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Supplemental Material

Correlates of the Built Environment and Active Travel: Evidence from 20 US Metropolitan Areas

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Table S1. Count data by metropolitan area, season, and count method

Metropolitan Area	Bicycle Count		Pedestrian Count		Level of aggregation[d]	Hour(s)	Year(s)	Number of years	Count Method	Date of Access from Google Earth
	Non-fall	Fall[c]	Non-fall	Fall						
Blacksburg, VA[a]		202		144	Disaggregate	7-9AM, 5-7PM	2015	1	Automated	N/A. Reported in the count database
Boston, MA	162	84	44	25	Aggregate	7-9AM, 5-7PM	1999-2015	17	Manual	1-2/2017
Champaign Urbana, IL[b]		660		242	Aggregate	7-9AM, 5-7PM	2011-2016	6	Manual	3/2017
Cleveland, OH	51	82	51	81	Aggregate	5-7PM	2011-2014	4	Manual	N/A. Reported in the count database
Columbus, OH	237	220	237	220	Aggregate	7-9AM	2005-2016	12	Manual	2/2017
Denver, CO[a]	79	122			Aggregate	7-9AM, 4-6PM	2015	1	Manual	3/2017
Hartford, CT		76		76	Aggregate	4-6PM	2015-2016	2	Manual	3/2017
Lawrence, KS[a]		109		109	Aggregate	5-7PM	2012-2016	5	Manual	3/2017
Los Angeles, CA	199	1,870			Disaggregate	7-9AM, 5-7PM	2008-2016	9	Manual	3/2017
Madison, WI[b]	265	381	66	146	Aggregate	7-9AM, 4-6PM	2010-2016	7	Manual & Automated	5/2017
Manhattan, KS[a]		112		112	Aggregate	4-6PM	2014-2016	3	Manual	5/2017
Minneapolis, MN[a]		950		950	Aggregate	4-6PM	2007-2014	8	Manual	N/A. Reported in the count database
New York City, NY[a]	43		2,303	2,044	Disaggregate	7-9AM, 5-7PM	2006-2016	11	Manual	N/A. No bicycle count data.
Philadelphia, PA[b]	443	384	308	327	Disaggregate	7-9AM, 5-7PM	2010-2016	7	Automated	3/2017
Portland, OR		91		91	Disaggregate	4-6PM	2008-2009	2	Manual	4/2017
San Francisco, CA[a]		1,554		80	Disaggregate	4-6PM	2006-2015	10	Manual & Automated	5/2017
Seattle, WA		608		610	Disaggregate	7-9AM, 4-6PM	2010, 2015	2	Manual & Automated	8/2017
St Louis, MO		142		238	Aggregate	5-7PM	2012-2015	4	Manual	5/2017
Tucson, AZ[a]		2,126	92	2,149	Disaggregate	7-9AM, 4-6PM	2006-2015	10	Manual & Automated	8/2017
Washington, DC[a b]	851	128	62	20	Disaggregate	7-9AM, 4-6PM	2008-2016	9	Manual & Automated	8/2017
Total	**2,330**	**9,901**	**3,163**	**7,664**			**1999-2016**	**18**		

[a] Jurisdictions where counts were mostly collected in the central city.
[b] Jurisdictions where traffic was counted in each direction. The remainder were bidirectional (i.e., screenline count), or all directions (i.e., intersection count).
[c] Fall includes August to November. Non-fall includes all other months.
[d] Aggregate level: count data received in 2-hour period at the time of acquisition. Disaggregate level: count data received in 15-minute intervals at the time of acquisition.

Note: Data were derived from raw traffic count data obtained from each jurisdiction or from the National Bicycle and Pedestrian Documentation Project (NBPDP) from 1999 to 2016. For coding bicycle facilities, all count locations were cross-checked with multiple databases (e.g., shapefiles, Google Maps, Google Street View's historical views) in addition to Google Earth.

Table S2. Number of bicycle and pedestrian count locations by peak-period and location type (fall counts only)

MSAs	Bicycle				Pedestrian			
	AM Seg.	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
Blacksburg, VA	101	101			72	72		
Boston, MA	26	27	3	4	7	7	4	3
Champaign Urbana, IL	255	255	64	64			120	120
Cleveland, OH		54				54		
Columbus, OH	36		4		36		4	
Denver, CO			47	73				
Hartford, CT	1	11	3	58	1	11	3	58
Lawrence, KS		70				70		
Los Angeles, CA	400	315	336	363				
Madison, WI	29	28	15	68	29	28		
Manhattan, KS				68				68
Minneapolis, MN		469				469		
New York City, NY					114	114		
Philadelphia, PA	158	158			129	134		
Portland, OR		36		28		36		28
San Francisco, CA		326		87				45
Seattle, WA	16	5	254	249	16	5	256	249
St Louis, MO				44				76
Tucson, AZ	2	2	489	493	1	1	583	577
Washington, DC	52	52	10	10			10	10
Total	**1,076**	**1,909**	**1,225**	**1,609**	**405**	**1,001**	**980**	**1,234**

Abbreviations: Morning count at street segment (AM Seg.); Afternoon count at street segment (PM Seg.); Morning count at intersections (AM Int.); Afternoon count at street intersection (PM Int.). Afternoon intersection model (PM Int.). Morning peak period is 7-9AM. Afternoon peak period is 5-7PM or 4-6PM. Data were derived from raw traffic count data obtained from each jurisdiction or from the National Bicycle and Pedestrian Documentation Project (NBPDP) from 1999 to 2016. Fall includes August to November.

Table S3. Direct-demand model results for bicycle and pedestrian volumes in 20 US metropolitan areas (with unstandardized coefficients) [a]

