

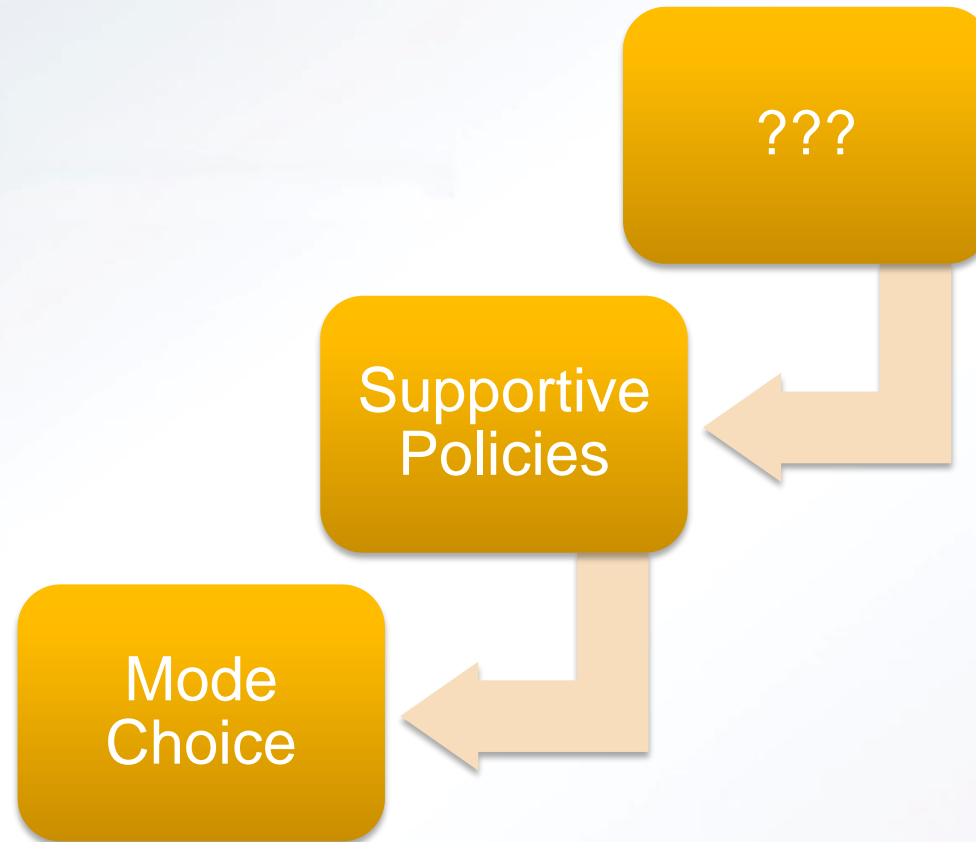
Leadership, Networks, and Windows of Opportunity: Exploring Decision Making through Bicycle Infrastructure at the Local Level

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Introduction



Purpose

- Why have some cities adopted [more] bicycle-supportive infrastructure, programs, and policies, while others have not?



Introduction

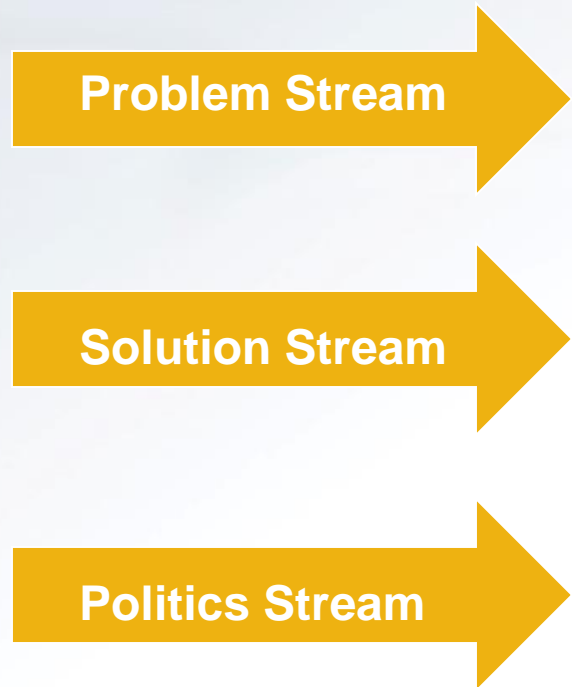
- Influential Actors?



