Google Street View Gentrification Observations Supplementary Material[1]

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[1] The material in this supplement is from Appendix A of my dissertation, "Gentrification, Race, and Immigration in the Changing American City." Material for Wave 1 data collection in Chicago also appears in the online supplement for the publication: Jackelyn Hwang and Robert J. Sampson. 2014. "Divergent Pathways of Gentrification: Racial Inequality and the Social Order of Renewal in Chicago Neighborhoods." *American Sociological Review*, 79(4):726-51. The online supplement is available at http://asr.sagepub.com/content/79/4/726/suppl/DC1.

Figure A.1. *Wave 1 Google Street View Gentrification Observations Coding Guide for Chicago*

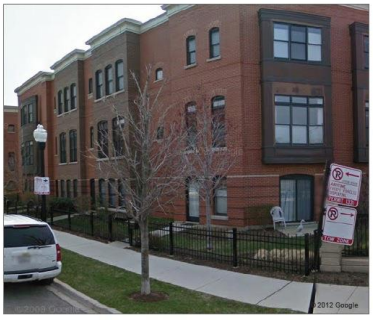
Figure A.1 (Continued)

Coding Guide and Visual Demonstration of Google Gentrification Observation in Chicago[1, 2]

Example block face 1
Address: 815 North Cambridge Avenue

Example block face 2
Address: 524 North Bishop Street

Example block face 3
Address: 1445 South Peoria Street



Example block face 4
Address: 1318 West Melrose Street

To interactively explore Google Street View (using the classic version of Google Maps) with the example block faces:

1. Enter https://maps.google.com/ in your web browser.
2. Type the street address listed for each example in the map search bar at the top of the screen and press "enter." The map will center to the address you entered.
3. Drag the "pegman" (the orange figure below the compass and above the zoom bar on the upper-left-hand side of the map) to one end of the block face. This will bring your screen to the Google Street View application.

[1] Using Google Street View to observe gentrification is part of an ongoing project. Updated instrument and coding guide are available at: http://scholar.harvard.edu/jackelynhwang/projects/ggo.

[2] The detailed characteristics for each indicator of the instrument described are specific to Chicago, although the GGO instrument was also tested in Boston, MA and Philadelphia, PA with similar results overall. However, due to variation between cities in building stock, public infrastructure styles, and land markets, we recommend that the specific characteristics used to identify each indicator be adjusted accordingly.

Figure A.1 (Continued)

4. To move forward and back along the street, use the up and down arrow keys on your keyboard or click along the street with your mouse. To get panoramic views, use the right and left arrow keys on your keyboard or drag on the screen with your mouse. To zoom in and out, use the scroll button on your mouse, click off the street with your mouse, or click on the "+" and "—" buttons below the compass in the upper left-hand side of the Google Street View screen.
5. Because block faces are only a single side of the street, only code the side of the street in the relevant census block unit.

Example Block Face 1: 803–869 N. Cambridge Avenue, Chicago, IL 60610 (East block face)
Block-face stage score: .41; Tract stage score: .47

L1. 1	N3. 0	B2. 0	D3. 0
P1. 0	N4. 0	B3. 1	G1. 2007/2009
N1. 0%	N5. 0	D1. 0	G2a. 1
N2. 1	B1. 1	D2. 1	G2b. No diff. bt yr

Example Block Face 2: 508–579 N. Bishop Street, Chicago, IL 60642 (East block face)
Block-face stage score: .58; Tract stage score: .60

L1. 1	N3. 0	B2. 1	D3. 1
P1. 0	N4. 0	B3. 1	G1. 2009
N1. >50%	N5. 0	D1. 0	G2a. 0
N2. 1	B1. 0	D2. 1	G2b. n/a

Example Block Face 3: 1445–1519 S. Peoria Street, Chicago IL 60608 (West block face)
Block-face stage score: .88; Tract stage score: .75

