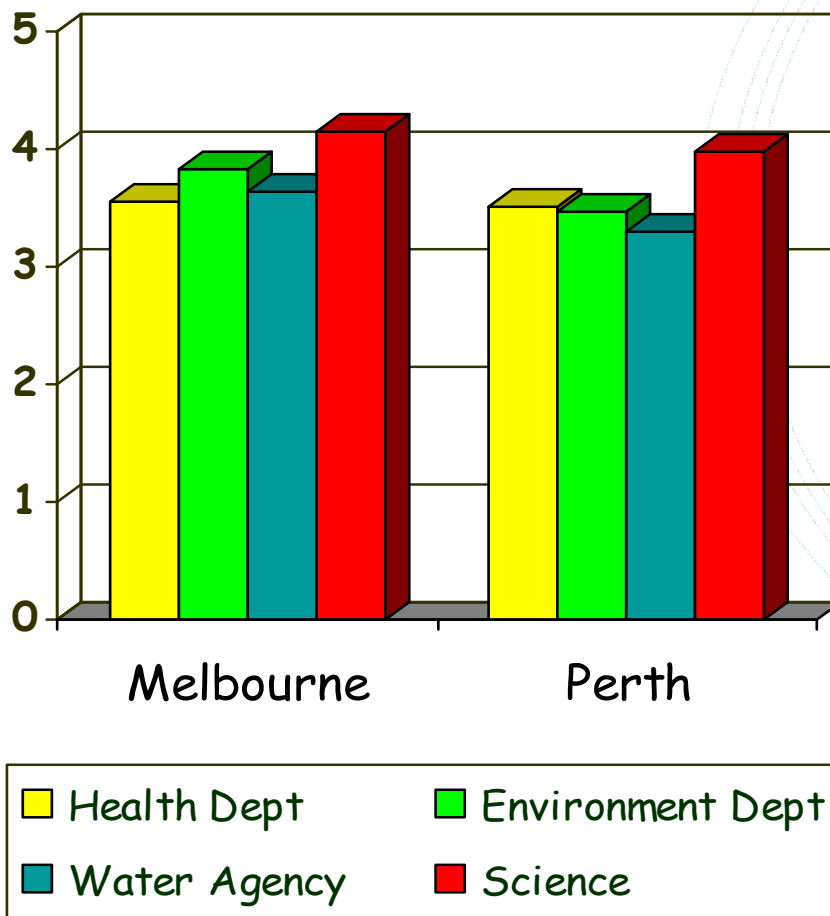
Perth Indirect Potable

- 61% thought that Perth would benefit greatly from the scheme

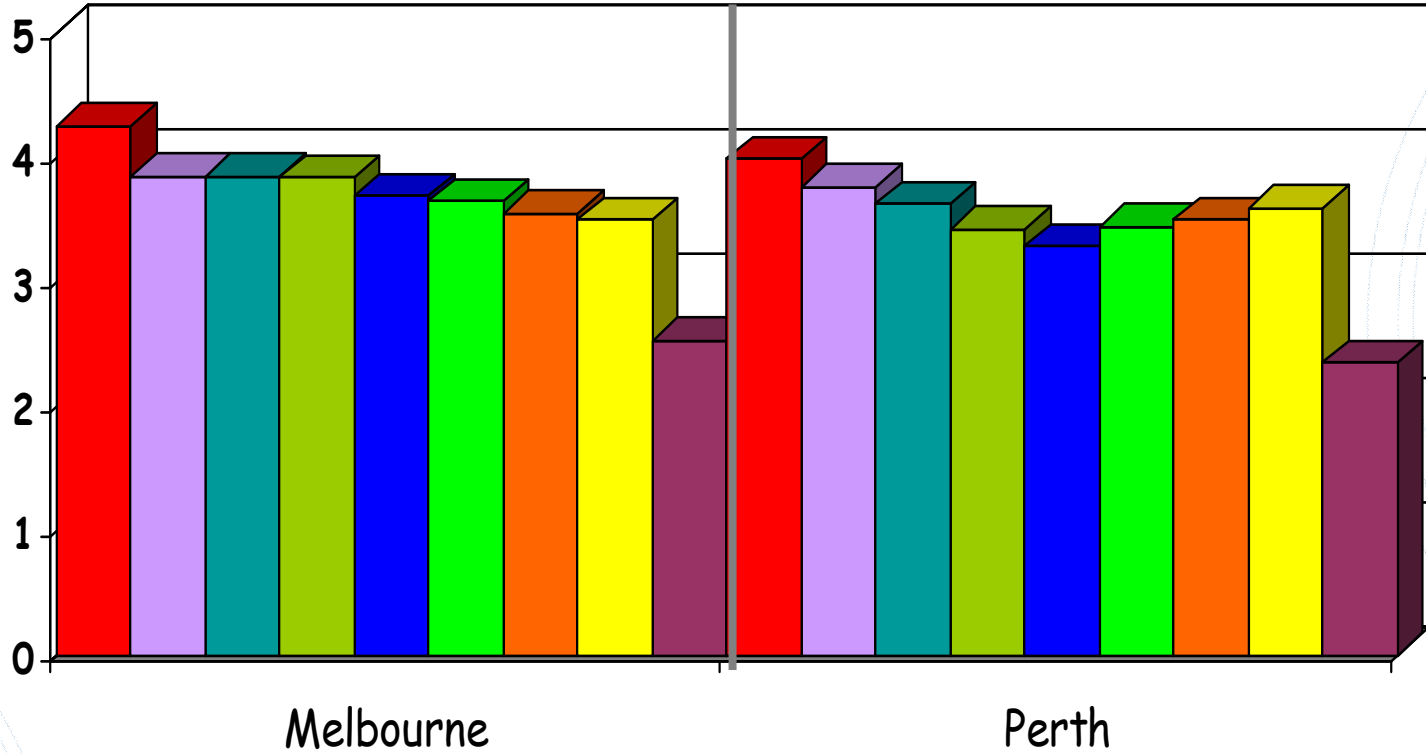
Trust



- How much do you trust
 - Health Dept. to ensure health and safety
 - Environment Dept. to ensure safety of environment
 - Water Agency to responsibly manage & monitor
 - Science and technology to produce safe recycled water



Trust to provide reliable information



- CSIRO
- Universities
- Medical doctors
- Environment Dept
- Water Agency
- Env groups
- Consumer groups
- Health Dept
- Private companies

Knowledge of the scheme



Melbourne Horticulture

- 36% said they had at least some knowledge

36% said they had NO knowledge at all

- 48% wanted more information

46% didn't want any more information

- 40% thought it was hardly important or not important at all to have information

Perth Indirect Potable

- 45% said they had at least some knowledge

36% said they had NO knowledge at all

- 72% wanted more information

24% didn't want any more information

- 17% thought it was hardly important or not important at all to have information

Would price make a difference?



Melbourne Horticulture

- Yes 41%
- Not sure 13%
- No 46%

Perth Indirect Potable

- Yes 17%
- Not sure 10%
- No 73%

Alternative potable



Would you consider drinking treated recycled wastewater in a scheme that did ***not pump into the underground aquifer first?***

- Yes 13%
- Not sure 43%
- No 44%

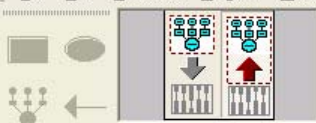
Compared with drinking recycled wastewater through the MAR scheme

- Yes 31%
- Not sure 51%
- No 18%

How long in the aquifer



- Length of time in the aquifer was important for non-discrimination between groundwater and recycled water (only 19% said it wouldn't make a difference)
- How long?
 - *23% trusted scientists to say*
 - *17% said 10 years*
 - *12% said 5 years*