Independent variable	Bicycle Models				Pedestrian Models			
	AM Seg.	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
Water and green space (ha)	0.02 (300m)	0.04 (200m)	0.02 (400m)	0.01 (500m)	-0.06 (300m)			0.03 (500m)
Household density (thousand households/km^2)					0.05 (1000m)			0.04 (1000m)
Total number of jobs (thousand jobs)		0.004 (300m)	0.002 (300m)	0.005 (200m)	0.01 (400m)		0.04 (500m)	0.03 (400m)
University/college campus (ha)			0.02 (400m)	0.04 (300m)		0.01 (500m)		0.06 (300m)
Off-street bike facility	1.52	1.15	0.19	0.16				
On-street bike facility	0.49	0.47	0.06	0.09				
Minor bike facility			0.06	0.07				
Intersection density (miles/sq mile)		0.001 (400m)		0.01 (2500m)		0.01 (750m)		0.01 (1500m)
Multimodal network density (miles/sq mile)	0.47 (3000m)	0.02 (100m)	0.13 (3000m)	0.04 (500m)	0.01 (100m)	0.01 (100m)		0.08 100m)
Local road (km)	-0.004 (3000m)	-0.10 (200m)				0.02 (1250m)	0.01 (2000m)	0.03 (750m)
Bike commute mode share (%)	0.11 (750m)	0.09 (1000m)	0.09 (3000m)	0.05 (750m)	-	-	-	-
Walking commute mode share (%)	-	-	-	-		0.02 (100m)	0.04 (100m)	0.02 (400m)
Transit stops	-	-	-	-	0.01 (400m)	-0.002 (3000m)	0.11 (100m)	0.12 (100m)
Transit commute mode share (%)	-	-	-	-	-0.09 (3000m)			-0.05 (3000m)
Zero-car households (thousand households)	0.08 (1000m)			2.57 (100m)		0.04 (3000m)		9.49 (100m)
Income (thousand dollars)	0.01 (3000m)	-0.002 (1000m)	0.01 (2500m)		-0.01 (2000m)			-0.01 (100m)
Population below 18 years old			-0.04 (3000m)	-0.01 (500m)				
Population 19-45 years old		0.01 (500m)				0.01 (100m)		
Population 45-65 years old	-0.03 (100m)		-0.02 (500m)	-0.01 (100m)	-0.01 (100m)	0.02 (100m)		
Population above 65 years old	-0.02 (500m)	0.01 (100m)	-0.01 (100m)	-0.01 (300m)		0.02 (3000m)		
Temperature	0.01	-0.01			0.02			
Precipitation	-0.12			0.11				
Year dummies								
Year 2005	-0.59	-0.56						
Year 2006	-1.14	-0.27						
Year 2007	-0.68			0.38				
Year 2009		-0.29						
Year 2010	-0.32			0.19	-0.35			
Year 2011	-0.57			0.24				
Year 2012	-0.64	0.22		0.16				
Year 2013			-0.26	-0.13				-0.14
Year 2014		0.31	-0.24	-0.14				
Year 2015				-0.63	-0.84	-1.01		
Midwest region			0.95	0.92				
Northeast region		-0.81				0.92		0.70
Ohio Valley		-0.46	-0.71				-0.85	-0.28
South region						-0.91		
Southeast region		-2.04						
Southwest region			0.99					
West region	0.34		1.07	0.53				

Independent variable	Bicycle Models				Pedestrian Models			
	AM Seg.	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
N	**1,126**	**3,279**	**1,915**	**2,533**	**1,545**	**2,526**	**1,202**	**1,657**
Adj-R^2	**0.50**	**0.46**	**0.49**	**0.61**	**0.61**	**0.72**	**0.42**	**0.60**
MSAs [b]	BBG, BOS, COL, LA, MAD, PHI, SEA, TUC, DC	BBG, BOS, CLE, HAR, LAW, LA, MAD, MIN, PHI, POR, SF, SEA, TUC, DC	BOS, CU, COL, HAR, LA, MAD, SEA, TUC, DC	BOS, DEN, HAR, LA, MAD, MAN, POR, SF, SEA, STL, TUC, DC	BBG, BOS, COL, HAR, MAD, NYC, PHI, SEA, TUC	BBG, BOS, CLE, HAR, LAW, MAD, MIN, NYC, PHI, POR, SF, SEA, TUC	BOS, CU, COL, HAR, SEA, TUC, DC	BOS, CU, HAR, LAW, MAN, POR, SF, SEA, STL, TUC, DC

[a] Buffer sizes are shown in parentheses. All dependent variables were log-transformed. All independent variables were significant at $p < 0.05$ level. Reference year is 1999, reference climate region is Northwest. Insignificant years and regions were not shown in the table. Units are included in the list of independent variables in Table 1 in the main text. Model abbreviations: Morning segment model (AM Seg.); Afternoon segment model (PM Seg.); Morning intersections model (AM Int.); Afternoon intersection model (PM Int.). Afternoon intersection model (PM Int.). Morning peak period is 7-9AM. Afternoon peak period is 5-7PM or 4-6PM.

[b] City abbreviations: Blacksburg (BBG), Boston (BOS), Champaign-Urbana (CU), Cleveland (CLE), Columbus (COL), Denver (DEN), Hartford (HAR), Lawrence (LAW), Los Angeles (LA), Madison (MAD), Manhattan (MAN), Minneapolis (MIN), New Your City (NYC), Philadelphia (PHI), Portland (POR), San Francisco (SF), Seattle (SEA), St Louis (STL), Tucson (TUC), Washington DC (DC). Champaign-Urbana (CU) was excluded from the PM Intersection model because its count dates were unknown, thus we did not have weather variables for this MSA.

Table S4. Correlation analysis of variables included in the core models

Bicycle AM Segment

	lnbike	Greenwat_300	OffStreetSeg	OnStreetSeg	D3amm_3000w	Rd_lc3000	Bikep_750	Car0_1000	Inc_3000w	A65p_100w	AXp_500w	temp_ss	prcp_ss
lnbike	1												
greenwat_300	0.10	1											
OffStreetSeg	0.17	0.24	1										
OnStreetSeg	0.13	-0.08	-0.14	1									
D3amm_3000w	0.37	0.00	-0.24	0.05	1								
Rd_lc3000	0.17	-0.12	-0.29	0.07	0.77	1							
Bikep_750	0.33	0.10	0.00	0.00	0.05	-0.02	1						
Car0_1000	0.23	-0.11	-0.19	0.07	0.57	0.68	0.08	1					
Inc_3000w	0.03	0.02	0.25	-0.04	-0.23	-0.21	-0.33	-0.06	1				
A65p_100w	-0.20	-0.01	0.09	0.02	-0.14	-0.14	-0.33	-0.10	0.34	1			
AXp_500w	0.10	0.40	0.21	-0.02	0.00	-0.12	0.07	-0.05	0.16	0.16	1		
temp_ss	0.05	-0.05	0.01	0.06	0.15	0.13	-0.41	0.03	0.14	0.02	-0.01	1	
prcp_ss	-0.28	-0.07	0.12	0.00	-0.47	-0.27	0.05	-0.24	-0.05	-0.25	-0.15	-0.02	1

Bicycle PM Segment

	lnbike	Greenwat_200	EmpTot_300	OffStreetSeg	OnStreetSeg	D3b_400w	D3amm_100w	Rd_lc200	Bikep_1000	Inc_1000w	A45p_500w	AXp_100w	temp_ss
lnbike	1												
greenwat_200	0.09	1											
EmpTot_300	0.46	-0.11	1										
OffStreetSeg	0.16	0.24	-0.19	1									
OnStreetSeg	0.23	-0.10	0.17	-0.19	1								
D3b_400w	0.34	0.09	0.48	-0.15	0.13	1							
D3amm_100w	0.23	-0.08	0.46	-0.16	0.10	0.30	1						
Rd_lc200	0.12	-0.35	0.39	-0.31	0.13	0.43	0.30	1					
Bikep_1000	0.36	-0.06	0.25	-0.04	0.17	0.23	-0.01	0.19	1				
Inc_1000w	0.02	0.09	0.13	-0.02	0.05	0.18	0.09	0.14	0.06	1			
A45p_500w	0.22	0.00	0.26	-0.07	0.11	0.25	0.04	0.05	0.32	-0.14	1		

Bicycle PM Segment

	lnbike	Greenwat _200	EmpTot _300	OffStreet Seg	OnStreet Seg	D3b _400w	D3amm _100w	Rd_lc 200	Bikep _1000	Inc _1000w	A45p _500w	AXp _100w	temp_ss
AXp_100w	0.00	0.13	0.08	0.05	-0.08	-0.02	0.08	-0.02	-0.16	0.09	-0.50	1	
temp_ss	-0.02	0.01	-0.08	0.04	0.00	-0.04	-0.04	-0.09	-0.12	-0.10	0.06	-0.03	1

