Ecological Paradigms and Landscape Plantings Along Freeways - A Case Study From Melbourne, Australia

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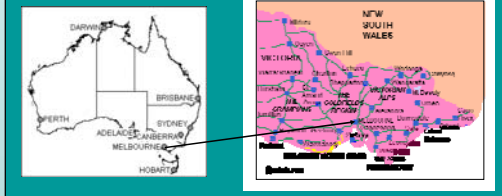


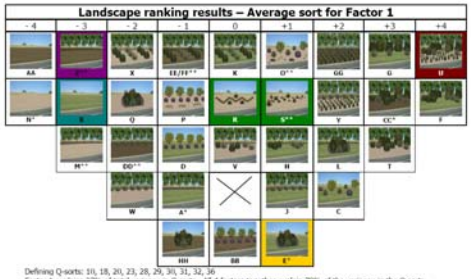
~3 million people in Melbourne
~5 million in state of Victoria

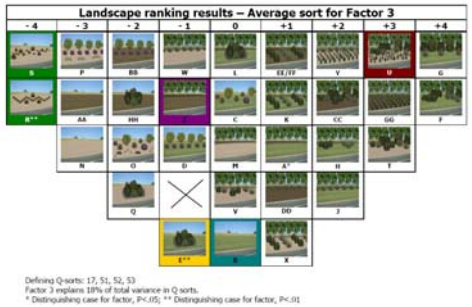
Typical roadside view:

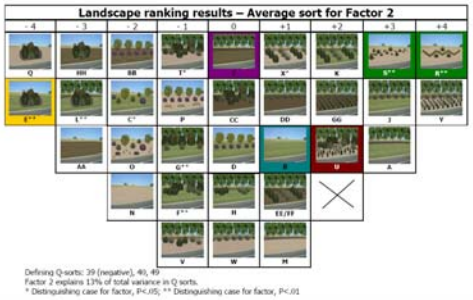
Plant migration and personal preferences – How are they connected?

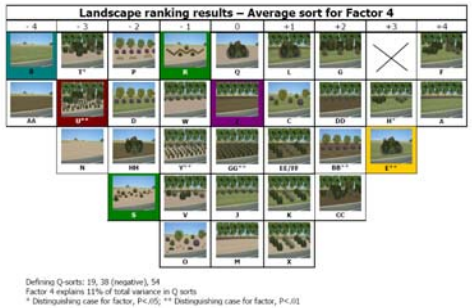
- Design and maintenance of roadside landscaping affects plant habitat
- Direct link between landscaping decisions and extant plant communities
- => coupled social-ecological system

Design Q-sort Factors









Factor Descriptions

Group 1: "Natural"

- 14 of 26 subjects fit type (Environmental officers, ecologists)
- Positive
  - -Denser vegetation
  - -Native Melbourne plants
  - -Higher species diversity
  - -Clumped or random
  - –"Attracts wildlife"
- Negative
  - – Bare foreground
  - – Regular spacing
  - –"Space for weeds"
- Neutral
  - – Groundcover type
  - – "Desert" designs
  - –"Garden" designs

Group 2: "Designed"

- 2 of 26 subjects fit type (Landscape architects)
- Positive
  - -"Desert" designs
  - -Native Melbourne plants
  - -"Scale of design"
  - -"High impact"
- Negative
  - – "Garden" designs
  - – Desert plants
- Neutral
  - – Regular vs. clumped spacing
  - –Species diversity

Group 3: "Gravel Haters"

- 4 of 26 subjects fit type (3 project managers, 1 ecologist)
- Positive
  - -Denser vegetation
  - -Native Melbourne plants
  - -Higher species diversity
  - -Grass (slight)
  - –"Attracts wildlife"
- Negative
  - – "Desert" design
  - – Desert plants
  - –"Garden" design
- Neutral
  - – Groundcover type
  - – Regular vs. clumped spacing

Group 4: "Easy Maintenance"

- 2 of 26 subjects fit type (Environmental officer, Project manager)
- Positive
  - -Grass
  - -Native Melbourne plants
  - -Regular spacing
- Negative
  - – Bare roadside
  - – Gravel
  - – Desert plants (slight)
- Neutral
  - – Mulch

Individuals

- Factors 2 and 4 each had one negative defining case

Q-Methodology

- Qualitative method for analyzing subjective opinions and preferences
- Consider individuals as subject rather than individual measurements ("bits of a person")
- Most common method is the Q-sort, where subjects are given a set of statements to arrange in order of degree of agreement

Overall Design

- Q-sorts of photos of plants and landscape designs (landscape designs shown here)
- New Ecological Paradigm Likert scale (range 1 to 5) of 15 statements
- Basic demographic data
- Personal interviews, group and mail surveys
- 26 Subjects:
  - –VicRoads enivronmental officers, landscape designers, and project managers
  - –Ecologists at Australian Research Centre for Urban Ecology

Concourse

- The set of statements or photos in a sort is called the concourse
- I modified a picture of a mainly bare roadside with a garden program to create the set of landscape designs
- Variables included:
  - Vegetation density
  - Plants native to Melbourne, or exotic
  - Known weeds
  - Ground cover type (gravel, mulch, grass)
  - Regular vs. random spacing
  - Designs of different scale and familiarity

Factor Analysis of Q-sorts

- Statistically analyze people's subjective opinions and preferences
- The factors group people with common preferences
- Use interview information to interpret the factors
- I used Principal Components Analysis (PCA) with manual rotation to extract four factors with eigenvalues >1

Results

What Does It Mean?

- Transportation professionals have very different training and preferences
- Each group manages a separate phase
- Ultimate results don't meet goals
- Greater collaboration may help maximize benefits

Next Steps

- Analysis of plant Q-sorts
- Analysis of NEP results
- Check for correlations between Q-sort results, demographic data, and NEP Likert scale

Future Research

- Interviews with Arizona subjects
- Comparison of Arizona and Victoria results
- Tie-in landscape design and maintenance with ecological data collected around Phoenix

Acknowledgments

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Consensus Items

Photos that did not distinguish between ANY pair of factors.

- Most liked mulch with shrubs and trees (+1 to +3)
- Didn't like gravel with desert-type trees and shrubs (-2 to -1)
- No one liked the plain gravel (-3 to -4)

Correlation Between Factor Scores

	1	2	3	4
1	1.0000	0.2218	0.6447	0.3457
2		1.0000	0.3195	0.0323
3			1.0000	0.3847
4				1.0000

Factor Characteristics

Factor	1	2	3	4
No. defining variables	10	3	4	3
Composite Reliability	0.976	0.923	0.941	0.923
S.E. of Factor Scores	0.156	0.277	0.243	0.277
Total Variance Explained	37%	13%	18%	11%