L1. 0	N3. 1	B2. 1	D3. 1
P1. 0	N4. 1	B3. 1	G1. 2009
N1. >50%	N5. 0	D1. 1	G2a. 0
N2. 1	B1. 0	D2. 1	G2b. n/a

Example Block Face 4: 1300–1386 W. Melrose Street, Chicago, IL 60657 (North block face)
Block-face stage score: .94; Tract stage score: .81

L1. 1	G2a. 0
P1. 1	G2b. n/a

N1. 11-50%
N2. 1
N3. 0
N4. 0
N5. 1
B1. 0
B2. 1
B3. 1
D1. 1
D2. 1
D3. 1
G1. 2009

Figure A.1 (Continued)

Detailed Description for Each GGO Instrument Item[3]

L1. Primary land use (residential, commercial, institutional, mixed [residential/ commercial/ institutional], industrial, other [e.g., highway])

This code categorizes the primary land use for a block face and includes the intended use of areas set for construction or under construction if distinguishable (e.g., based on signage). "Residential land use" consists of structures that appear to be used as single- or multi-family dwellings, including public or subsidized housing. "Commercial land use" consists of structures that appear to be used as office or retail space. "Institutional land use" consists of structures that appear to be used primarily as schools (including nonresidential university buildings), religious institutions, and medical facilities. A block face is coded as "mixed-use" if more than one of the first three listed land uses is present for at least one-third of the structures of the block face, including areas set for or under construction with the intended land use distinguishable. "Industrial land use" consists of structures that appear to be used for manufacturing, assembly, and warehouse. "Other" consists of any land uses not included above (e.g., highways, subway and railway tracks, parking lots and garages, stadiums, recreational parks and fields, brownfields, undeveloped vacant lots, miscellaneous green space between highways, and rail tracks). We also coded land uses as "other" if there was no Google Street View access to the block face and land use was indistinguishable. **We only observed and coded residential, commercial, and mixed land use block faces for the remaining instrument items.**

For the following two instrument items, coders first categorized structures from the exterior as older structures versus new construction or renovation. We used the following characteristics as guides for determining if a structure was "new":

- modern design: sleek, geometric, glass or steel exterior materials, lack of ornate detailing around window frames and façade, lack of aluminum siding
- sandblasted brick: unstained and bright
- reconstructed or restored porches and balconies, window frames, and doors: fresh paint, well-kept and attractive, modern design
- new signage (e.g., house numbering)

For large-scale multi-family dwellings (100+ units), we used the following characteristics to determine if a structure was "new":

- modern design: sleek, geometric, glass or steel exterior materials, large windows, rectangular, no concrete
- new balconies: fresh paint, well-kept and attractive, modern design
- new signage (e.g., building name), entryways, and walkways: no cracks in pavement, fresh paint, modern design

For commercial units, we used the following characteristics to determine if a structure was "new":

- modern design: sleek, geometric, glass or steel exterior materials, lack of ornate detailing around window frames and façade, lack of aluminum siding
- sandblasted brick: unstained and bright

[3] We only coded parcels on the block face and ignored structures and indicators that were visible from the observed block face but were part of parcels on adjacent block faces.

- reconstructed or restored window frames and doors: fresh paint, well-kept and attractive, modern design
- new signage

Because commercial uses can change frequently and undergo renovation with each change, buildings with mixed uses may have "new" (rehabbed) commercial structures with older residential units.

For all land uses, at least two characteristics should be present to be considered as "new." In addition, structures must not have peeling of faded paint, obvious necessary structural repairs, or deteriorated or discolored siding or brick. If buildings are undergoing construction or major rehabilitation at the time of observation, we considered these as "new."

These characteristics are consistent with accounts of gentrification as a process of preservation and restoration of older homes and converted-use warehouses, as well as new-build gentrification of modern home construction and condominiums. Because our working definition of gentrification entails reinvestment and renewal, we consider any new construction, both modest and luxury quality, as reinvestment in a neighborhood. We categorize structures that do not fit this description as older.