Bicycle AM Intersection

	lnbike	Greenwat _400	EmpTot _300	Uni _400	OffStreet Int	OnStreet Int	MinorFacil Int	D3amm _3000w	Bikep _3000	Inc _2500w	A18p _3000w	A65p _500w	AXp _100w
lnbike	1												
greenwat_400	0.14	1											
EmpTot_300	0.30	-0.01	1										
Uni_400	0.27	-0.14	0.08	1									
OffStreetInt	0.20	0.40	-0.06	-0.05	1								
OnStreetInt	-0.03	-0.10	-0.27	-0.05	-0.19	1							
MinorFacilInt	0.08	-0.06	0.10	-0.02	-0.05	-0.08	1						
D3amm_3000w	0.28	-0.02	0.59	-0.02	-0.06	-0.28	0.08	1					
Bikep_3000	0.49	0.01	0.30	0.46	0.07	-0.14	0.15	0.25	1				
Inc_2500w	-0.08	0.04	0.06	-0.22	-0.05	-0.01	-0.10	-0.03	-0.52	1			
A18p_3000w	-0.42	-0.16	-0.39	-0.28	-0.08	0.14	-0.04	-0.18	-0.45	0.06	1		
A65p_500w	-0.27	-0.01	-0.14	-0.61	-0.05	0.11	-0.06	-0.03	-0.54	0.47	0.21	1	
AXp_100w	-0.11	0.17	-0.20	-0.31	0.12	0.13	-0.07	-0.21	-0.26	0.13	-0.11	0.15	1

Bicycle PM Intersection

	lnbike	Greenwat _500	EmpTot _200	Uni _300	OffStreet Int	OnStreet Int	MinorFacil Int	D3b _2500w	D3amm _500w	Bikep _750	Car0 _100	A18p _500w	A65p _100w	AXp _300w	prcp_ss
lnbike	1														
greenwat_500	0.19	1													
EmpTot_200	0.49	0.00	1												
Uni_300	0.26	-0.10	-0.02	1											
OffStreetInt	0.14	0.31	-0.11	-0.03	1										

Bicycle PM Intersection

	lnbike	Greenwat_500	EmpTot_200	Uni_300	OffStreet Int	OnStreet Int	MinorFacil Int	D3b_2500w	D3amm_500w	Bikep_750	Car0_100	A18p_500w	A65p_100w	AXp_300w	prcp_ss
OnStreetInt	-0.04	-0.10	-0.11	-0.03	-0.16	1									
MinorFacilInt	0.16	-0.02	0.16	-0.03	-0.07	-0.09	1								
D3b_2500w	0.56	-0.01	0.61	0.13	-0.19	-0.12	0.23	1							
D3amm_500w	0.47	0.13	0.63	-0.09	-0.02	-0.10	0.11	0.53	1						
Bikep_750	0.45	0.03	0.17	0.25	0.06	-0.06	0.13	0.45	0.15	1					
Car0_100	0.39	0.01	0.48	-0.10	-0.10	-0.13	0.18	0.52	0.43	0.12	1				
A18p_500w	-0.48	-0.13	-0.43	-0.36	0.00	0.11	-0.06	-0.46	-0.31	-0.43	-0.37	1			
A65p_100w	-0.20	-0.04	0.01	-0.52	-0.04	0.10	-0.04	-0.07	0.10	-0.37	0.04	0.24	1		
AXp_300w	-0.13	0.19	-0.07	-0.26	0.14	0.10	-0.07	-0.25	-0.04	-0.14	-0.10	-0.15	0.10	1	
prcp_ss	0.17	0.19	-0.05	0.12	0.30	-0.09	-0.05	-0.22	0.04	0.24	-0.03	-0.13	-0.17	0.05	1

Pedestrian AM Segment

	lnped	Greenwat_300	HH_1000	EmpTot_400	D3amm_100w	Stop_400	PTrp_3000	Inc_2000w	A65p_100w	temp_ss
lnped	1									
greenwat_300	-0.22	1								
HH_1000	0.67	-0.12	1							
EmpTot_400	0.44	-0.20	0.45	1						
D3amm_100w	0.16	0.25	0.07	-0.02	1					
Stop_400	0.27	-0.28	0.13	0.59	-0.01	1				
PTrp_3000	-0.55	0.00	-0.52	-0.15	-0.08	-0.05	1			
Inc_2000w	0.21	-0.11	0.37	0.46	0.00	0.16	-0.17	1		
A65p_100w	0.05	-0.34	0.07	0.04	-0.14	0.03	-0.19	0.34	1	
temp_ss	0.15	-0.01	0.13	0.05	0.02	0.00	-0.11	0.11	0.05	1

Pedestrian PM Segment

	lnped	Uni_500	D3b_750w	D3amm_100w	Rd_lc1250	Walkp_100	Stop_3000	Car0_3000	A45p_100w	A65p_100w	AXp_3000w
lnped	1										
Uni_500	-0.03	1									
D3b_750w	0.13	0.15	1								
D3amm_100w	0.18	-0.04	0.01	1							
Rd_lc1250	0.46	-0.11	0.23	0.05	1						
Walkp_100	0.40	0.31	0.23	-0.02	0.20	1					
Stop_3000	-0.04	0.01	0.52	-0.01	0.36	0.35	1				
Car0_3000	0.75	-0.16	-0.02	0.10	0.55	0.43	0.13	1			
A45p_100w	-0.01	0.44	0.36	-0.14	0.05	0.38	0.25	-0.13	1		
A65p_100w	-0.08	-0.39	-0.11	-0.13	-0.02	-0.26	-0.01	-0.03	-0.38	1	
AXp_3000w	0.52	-0.15	-0.13	0.16	0.01	0.16	-0.35	0.44	-0.20	-0.06	1

Pedestrian AM Intersection

	lnped	EmpTot_500	Rd_lc2000	Walkp_100	Stop_100
lnped	1				
EmpTot_500	0.36	1			
Rd_lc2000	0.57	0.37	1		
Walkp_100	0.54	0.30	0.55	1	
Stop_100	0.15	0.07	0.18	0.21	1

Pedestrian PM Intersection

	lnped	Greenwat_500	HH_1000	EmpTot_400	Uni_300	D3b_1500w	D3amm_100w	Rd_lc750	Walkp_400	Stop_100	PTrp_3000	Car0_100	Inc_100w
lnped	1												
greenwat_500	0.10	1											
HH_1000	0.53	0.00	1										
EmpTot_400	0.39	0.00	0.41	1									

Pedestrian PM Intersection

	lnped	Greenwat _500	HH _1000	EmpTot _400	Uni _300	D3b _1500w	D3amm _100w	Rd_lc 750	Walkp _400	Stop _100	PTrp _3000	Car0 _100	Inc _100w
Uni_300	0.36	-0.14	0.00	0.04	1								
D3b_1500w	0.63	0.02	0.55	0.43	0.19	1							
D3amm_100w	0.37	0.08	0.44	0.40	-0.13	0.45	1						
Rd_lc750	0.45	-0.13	0.43	0.29	0.15	0.59	0.23	1					
Walkp_400	0.53	-0.07	0.28	0.32	0.74	0.40	0.06	0.38	1				
Stop_100	0.27	0.04	0.37	0.19	0.05	0.15	0.21	0.18	0.12	1			
PTrp_3000	0.06	-0.17	-0.17	0.04	0.42	0.10	-0.18	0.37	0.48	-0.14	1		
Car0_100	0.45	0.03	0.73	0.24	-0.06	0.45	0.35	0.38	0.28	0.27	-0.10	1	
Inc_100w	-0.20	0.20	0.03	-0.04	-0.31	-0.20	0.06	-0.25	-0.32	0.16	-0.38	0.00	1