Background – Policy Change

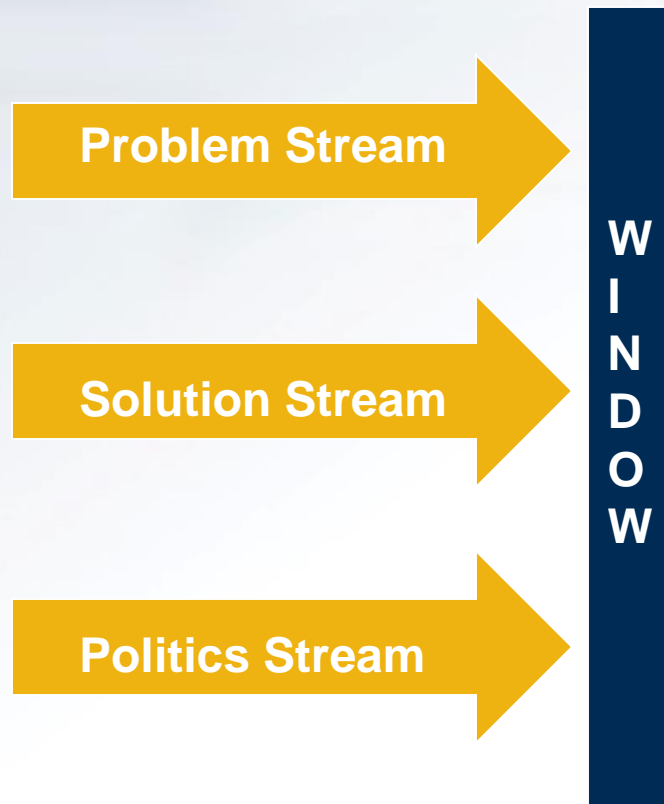
- All scales are important (Newhall 2013, York et al 2011), but local is home of most decision-making (Handy and McCann 2010)
- Non-governmental actors may be a factor in policy change (Wray 2008, Buehler and Pucher 2012a, Gaffron 2003).
- Transportation decision-making is highly path dependent (Hysing 2009, Low and Astle 2009, Bertolini 2007)
- Individual actors seem to play a major role in at least some cases (Handy and McCann 2010, Cole et al 2010, Wray 2008), as does the coordination of multiple actors (Pucher et al 2011, Buehler 2008).