P1. For land uses that are not new, most or all appear to be in good condition (well-kept, attractive, and sizeable)

The purpose of this indicator is to determine the preexisting structural condition of the block face, particularly if structures on the block face have been in good condition for an extended period of time. For this instrument item (P_1), we coded block faces as 1 if at least 75% of the homes categorized as older are "well-kept, attractive, and sizeable." We used the following characteristics to determine if a structure was "well-kept, attractive, and sizeable":

- absence of peeling or faded paint, no obvious structural repairs needed, and no deteriorated or discolored siding or brick
- porches and balconies, windows and frames, doors, signage (e.g., house numbering, business signage), entryways, storefronts, and walkways beyond basic design or décor
- large enough to comfortably house at least a family of two adults with children

Because it is sometimes difficult to distinguish between new construction/rehabilitation and older homes that are well-kept, attractive, and sizeable, we combine the scores for the condition of older homes (P_1) with the degree of new structures (N_1, N_2, N_3, N_4, and N_5) to form a "structural mix" score for determining the neighborhood stage score, as described in the main text. A block face categorized as having most of its older homes in well-kept, attractive, and sizeable condition would receive the same structural mix score as a block face with all of its homes, both new and old, in well-kept, attractive, and sizeable condition, even if the coder only categorized a fraction of the homes as older. In addition, the block face would receive a similar structural mix score if we categorized all of the structures as newly constructed or rehabilitated.

We coded each example block face for the P_1 indicator as follows:

- Ex. 1: We coded this block face with a 0. We categorized all of the structures as older with a lack of modern design, no sandblasted brick, no new signage or walkways, and the presence of deteriorated brick. Furthermore, the deteriorated brick and basic design of

Figure A.1 (Continued)

windows and frames, doors, and entryways, as well as the small size of units based on the spacing between exterior doors indicate these are not all well-kept, attractive, and sizeable units.

- Ex. 2: We coded this block face with a 0. We categorized most of the structures as newer except for one tan house, due to its lack of modern design and sandblasted brick. This structure is well-kept and has some features that are beyond basic design or décor (e.g., window frames and entryway), but it appears to be a split-level home and is of modest size. One could arguably consider this home to be rehabbed within the past 10 to 15 years—with its newer entryway and window frames—and if this was the case, the block would still receive the same structural mix score. While relatively modest in design (rather than luxury), we categorized the townhomes in the image as newly constructed. Another apartment building on the street is difficult to distinguish between older and newer, but based on its sandblasted brick and the absence of peeling paint, no obvious structural repairs needed, and no deteriorated siding or brick, we categorized the building as having been constructed or rehabilitated within the past 10 to 15 years. Based on the one structure categorized as older, we therefore coded the block face with a 0.
- Ex. 3: We coded this block face with a 0. We categorized all the structures as new based on the modern design, sandblasted brick, new entryways and walkways, absence of peeling paint, no obvious structural repairs needed, and no deteriorated siding or brick.
- Ex. 4: We coded this block face with a 1. We categorized a majority of the structures as older except for four houses with modern design and sandblasted brick. The homes we categorized as older were nearly all well-kept, attractive, and sizeable, with no peeling paint, no obvious structural repairs needed, and no deteriorating siding or brick; porches and balconies, windows and frames, doors, entryways, and walkways were beyond basic design or décor; and they were large enough to comfortably house a family. Only one home was modestly sized and lacked features beyond basic design or décor.

N1. Amount of new land uses (rehabilitation or new construction appearing to be completed within approximately the past 10 to 15 years) (0%, 1–10%, 11–50%, >50%)

See earlier description for how residential and commercial structures were categorized as new. We estimated percentages out of the amount of the block face occupied by buildings on the block face, including areas set for construction or under construction but excluding vacant areas. For Ex. 1, we coded 0% as new, >50% for Ex. 2, >50% for Ex. 3, and 11–50% for Ex. 4.