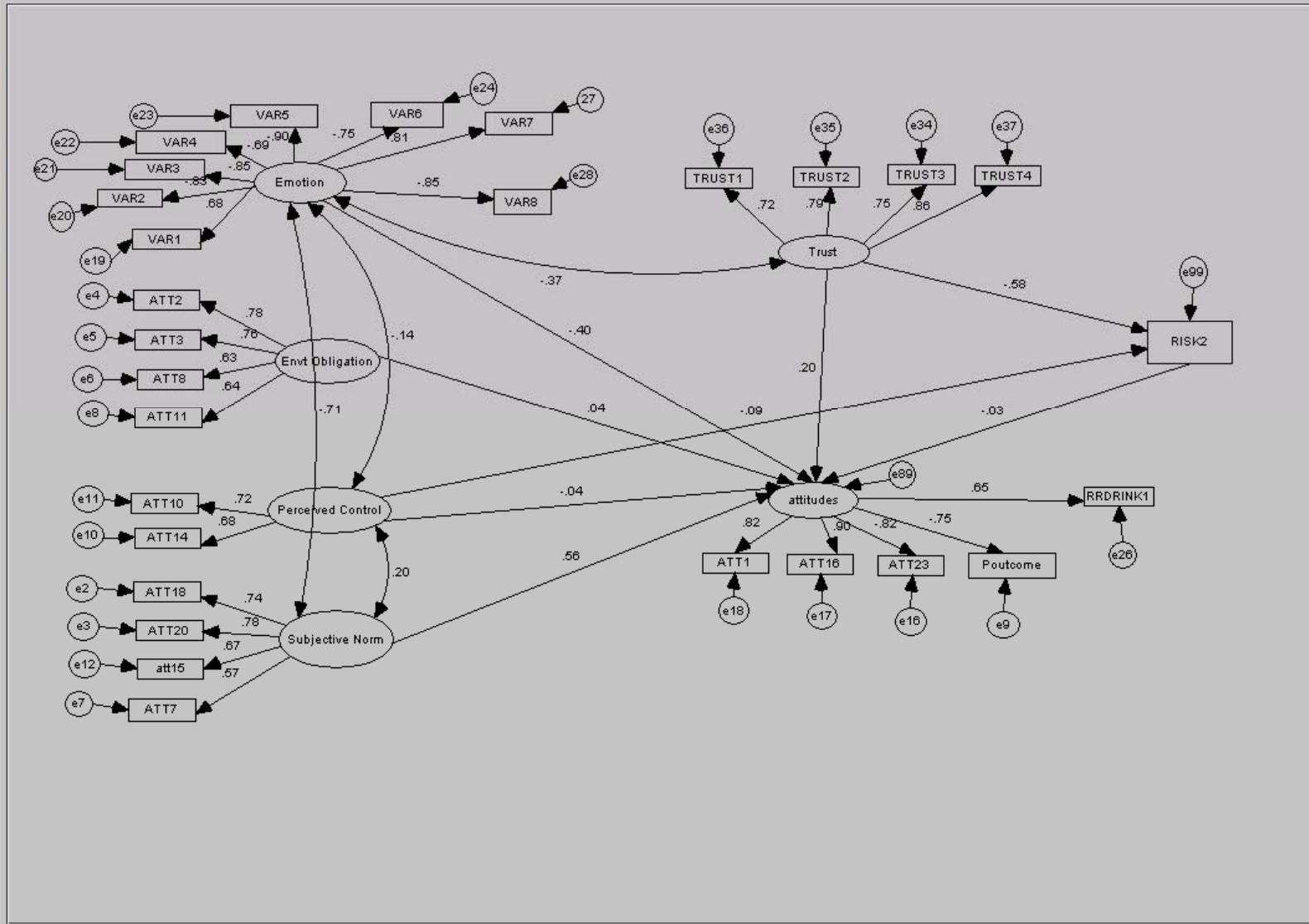
Group number 1

OK: Default model

Unstandardized estimate
Standardized estimates

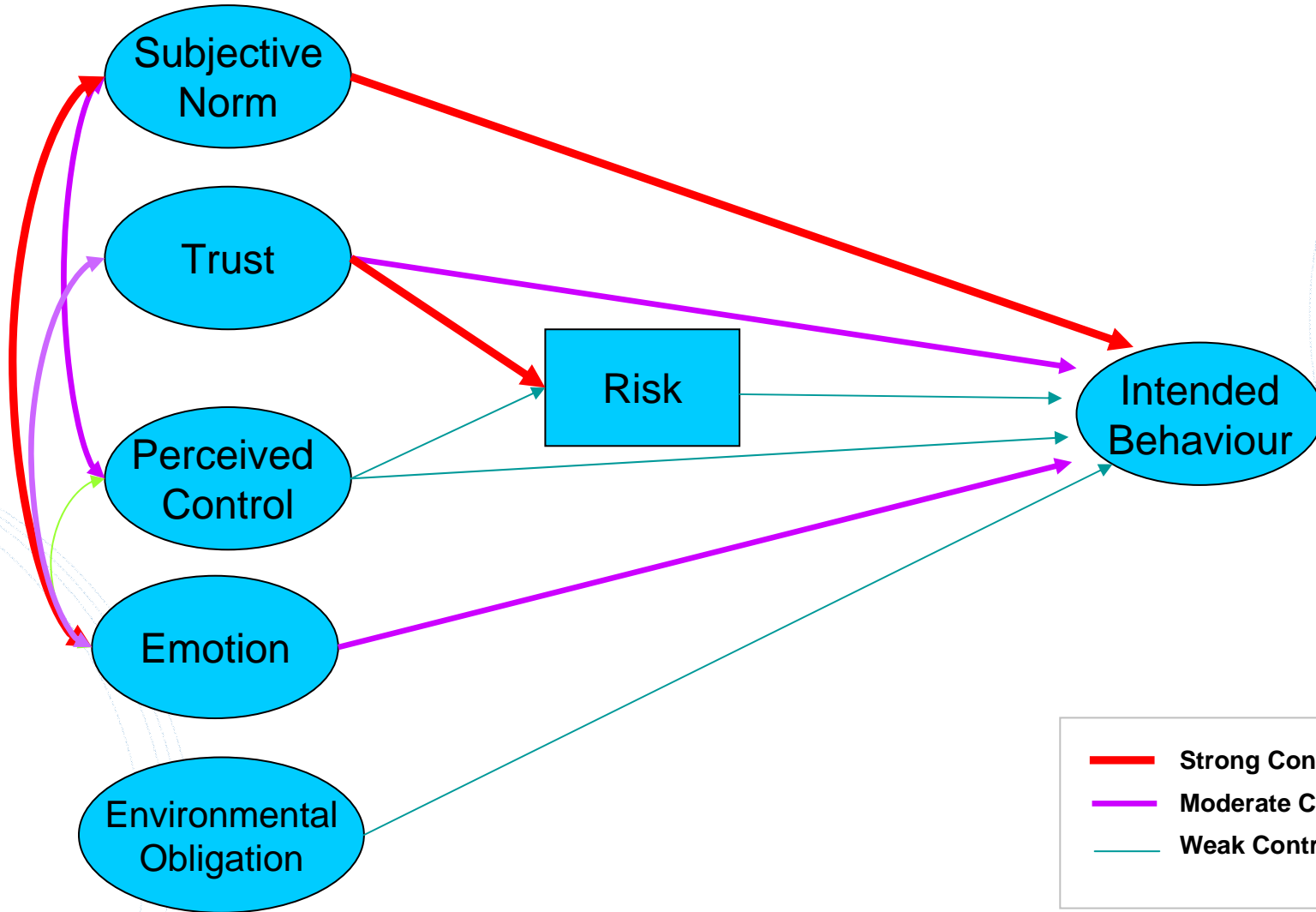
Chi-square = 1025.5
Finished

- 3A MODEL.amw
- 3b MODEL.amw
- 3c MODEL.amw
- 5g model.amw
- 5a model.amw
- 5b model.amw
- 5c model.amw
- 5d model.amw
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- 7i model.amw
- 7th model.amw
- fifth model - risk.amw
- final model.amw
- final model2.amw
- FOURTH.amw
- knowledge.amw
- original proposed mod
- original proposed mod
- possrisk.amw
- risk.amw
- second model.amw



ARCWIS MODEL OF COMMUNITY REUSE BEHAVIOUR

V 1.1 (2005)



- Strong Contribution** (Red line)
- Moderate Contribution** (Purple line)
- Weak Contribution** (Green line)

What does this mean?



- We now have a tool to understand the community's behavioural decisions for proposed reuse schemes
 - Identify the variables that will govern behaviour
 - Investigate the nature of those variables
 - *eg. What is meant by "trust" and how can we influence it?*
 - Structure community engagement around these issues
 - *Genuinely address the concerns*
 - *Don't try to persuade*
 - Re-measure at key stages in the program and revise community engagement to respond to changes

What does this mean?



- There will be no quick and easy way for the big issues, but understanding the community is essential
 - It is not just a matter of “bringing the community along”
- There may never be an answer to the “*yuck factor*”
 - Indirect potable might be the easiest form of reuse
 - The answer may need more creative thinking – a combination of sources and supply systems at different scales
- The future demands a partnership with the community
 - and time!!



Thank You



- The Report can be found at

http://www.clw.csiro.au/publications/consultancy/2005/WfHC_Predicting_Reuse_Behaviour.pdf

You can contact me at

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