Theory - Multiple Streams

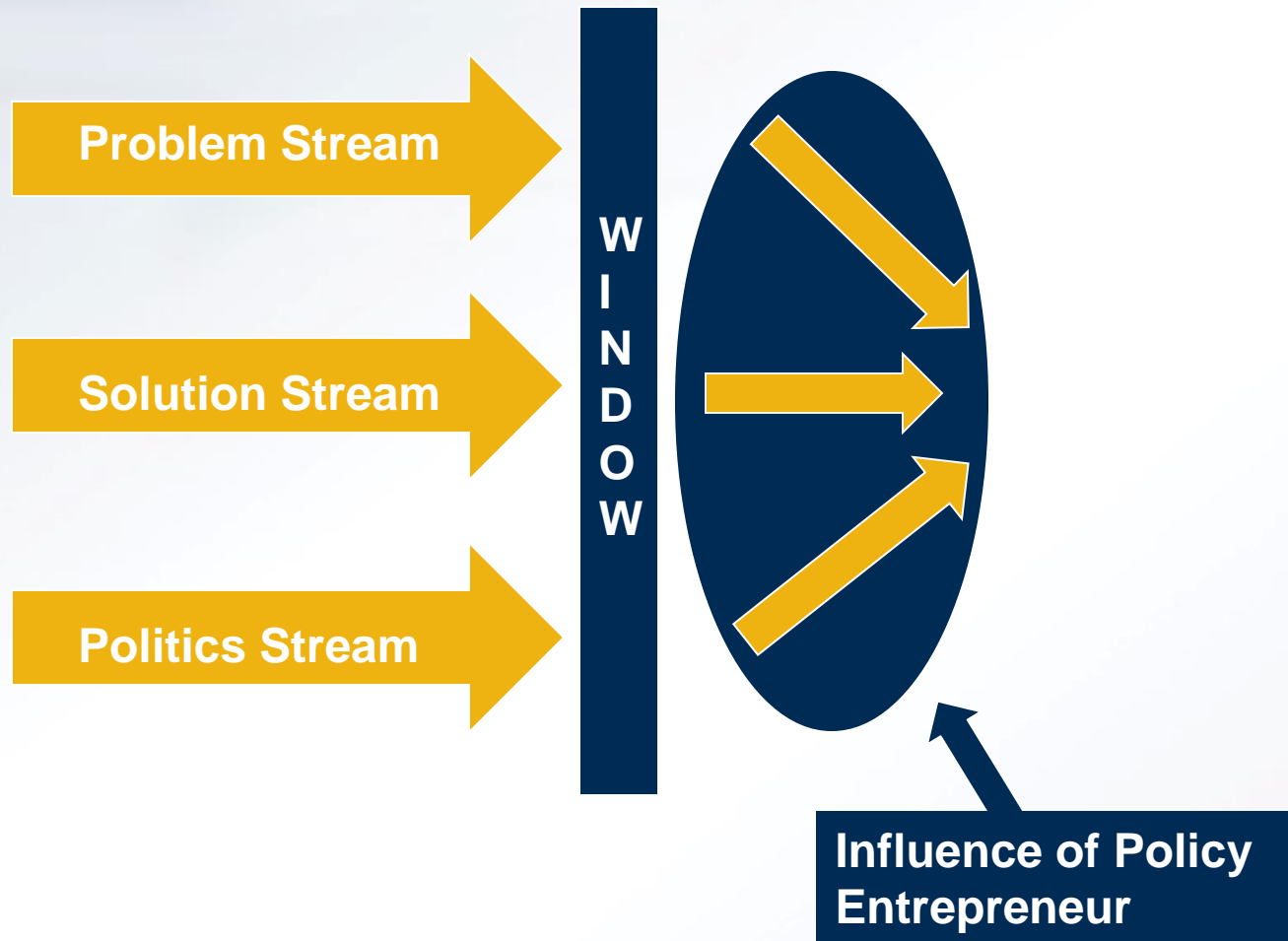


Change

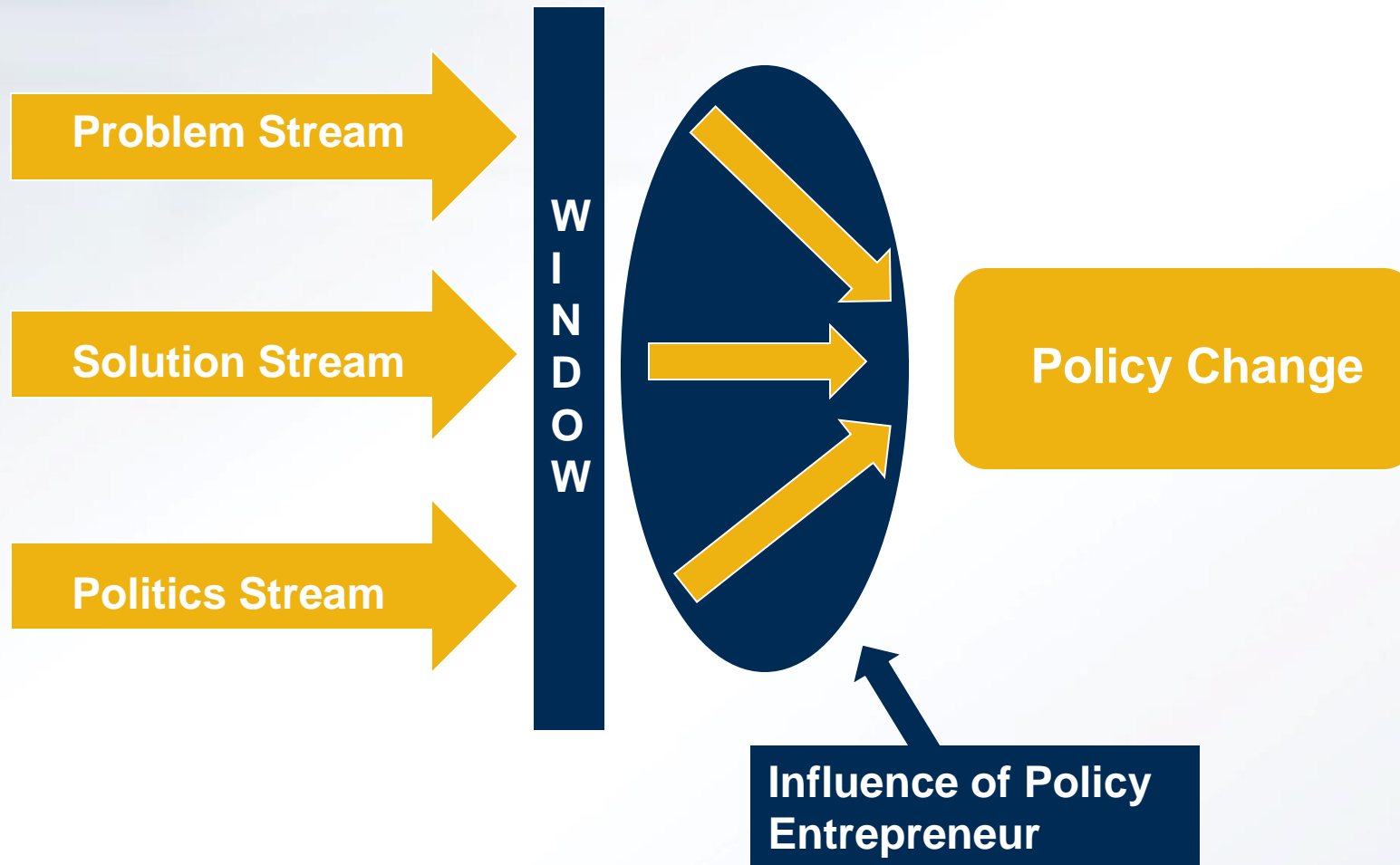
Theory - Multiple Streams



Theory - Multiple Streams



Theory - Multiple Streams



Research Questions

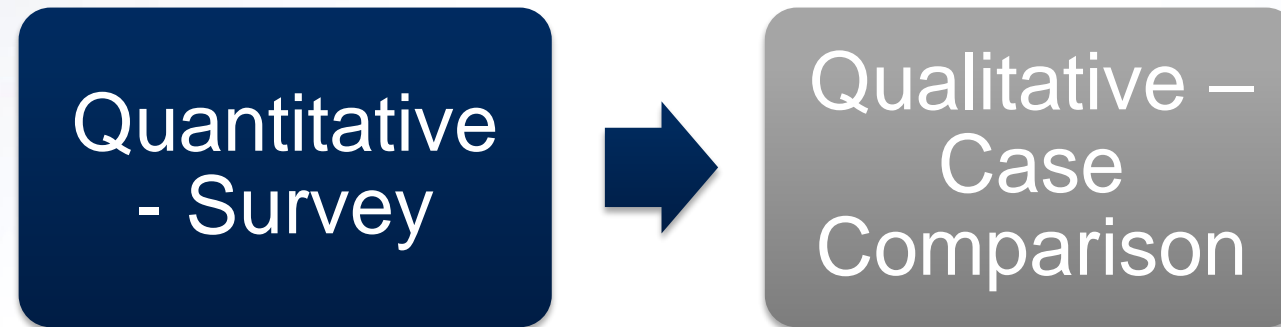
Research Questions

RQ1: Why is there such distinct variation in the implementation of bicycle infrastructure across municipal governments in the US?

RQ2: Are there factors consistently responsible for this variation?

Methods

Serial Mixed Methods (explanatory sequential design):



Quantitative Methods

- Sample: 200 most populous U.S. municipalities (as of 2013)
- Contacts identified through website or via email, confirmed via email and phone
 - Municipal staff identified as best contact for bicycle projects
 - Additional respondents identified via recommendation snowball sampling
- 195 total responses, 136 final cities included (46 cities had multiple responses) *68% response rate*

Dependent Variables

Dependent Variable	Variable Type	Variable Name	Source	Hypothesis
Consideration of protected/separated projects by city	Dichotomous	considerprotected	Survey	H1