Notes: Variable names: *lnbike*: log of bicycle count; *lnped*: log of pedestrian count; *greenwat*: water and green space; *HH*: household density; *EmpTot*: total number of jobs; *Uni*: university/college campus; *OffStreet*: off street bike facility; *OnStreet*: onstreet bike facility; *MinorFacil*: minor bike facility (*Seg* for segment, *Int* for intersection); *D3b*: intersection density; *D3amm*: Multimodal network density; *Rd_lc*: local road; *Bikep*: bike commute mode share; *Walkp*: walking commute mode share; *Stop*: transit stop; *PTrp*: transit commute mode share; *Car0*: zero-car household; *Inc*: income; *A18p*: population under 18 years old; *A45p*: population 19-45 years old; *A65p*: population 46-65 years old; *AXp*: population above 65 years old; *temp_ss*: temperature; *prcp_ss*: precipitation. Numbers after underscore represent buffer sizes in meter.

Table S5. Sensitivity analysis 1: Temporally averaged model results (with standardized coefficients) [a]

	Bicycle				Pedestrian			
Independent variable	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
Water and green space				0.11 (100m)			0.14 (400m)	0.16 (1500m)
Household density					0.39 (1000m)		0.26 (1000m)	0.24 (750m)
Total number of jobs		0.38 (300m)		0.34 (300m)		0.27 (400m)	0.15 (400m)	
University/college campus						0.05 (500m)		0.17 (300m)
Off-street bike facility	0.25	0.37	0.15					
On-street bike facility		0.13						
Minor bike facility								
Intersection density						0.11 (200m)		0.34 (1250m)
Multimodal network density					0.03 (100m)	0.05 (300m)		
Local road				0.14 (100m)	0.32 (200m)			
Bike commute mode share		0.16 (1250m)			-	-	-	-
Walking commute mode share	-	-	-	-				
Transit stops	-	-	-	-	-0.24 (3000m)	-0.13 (3000m)		
Transit commute mode share	-	-	-	-				
Zero-car households						0.28 (200m)		
Income			0.23 (3000m)	0.11 (3000m)				
Population below 18 years old	-0.03 (100m)		-0.39 (2000m)	-0.33 (3000m)	-0.22 (1000m)			
Population 19-45 years old							0.48 (1000m)	
Population 45-65 years old	-0.28 (1250m)		-0.33 (500m)	-0.34 (500m)				
Population above 65 years old			-0.20 (200m)	-0.11 (500m)	-0.15 (3000m)			
Temperature								
Precipitation	-0.39			0.11				
N	**57**	**311**	**159**	**235**	**154**	**221**	**97**	**166**
Adj-R^2	**0.40**	**0.39**	**0.40**	**0.61**	**0.60**	**0.71**	**0.44**	**0.65**
MSAs [b]	BOS, COL, LA, MAD, PHI, TUC, DC	BOS, CLE, LAW, LA, MAD, MIN, PHI, SF, TUC, DC	COL, LA, MAD, TUC	LA, MAD, MAN, SF, STL, TUC	COL, MAD, NYC, PHI, TUC	CLE, LAW, MAD, MIN, NYC, PHI, TUC	BOS, COL, TUC	MAN, SF, STL, TUC

[a] Buffer sizes are shown in parentheses. All dependent variables were log-transformed. The standardized coefficients are interpreted as percent change in the 5th – 95th percentile range of pedestrian or bicycle volume. All independent variables were significant at $p < 0.05$ level. All models included climate region as control variable. Model abbreviations: Morning segment model (AM Seg.); Afternoon segment model (PM Seg.); Morning intersections model (AM Int.); Afternoon intersection model (PM Int.). Afternoon intersection model (PM Int.). Morning peak period is 7-9AM. Afternoon peak period is 5-7PM or 4-6PM.

[b] City abbreviations: Blacksburg (BBG), Boston (BOS), Champaign-Urbana (CU), Cleveland (CLE), Columbus (COL), Denver (DEN), Hartford (HAR), Lawrence (LAW), Los Angeles (LA), Madison (MAD), Manhattan (MAN), Minneapolis (MIN), New Your City (NYC), Philadelphia (PHI), Portland (POR), San Francisco (SF), Seattle (SEA), St Louis (STL), Tucson (TUC), Washington DC (DC).

Table S6. Sensitivity analysis 1: Temporally averaged model results (with unstandardized coefficients) [a]

	Bicycle				Pedestrian			
Independent variable	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
Water and green space (ha)				0.34 (100m)			0.07 (400m)	0.01 (1500m)
Household density (thousand households/km^2)					0.05 (1000m)		0.38 (1000m)	0.38 (750m)
Total number of jobs (thousand jobs)		0.004 (300m)		0.004 (300m)		0.02 (400m)	0.10 (400m)	
University/college campus (ha)						0.02 (500m)		0.07 (300m)
Off-street bike facility	1.15	1.59	0.14					
On-street bike facility		0.58						
Minor bike facility								
Intersection density (miles/sq mile)						0.003 (200m)		0.01 (1250m)
Multimodal network density (miles/sq mile)					0.01 (100m)	0.03 (300m)		
Local road (km)				0.81 (100m)	0.69 (200m)			
Bike commute mode share (%)		0.08 (1250m)			-	-	-	-
Walking commute mode share (%)	-	-	-	-				
Transit stops	-	-	-	-	-0.002 (3000m)	-0.001 (3000m)		
Transit commute mode share (%)	-	-	-	-				
Zero-car households (thousand households)						3.32 (200m)		
Income (thousand dollars)			0.01 (3000m)	0.01 (3000m)				
Population below 18 years old	-0.03 (100m)		-0.07 (2000m)	-0.08 (3000m)	-0.06 (1000m)			
Population 19-45 years old							0.03 (1000m)	
Population 45-65 years old	-0.06 (1250m)		-0.04 (500m)	-0.05 (500m)				
Population above 65 years old			-0.02 (200m)	-0.01 (500m)	-0.02 (3000m)			
Temperature								
Precipitation	-5.26			0.17				
N	**57**	**311**	**159**	**235**	**154**	**221**	**97**	**166**
Adj-R^2	**0.40**	**0.39**	**0.40**	**0.61**	**0.60**	**0.71**	**0.44**	**0.65**
MSAs [b]	BOS, COL, LA, MAD, PHI, TUC, DC	BOS, CLE, LAW, LA, MAD, MIN, PHI, SF, TUC, DC	COL, LA, MAD, TUC	LA, MAD, MAN, SF, STL, TUC	COL, MAD, NYC, PHI, TUC	CLE, LAW, MAD, MIN, NYC, PHI, TUC	BOS, COL, TUC	MAN, SF, STL, TUC

[a] Buffer sizes are shown in parentheses. All dependent variables were log-transformed. All independent variables were significant at $p < 0.05$ level. All models included climate region as control variable. Model abbreviations: Morning segment model (AM Seg.); Afternoon segment model (PM Seg.); Morning intersections model (AM Int.); Afternoon intersection model (PM Int.). Afternoon intersection model (PM Int.). Morning peak period is 7-9AM. Afternoon peak period is 5-7PM or 4-6PM.