Implementation of protected/separated projects by city	Dichotomous	implemprotected	Survey	H2
Implementation of bicycle projects by city	Dichotomous	implemented	Survey	H2
Level of bicycle infrastructure implementation	Ordinal	implementlevel	Survey	H3

Independent Variables

Variable	Type	Name	Variable	Type	Name
City Population	Continuous	city_pop	City "ideology" score	Continuous	Ideology_pos
City land area	Continuous	city_size	PE presence	Dichotomous	pe
Population Density	Continuous	pop_density	Window open (considered + supportive political)	Dichotomous	window
Percentage of population between 20 and 24 years of age	Continuous	perc_ya	Coupled streams (window is open and a PE is present)	Dichotomous	coupled
Median age	Continuous	med_age	Level of support	Ordinal	netsupport
Percentage of population that is white	Continuous	perc_white	Level of supportive is net positive	Dichotomous	possupport
Median income (2009-13 average)	Continuous	income	Problem shopping: air quality	Dichotomous	airquality
City tax revenue per capita	Continuous	taxes_capita	Problem shopping: congestion	Dichotomous	congestion
City expenditures per capita	Continuous	expenditures_capita	Problem shopping: cost of living	Dichotomous	costliving
Census region	Categorical	region_political	Problem shopping: economic compet.	Dichotomous	econcompete
Level of influence of local advocacy group	Ordinal	advoimpact	PE qualities: persistence, social acuity, networking, expertise, etc.	Dichotomous	Pe_persist, pe_savvy, etc.
PE is/was an: elected official	Dichotomous	peofficial			
PE is/was an: administrator	Dichotomous	pegov			

Analytical Tools

- H1 & H2 (Consideration and Implementation): Dichotomous Dependent Variables - Logistic Regression
- H3 (Level of Implementation): Ordinal Dependent Variable - Ordered Logistic Regression

Results

Results – H1 (Consideration)

- Consideration of Infrastructure
 - No variation (**100% of cities**)
- Consideration of Protected Infrastructure (82% of cities)
 - Likelihood Ratio chi-square: 46.11 (p=0.0012)
 - Pseudo R-square: 0.5145

Variable	Relationship	Significance level	Odds Ratio
PE Presence	(+)	.05	135.6
Advocacy Impact	(-)	.05	0.30
City pop.	(+)	0.1	1.00011
Ideology score	(-)	0.1	.013
Cost of living	(-)	0.1	.042
Job access	(+)	0.1	14.5

Results – H2 (Implementation)

- Implementation
 - Limited variation (95% of cities had implemented something)
 - Likelihood Ratio chi-square: 31.55 (p=0.0005)
 - Pseudo R-square: 0.649

Variable	Relationship	Significance level	Odds Ratio
Net support	(+)	.05	15.4
City pop.	(+)	0.1	1.00008

Results – H2 (Implementation)

- Implementation of Protected Infrastructure
 - 58% of cities had implemented
 - Likelihood Ratio chi-square: 49.5 (p=0.0004)
 - Pseudo R-square: 0.2898

Variable	Relationship	Significance level	Odds Ratio
Window	(+)	.05	6.08
City pop.	(+)	.05	1.000003

Results – H3 (Level of Implementation)

- Level of Implementation of Bicycle Infrastructure
 - Average implementation level = 5.16 (“some implementation”)
 - Likelihood Ratio chi-square: 24.18 (p=0.00)
 - Pseudo R-square: 0.2090

Variable	Relationship	Significance level	Odds Ratio
Window	(+)	.01	12.5
City pop	(+)	.01	1.000002
City size	(-)	.05	.997
Ideology	(-)	0.1	0.24
% White	(+)	0.1	1.02

Findings / Conclusions

H1 (consideration):

- PEs may play an important role in facilitating consideration of a policy proposal
- More populous cities are more innovative than smaller cities

H2 (implementation):

- Singular PEs are not enough to push discussion into implementation; broader support is a major component.
- Special opportunities (ideally with funding or political support attached) are a major boon
- Population -> Innovation

Findings / Conclusions

H3 (level of implementation):

- Singular PEs not enough
- Special opportunities are a major boon (*attach funding or support!*)
- Population -> Innovation
- Larger city = larger burden for implementation

Takeaways

- City population captures underlying factors that influence policy decision-making (e.g. **more populous cities have greater opportunity or need for innovation**)
- Opportunities are not necessary or sufficient but are a **major facilitator for policy action**
 - On this note, what appears to matter is the level of local support for projects (*removing window from the models makes level of support variables strongly significant*)

Takeaways

- If advocacy organizations are having a positive impact, it's captured here in other ways (problem discussions, local support)
- Being a successful policy entrepreneur means more than being present and championing a proposal – **creating windows and building networks of support is critical**

Questions & Contact

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Qualitative Methods – Case Study

- Cases selected from the quantitative results via Mahalanobis Matching (maximizing treatment spread across implementation level)

(Mahalanobis Distance, per Rubin (1973): a generalization of Euclidean distance that accounts for correlations between variables)

Qualitative Methods – Case Study

- Candidate pairs:

Mahalanobis Distance	City #1	City #2	Treatment Spread
3.42	Fresno	Joliet	5
3.44	Fresno	Shreveport	5
5.19	Amarillo	Fresno	5
6.33	Shreveport	Tampa	5
8.23	Joliet	Tampa	5
8.77	Dayton	Springfield	5
8.94	Joliet	Long Beach	5
9.12	Philadelphia	Springfield	5
10.14	Irvine	Joliet	5
10.16	Long Beach	Shreveport	5

Qualitative Methods – Case Study

- 6 cities selected:

City #1	City #2	Mahalanobis Distance	Treatment Spread
Fresno, CA	Joliet, IL	3.42	5
Tampa, FL	Shreveport, LA	6.33	5
Dayton, OH	Springfield, MA	8.77	5

Qualitative Methods – Case Study

City	Fresno	Joliet	Tampa	Shreveport	Dayton	Springfield
Implementation Level	7	2	7	2	7	2
Population	505882	148268	347645	201867	141359	153552
Size (sq.miles)	112	62.1	113.4	105.4	55.7	31.9
Median Age (years)	30	33.1	33.5	34.6	34.4	32.7
Percent White	30%	53%	46.3%	40%	50.5%	36.7%
Ideology score	0.995	1.08	.838	1.10	.754	.482
Window	0	0	1	0	1	0
Income	42015	61744	43242	38633	28456	34311
Expenditures per capita	\$1,286	\$1,435	\$1,844	\$1,437	\$1,312	\$3,296
Net support	0	1	3	0	4	3
PE	1	1	1	1	1	1