[b] City abbreviations: Blacksburg (BBG), Boston (BOS), Champaign-Urbana (CU), Cleveland (CLE), Columbus (COL), Denver (DEN), Hartford (HAR), Lawrence (LAW), Los Angeles (LA), Madison (MAD), Manhattan (MAN), Minneapolis (MIN), New Your City (NYC), Philadelphia (PHI), Portland (POR), San Francisco (SF), Seattle (SEA), St Louis (STL), Tucson (TUC), Washington DC (DC).

Table S7. Sensitivity analysis 2: Disaggregate employment data model results (with standardized coefficients) [a]

	Bicycle				Pedestrian Models			
Independent variable	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
Water		0.09 (200m)	0.07 (100m)	0.07 (750m)	0.18 (3000m)			0.03 (750m)
Park		-0.05 (750m)		0.02 (500m)	-0.06 (200m)	-0.05 (1000m)	0.05 (400m)	0.07 (500m)
Household density					0.42 (1000m)	0.12 (200m)		0.04 (1000m)
Retail job		-0.01 (100m)						
Office job			-0.04 (300m)				0.04 (100m)	0.04 (100m)
Service job		0.21 (3000m)		0.18 (3000m)	0.16 (300m)	0.13 (200m)		
Entertainment job			0.12 (2500m)					
Industry job		0.11 (1250m)			0.03 (750m)		-0.06 (3000m)	-0.02 (300m)
University/college campus			0.16 (400m)	0.10 (500m)	0.03 (100m)	0.06 (500m)	0.20 (200m)	0.21 (300m)
Off-street bike facility	0.31	0.25	0.16	0.13				
On-street bike facility	0.10	0.09	0.13	0.13				
Minor bike facility				0.05				
Intersection density		0.08 (400m)	0.14 (2000m)	0.09 (750m)		0.26 (750m)		0.23 (1500m)
Multimodal network density	0.37 (3000m)	0.06 (200m)		0.12 (1000m)	0.03 (100m)	0.02 (100m)	0.06 (100m)	0.08 (100m)
Local road	-0.09 (500m)	-0.07 (750m)			0.12 (2000m)	0.13 (1250m)	0.24 (2000m)	0.13 (750m)
Bike commute mode share	0.29 (750m)	0.18 (1000m)	0.36 (3000m)	0.23 (3000m)	-	-	-	-
Walking commute mode share	-	-	-	-	-0.17 (3000m)		0.20 (100m)	0.15 (400m)
Transit stops	-	-	-	-	0.08 (400m)	-0.20 (3000m)	0.05 (100m)	0.08 (100m)
Transit commute mode share	-	-	-	-	-0.11 (3000m)			-0.15 (3000m)
Zero-car households				0.05 (100m)		0.37 (3000m)	0.12 (750m)	0.08 (100m)
Income	0.20 (3000m)	-0.05 (750m)	0.16 (2500m)	0.06 (3000m)	-0.08 (2000m)			-0.08 (100m)
Population below 18 years old		-0.05 (100m)		-0.08 (500m)				
Population 19-45 years old		0.13 (500m)						
Population 45-65 years old	-0.19 (100m)	0.04 (3000m)		-0.06 (100m)				
Population above 65 years old				-0.08 (1250m)	-0.09 (200m)	0.07 (3000m)		
Temperature		-0.04			0.07			
Precipitation	-0.18			0.03				
N	**1,132**	**3,276**	**1,917**	**2,533**	**1,539**	**2,526**	**1,196**	**1,655**
Adj-R^2	**0.49**	**0.49**	**0.48**	**0.61**	**0.64**	**0.73**	**0.46**	**0.60**
MSAs [b]	BBG, BOS, COL, LA, MAD, PHI, SEA, TUC, DC	BBG, BOS, CLE, HAR, LAW, LA, MAD, MIN, PHI, POR, SF, SEA, TUC, DC	BOS, CU, COL, HAR, LA, MAD, SEA, TUC, DC	BOS, DEN, HAR, LA, MAD, MAN, POR, SF, SEA, STL, TUC, DC	BBG, BOS, COL, HAR, MAD, NYC, PHI, SEA, TUC	BBG, BOS, CLE, HAR, LAW, MAD, MIN, NYC, PHI, POR, SF, SEA, TUC	BOS, CU, COL, HAR, SEA, TUC, DC	BOS, CU, HAR, LAW, MAN, POR, SF, SEA, STL, TUC, DC

[a] Buffer sizes are shown in parentheses. All dependent variables were log-transformed. The standardized coefficients are interpreted as percent change in the 5th – 95th percentile range of pedestrian or bicycle volume. All independent variables were significant at $p < 0.05$ level. All models included climate region as control variable. Model abbreviations: Morning segment model (AM Seg.); Afternoon segment model (PM Seg.); Morning intersections model (AM Int.); Afternoon intersection model (PM Int.). Afternoon intersection model (PM Int.). Morning peak period is 7-9AM. Afternoon peak period is 5-7PM or 4-6PM.

[b] City abbreviations: Blacksburg (BBG), Boston (BOS), Champaign-Urbana (CU), Cleveland (CLE), Columbus (COL), Denver (DEN), Hartford (HAR), Lawrence (LAW), Los Angeles (LA), Madison (MAD), Manhattan (MAN), Minneapolis (MIN), New Your City (NYC), Philadelphia (PHI), Portland (POR), San Francisco (SF), Seattle (SEA), St Louis (STL), Tucson (TUC), Washington DC (DC). Champaign-Urbana (CU) was excluded from the PM Intersection model because its count dates were unknown, thus we did not have weather variables for this MSA

Table S8. Sensitivity analysis 2: Disaggregate employment data model results (with unstandardized coefficients) [a]