Case Comparison

City	City #1	City #2	City #3	City #4	City #5	City #6
Policy Entrepreneur(s):	<ul style="list-style-type: none"> • Citizen advocate • City staff person 	None	<ul style="list-style-type: none"> • Mayor • City staff person • Regional gov't staff person • Citizen advocates 	<ul style="list-style-type: none"> • County commissioner 	<ul style="list-style-type: none"> • Mayor (former city commissioner) • City staff person 	<ul style="list-style-type: none"> • Regional gov't staff person • City staff person (opponent of bicycle projects)
PE qualities:	<ul style="list-style-type: none"> • Expertise, • persistence, • create opportunities 	N/A	<ul style="list-style-type: none"> • Relationship building, • expertise, • vocal 	<ul style="list-style-type: none"> • Relationship building, • vocal, • create opportunities 	<ul style="list-style-type: none"> • Vocal • create opportunities 	<ul style="list-style-type: none"> • Create opportunities, • expertise, • persistence
City policy:	<ul style="list-style-type: none"> • Developers required to provide facilities 	<ul style="list-style-type: none"> • Housing developments required to build trails 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Complete Streets Policy 	<ul style="list-style-type: none"> • Complete Streets Policy
Status/Level of consideration:	<ul style="list-style-type: none"> • Bike master plan • Protected/separated projects planned 	<ul style="list-style-type: none"> • Recently begun considering • Only trail planning to-date 	<ul style="list-style-type: none"> • Have a guiding list for projects • Plans for protected facilities 	<ul style="list-style-type: none"> • Very little at the city • County and MPO are starting to do planning 	<ul style="list-style-type: none"> • Bike master plan • Plans to tap into trail system 	<ul style="list-style-type: none"> • Bike master plan
Other factors:	<ul style="list-style-type: none"> • PE pushed too hard, damaged relationships • Older parts of city are narrow and tough 	<ul style="list-style-type: none"> • Older parts of city are narrow and tough. 	<ul style="list-style-type: none"> • Parties looking for better guidance documents, etc. 	<ul style="list-style-type: none"> • Starting to see larger trends toward livability and urban development reach the city 	<ul style="list-style-type: none"> • History of trail network, big resource to tap into 	<ul style="list-style-type: none"> • Lack of understanding of how to implement projects within existing tasks (resurfacing, etc.)

Qualitative Methods – Case Study

- Semi-structured interviews (30-90 min) with city staff and other knowledgeable actors (snowball sampling to produce minimum of 3 contacts per city)
- Final interview participants included city staff, regional (MPO) staff, advocacy organization staff, and/or non-affiliated citizens (total of 20 interviews)

Qualitative Methods – Case Study

- Interview responses were combined into inter-subjective case reports
- Each participant had the chance to review and provide input/edits/feedback on the draft case report and subsequent updates

Case Comparison

City	Fresno	Joliet	Tampa	Shreveport	Dayton	Springfield
Window:	<ul style="list-style-type: none"> Local sales tax measure 	<ul style="list-style-type: none"> Trail network built when region had revenue (late 90s) 	<ul style="list-style-type: none"> New Mayor and staff together broke standoff between staff & advocates 	<ul style="list-style-type: none"> No window, though the county commissioner has been trying 	<ul style="list-style-type: none"> Training workshops around a plan update 	<ul style="list-style-type: none"> Large grant to fund coordinator, plan, committee, and projects
Coupling of streams:*	Some/yes/yes	No / No / No	Some / Yes / Somewhat	No / No / No	Some / Beginning to be / Yes	No / Yes / No
Problem Priorities:	<ul style="list-style-type: none"> Air quality Sustainability Economic competitiveness 	<ul style="list-style-type: none"> Economic competitiveness Attract/retain 	<ul style="list-style-type: none"> Economic competitiveness Attract/retain 	<ul style="list-style-type: none"> Equity Economic competitiveness Livability 	<ul style="list-style-type: none"> Economic competitiveness Attract/retain 	<ul style="list-style-type: none"> Public health Air quality Safety
Policy Entrepreneur(s):	<ul style="list-style-type: none"> Citizen advocate City staff person 	None	<ul style="list-style-type: none"> Mayor City staff person Regional staff Citizens 	<ul style="list-style-type: none"> County commissioner 	<ul style="list-style-type: none"> Mayor (former city commissioner) City staff person 	<ul style="list-style-type: none"> Regional gov't staff person City staff opponent
Local support:	<ul style="list-style-type: none"> Neutral officials, supportive staff 	<ul style="list-style-type: none"> Supportive staff 	<ul style="list-style-type: none"> Supportive officials and staff 	<ul style="list-style-type: none"> Ambivalence at best 	<ul style="list-style-type: none"> Supportive officials and staff 	<ul style="list-style-type: none"> Neutral
Status/level of implementation:	<ul style="list-style-type: none"> Expanding network Large in scale but disconnected 	<ul style="list-style-type: none"> Regional trail network Disconnected No on-street facilities 	<ul style="list-style-type: none"> Medium network of on-street facilities Some innovative projects Bike share 	<ul style="list-style-type: none"> One multi-use trail segment A few shared lane markings 	<ul style="list-style-type: none"> Regional trail network Growing On-street network Opportunistic implementation Bike share 	<ul style="list-style-type: none"> One multi-use trail segment One on-street bike lane & some shared lane markings

*problem agreement? / Bicycling viewed as solution? / Supportive context?

Case Comparison

City	City #1	City #2	City #3	City #4	City #5	City #6
Role of funding:	<ul style="list-style-type: none"> • Outside funding creates its own support • Funding is biggest barrier 	<ul style="list-style-type: none"> • Funding is major barrier • Bike projects not a priority 	<ul style="list-style-type: none"> • Constrains the selection and timeline of projects • Major barrier to protected projects 	<ul style="list-style-type: none"> • Funding is major barrier • External funding would help create its own support 	<ul style="list-style-type: none"> • Constrains the selection and timeline of projects • Outside funding creates its own support 	<ul style="list-style-type: none"> • Funding is major barrier • Outside funding creates its own support
Network:	<ul style="list-style-type: none"> • Bicycle advisory committee 	<ul style="list-style-type: none"> • Trail organization 	<ul style="list-style-type: none"> • Bicycle advisory committee 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Bicycle advisory committee 	<ul style="list-style-type: none"> • Bicycle advisory committee
State/regional support:	<ul style="list-style-type: none"> • Support and signal from state DOT 	<ul style="list-style-type: none"> • DOT starting to put pressure on for bike projects, not totally bought in yet 	<ul style="list-style-type: none"> • MPO major influence • Fed pressure is helping 	<ul style="list-style-type: none"> • Regional support and county support have been important 	<ul style="list-style-type: none"> • MPO major influence • State has not yet joined in vision 	<ul style="list-style-type: none"> • State has provided pressure and resources to build projects
Advocacy:	<ul style="list-style-type: none"> • Small group of active and organized residents 	<ul style="list-style-type: none"> • Regional advocacy org, limited local presence 	<ul style="list-style-type: none"> • Limited organized advocacy • Involved citizens 	<ul style="list-style-type: none"> • Disorganized citizen advocates 	<ul style="list-style-type: none"> • Growing advocacy voice • Citizens involved. 	<ul style="list-style-type: none"> • State advocacy org, limited local presence • No involved citizens