	Bicycle Models				Pedestrian Model			
Independent variable	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**	**AM Seg.**	**PM Seg.**	**AM Int.**	**PM Int.**
Water (ha)		0.12 (200m)	0.46 100m)	0.01 (750m)	0.001 (3000m)			0.01 (750m)
Park (ha)		-0.01 (750m)		0.01 (500m)	-0.12 (200m)	-0.004 (1000m)	0.04 (400m)	0.03 (500m)
Household density (thousand households/km^2)					0.05 (1000m)	0.41 (200m)		0.04 (1000m)
Retail job (thousand jobs)		-0.95 (100m)						
Office job (thousand jobs)			-0.15 (300m)				2.49 (100m)	2.18 (100m)
Service job (thousand jobs)		0.01 (3000m)		0.01 (3000m)	0.05 (300m)	0.11 (200m)		
Entertainment job (thousand jobs)			0.04 (2500m)					
Industry job (thousand jobs)		0.03 (1250m)			0.01 (750m)		-0.02 (3000m)	-0.48 (300m)
University/college campus (ha)			0.002 (400m)	0.001 (500m)	0.03 (100m)	0.002 (500m)	0.01 (200m)	0.01 (300m)
Off-street bike facility	1.50	1.18	0.17	0.17				
On-street bike facility	0.50	0.44	0.07	0.08				
Minor bike facility				0.06				
Intersection density (miles/sq mile)		0.001 (400m)	0.003 (2000m)	0.002 (750m)		0.01 (750m)		0.01 (1500m)
Multimodal network density (miles/sq mile)	0.40 (3000m)	0.02 (200m)		0.10 (1000m)	0.01 (100m)	0.01 (100m)	0.06 (100m)	0.08 (100m)
Local road (km)	-0.04 (500m)	-0.01 (750m)			0.01 (2000m)	0.02 (1250m)	0.01 (2000m)	0.03 (750m)
Bike commute mode share (%)	0.11 (750m)	0.09 (1000m)	0.13 (3000m)	0.10 (3000m)	-	-	-	-
Walking commute mode share (%)	-	-	-	-	-0.04 (3000m)		0.02 (100m)	0.02 (400m)
Transit stops	-	-	-	-	0.01 (400m)	-0.002 (3000m)	0.09 (100m)	0.12 (100m)
Transit commute mode share (%)	-	-	-	-	-0.04 (3000m)			-0.05 (3000m)
Zero-car households (thousand households)				3.14 (100m)		0.03 (3000m)	0.31 (750m)	10.18 (100m)
Income (thousand dollars)	0.01 (3000m)	-0.003 (750m)	0.01 (2500m)	0.004 (3000m)	-0.01 (2000m)			-0.01 (100m)
Population below 18 years old		-0.01 (100m)		-0.01 (500m)				
Population 19-45 years old		0.01 (500m)						
Population 45-65 years old	-0.03 (100m)	0.01 (3000m)		-0.01 (100m)				
Population above 65 years old				-0.01 (1250m)	-0.01 (200m)	0.01 (3000m)		
Temperature		-0.01			0.02			
Precipitation	-0.10			0.09				
N	**1,132**	**3,276**	**1,917**	**2,533**	**1,539**	**2,526**	**1,196**	**1,655**
Adj-R^2	**0.49**	**0.49**	**0.48**	**0.61**	**0.64**	**0.73**	**0.46**	**0.60**
MSAs [b]	BBG, BOS, COL, LA, MAD, PHI, SEA, TUC, DC	BBG, BOS, CLE, HAR, LAW, LA, MAD, MIN, PHI, POR, SF, SEA, TUC, DC	BOS, CU, COL, HAR, LA, MAD, SEA, TUC, DC	BOS, DEN, HAR, LA, MAD, MAN, POR, SF, SEA, STL, TUC, DC	BBG, BOS, COL, HAR, MAD, NYC, PHI, SEA, TUC	BBG, BOS, CLE, HAR, LAW, MAD, MIN, NYC, PHI, POR, SF, SEA, TUC	BOS, CU, COL, HAR, SEA, TUC, DC	BOS, CU, HAR, LAW, MAN, POR, SF, SEA, STL, TUC, DC

[a] Buffer sizes are shown in parentheses. All dependent variables were log-transformed. All independent variables were significant at $p < 0.05$ level. All models included climate region as control variable. Model abbreviations: Morning segment model (AM Seg.); Afternoon segment model (PM Seg.); Morning intersections model (AM Int.); Afternoon intersection model (PM Int.). Afternoon intersection model (PM Int.). Morning peak period is 7-9AM. Afternoon peak period is 5-7PM or 4-6PM.

[b] City abbreviations: Blacksburg (BBG), Boston (BOS), Champaign-Urbana (CU), Cleveland (CLE), Columbus (COL), Denver (DEN), Hartford (HAR), Lawrence (LAW), Los Angeles (LA), Madison (MAD), Manhattan (MAN), Minneapolis (MIN), New Your City (NYC), Philadelphia (PHI), Portland (POR), San Francisco (SF), Seattle (SEA), St Louis (STL), Tucson (TUC), Washington DC (DC). Champaign-Urbana (CU) was excluded from the PM Intersection model because its count dates were unknown, thus we did not have weather variables for this MSA

Table S9. Correlation analysis of employment types

100m buffer	Ret_100	Off_100	In_100	En_100	Sv_100
Ret_100	1				
Off_100	0.5389	1			
In_100	0.1345	0.2445	1		
En_100	0.5326	0.6018	0.1389	1	
Sv_100	0.5526	0.7413	0.2098	0.5879	1
500m buffer	Ret_500	Off_500	In_500	En_500	Sv_500
Ret_500	1				
Off_500	0.7175	1			
In_500	0.4738	0.5099	1		
En_500	0.7797	0.7827	0.4218	1	
Sv_500	0.7909	0.8916	0.5667	0.7972	1
1000m buffer	Ret_1000	Off_1000	In_1000	En_1000	Sv_1000
Ret_1000	1				
Off_1000	0.8694	1			
In_1000	0.7348	0.7123	1		
En_1000	0.9279	0.8657	0.7059	1	
Sv_1000	0.9289	0.9271	0.7897	0.907	1
1500m buffer	Ret_1500	Off_1500	In_1500	En_1500	Sv_1500
Ret_1500	1				
Off_1500	0.8879	1			
In_1500	0.869	0.8025	1		
En_1500	0.9667	0.8765	0.8308	1	
Sv_1500	0.9594	0.9271	0.877	0.9437	1
3000m buffer	Ret_3000	Off_3000	In_3000	En_3000	Sv_3000
Ret_3000	1				
Off_3000	0.9271	1			
In_3000	0.9363	0.9436	1		
En_3000	0.984	0.9151	0.9114	1	
Sv_3000	0.9729	0.9461	0.9365	0.9789	1

Variable coding: *Ret*: Retail, *Off*: Office, *In*: Industry, *En*: Entertainment, *Sv*: Service. Buffer sizes are shown after the underscore (Ret_100 stands for retail jobs within a 100m buffer).

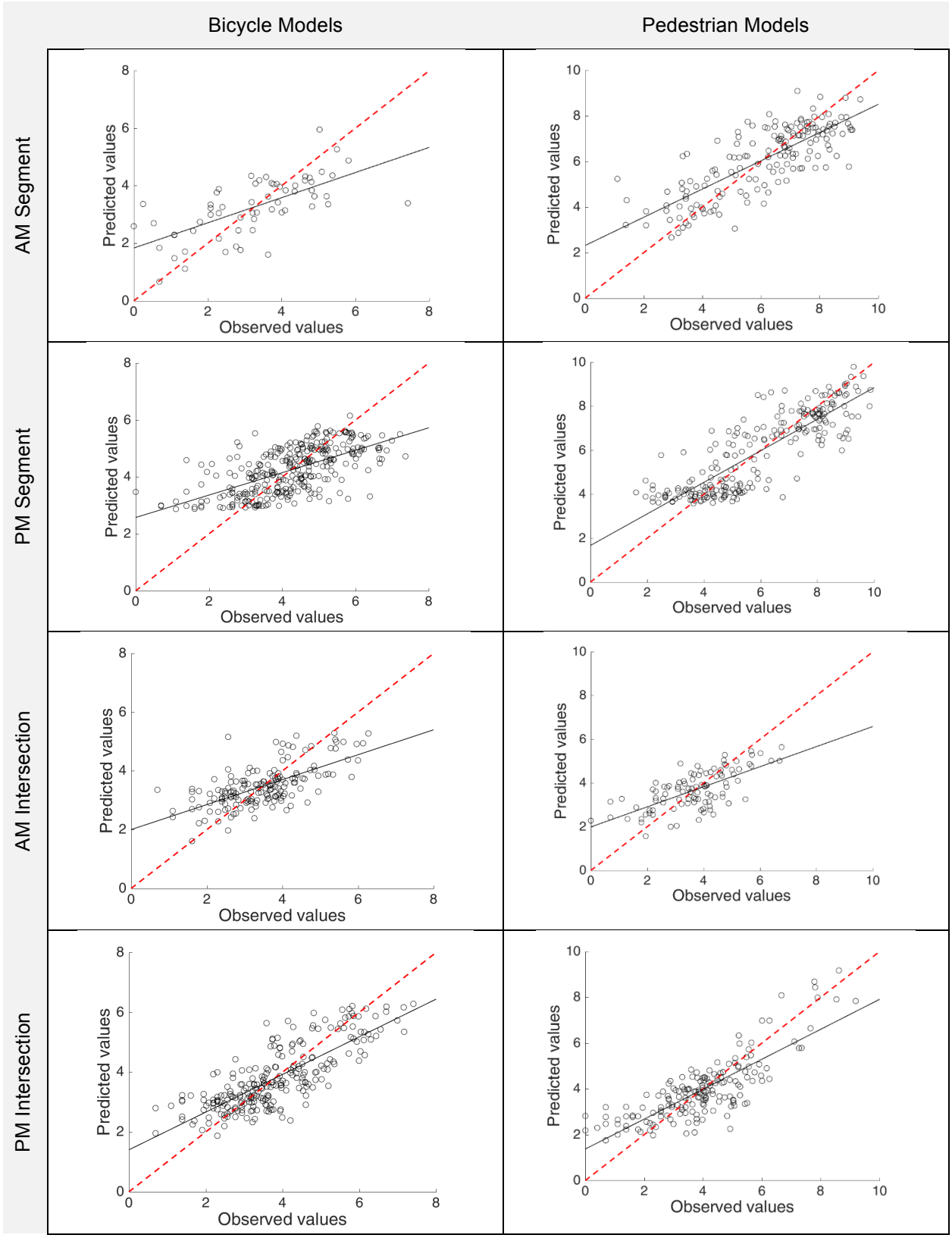

Figure S1. Scatter plots of predicted vs. observed values for the temporally averaged models. The dashed red line is the 1:1 line; the best fit line is shown in solid black.

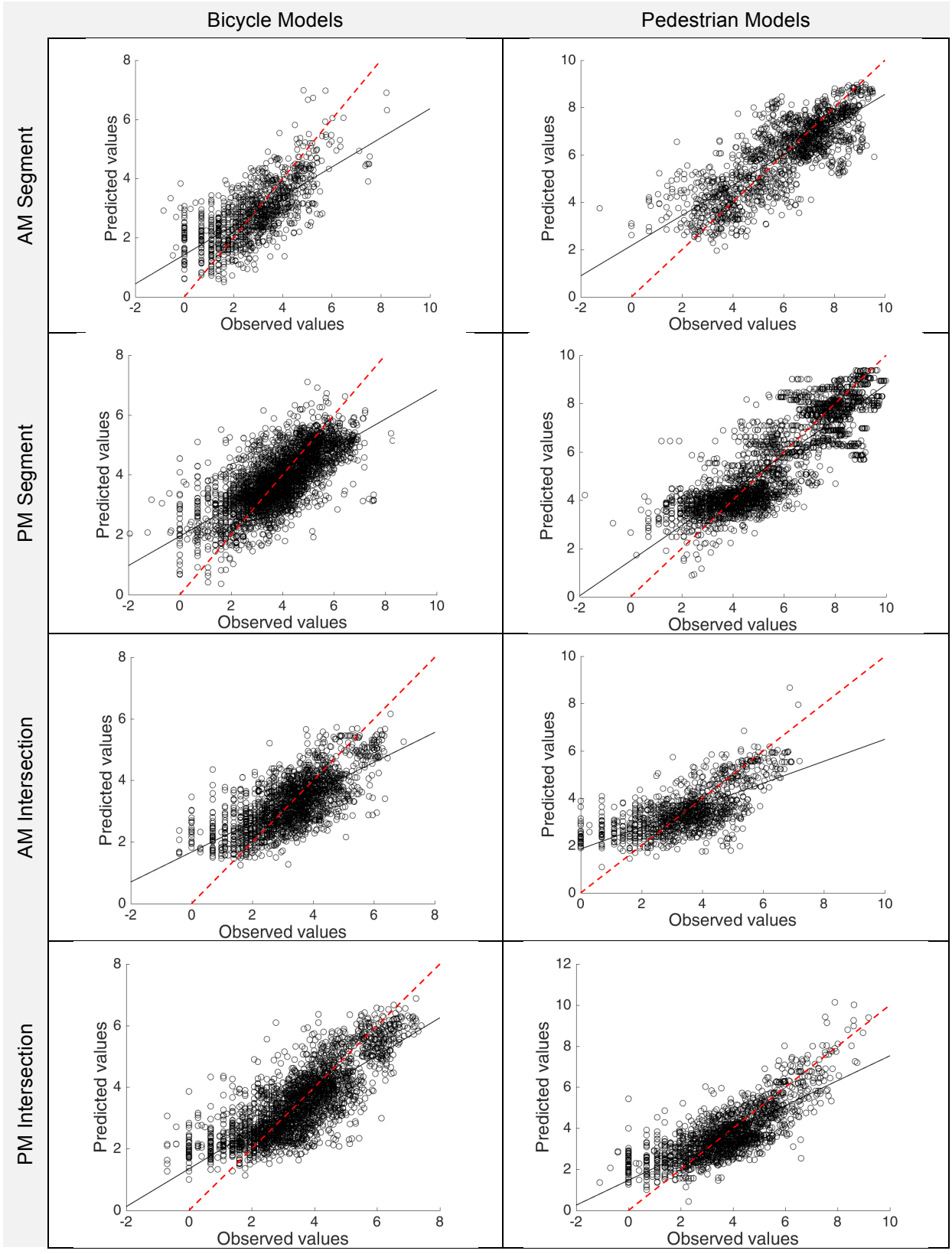

Figure S2. Scatter plots of predicted vs. observed values for disaggregated employment type models. The dashed red line is the 1:1 line; the best fit line is shown in solid black.

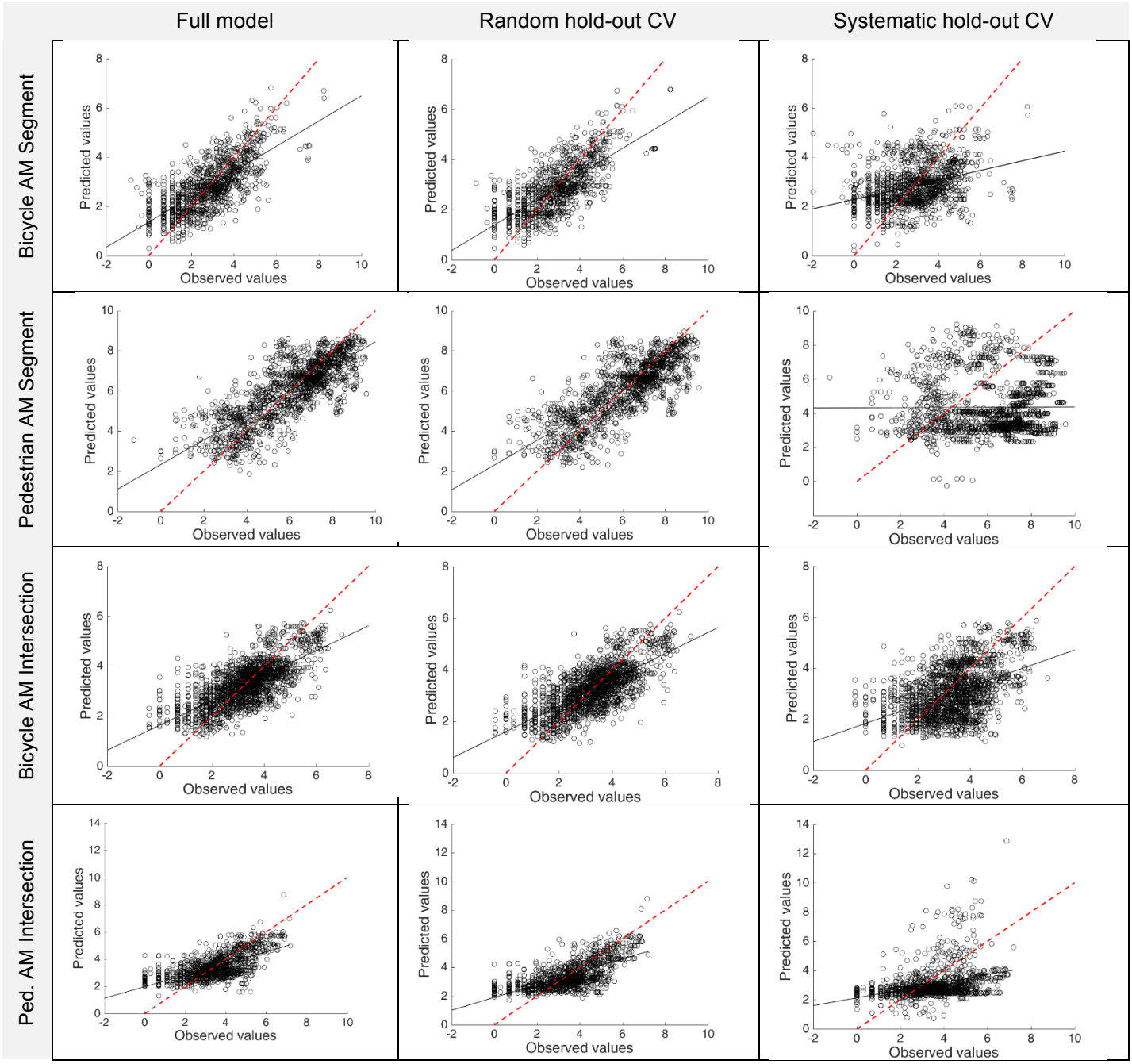

Figure S3. Cross validation (CV) results: Plots of predicted vs. observed values of AM peak-period models for each cross-validation approach. The dashed red line is the 1:1 line; the best fit line is shown in solid black.

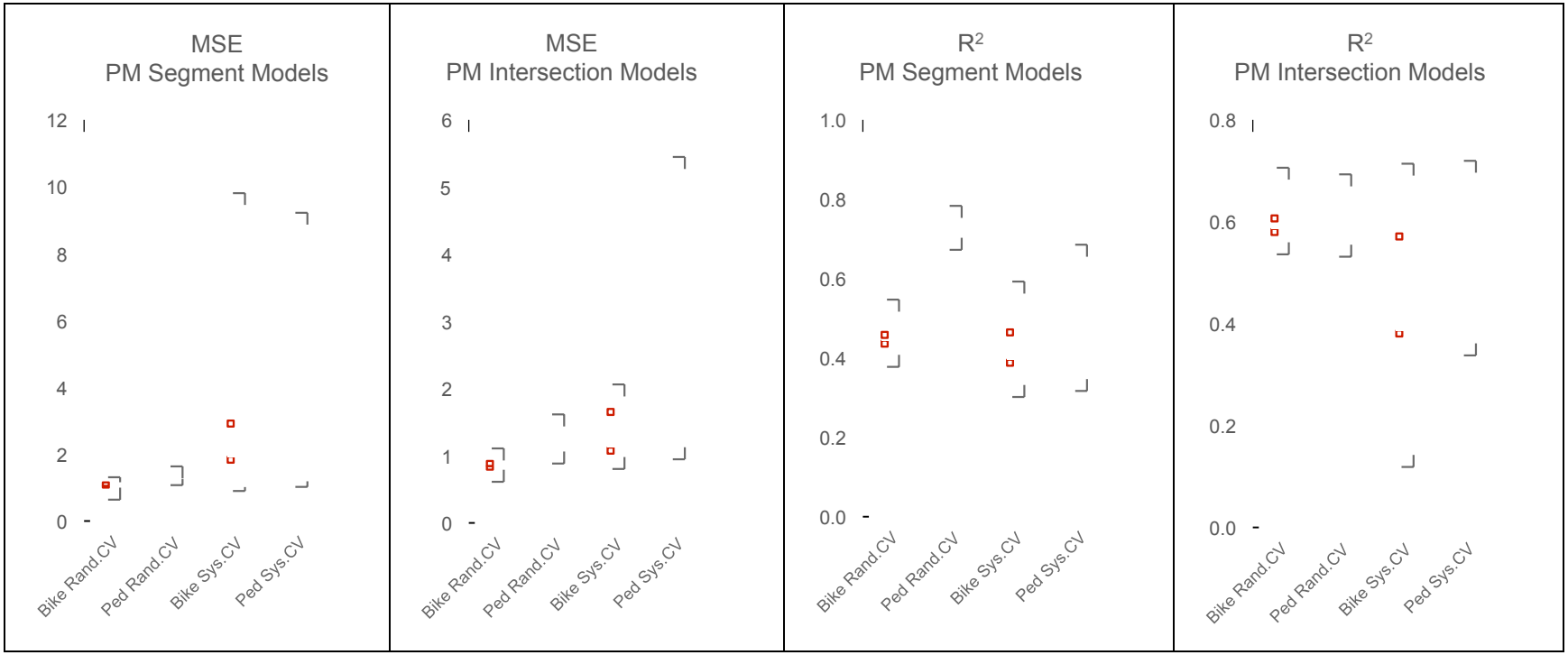

Figure S4. Cross validation results: Box plots of MSE and adjusted R^2 for the PM models. Model abbreviations: Bicycle, random hold-out (Bike Rand.CV); Pedestrian, random hold-out (Ped Rand.CV); Bicycle, systematic hold-out (Bike Sys.CV); Pedestrian, systematic hold-out (Ped Sys.CV). The whiskers represent the min and max values, the boxes represent the 25, 50, and 75 percentile values of all cross-validated models' MSE and R^2.