N2. New signs or structures controlling traffic (e.g., speed, pedestrian crossing, bike lanes, parking)

This indicator captures aspects of public reinvestment. Traffic signs and structures include speed limitation signs or speed bumps, pedestrian crosswalks and signs, bike lanes, parking limitation signs (e.g., handicap parking, no parking times), and any other public signs controlling traffic. "New" refers to signs and structures that appear to have been installed within approximately the past 10 to 15 years, presumably by the city. Bright and unfaded paint or print indicates new signs; speed bumps or crosswalks in the road without cracks or obvious repairs needed and bright and unfaded paint on the road (if applicable) indicate new traffic structures. We consider vandalism as a separate indicator that does not affect how we code the age of traffic signs and structures. All example block faces contained signs limiting traffic or parking with bright and unfaded paint or print and were thus all coded with a 1.

Figure A.1 (Continued)

N3. New public courtesies (e.g., bus stop or subway entrance, street furniture, bike racks, public trash cans, street lamps)

This indicator captures aspects of public reinvestment in public space. Public courtesies include bus stops or subway entrances, public seating, bike racks, public trash cans, newspaper stands, mailing depositories, and street lamps. "New" refers to signs and structures that appear to have been installed or rehabilitated within approximately the past 10 to 15 years, presumably by the city. Bright and unfaded paint without obvious repairs needed and modern design or décor (for bus stops, subways entrances, public trash cans, and street lamps) indicate new public courtesies. We consider vandalism as a separate indicator that does not affect how we code the age of public courtesies. Modern bus stops and modern public trash cans in Chicago appear as in Figs. 1 and 2 below. We did not find any new subway entrances = in the observed sample. Only Ex. 3 contains public courtesies—street lamps—that appeared new based on their bright and unfaded paint and modern design and décor.

Fig. 1. Modern bus stop in Chicago
Address: 1809 West Polk Street

Fig. 2. Modern public trash can in Chicago
Address: 2986 North Sheridan Road

N4. New large-scale development (e.g., luxury condos, large residential/commercial area developments, converted industrial use)

This indicator captures aspects of large-scale reinvestment. We coded block faces with a 1 if they contain new structures that are also luxury high-rise condominiums, large residential/commercial area developments occupying at least the entire block face, or converted industrial use to residential or commercial use. If the development consists of single-family dwellings or are low-rise, we only considered these as "large-scale" if they occupied at least 75% of the block face. Warehouse buildings being used for residential or commercial purposes based on the signage, entryways, and walkways indicate converted industrial land use (see Fig. 3). See earlier description for "new" building structures. If all structures were considered "old," the block face received a 0 for this indicator. Signage, entryways, and walkways beyond basic design or décor indicate new luxury condos (see Fig. 4). Homogeneous architectural design with signage, entryways, and walkways beyond basic design or décor and that occupy at least the predominant land use of the block face indicate new large residential and commercial developments. We also included areas under construction in which signage indicated this land use. Only Ex. 3 has a new large residential development, which occupies the entire block face.

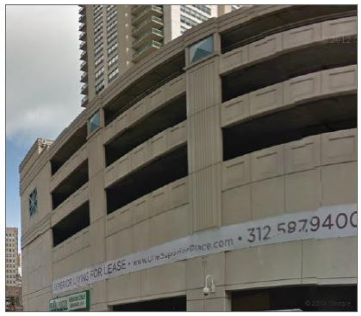
Figure A.1 (Continued)

N5. Residential or commercial units for sale or lease in new condition or under construction
This indicator captures aspects of recent reinvestment by outside investors or developers, that is, not by residents themselves. We coded block faces with a 1 if they contain new structures that are also for sale or lease (not rent) based on signage (e.g., Fig. 4). See description for "new" building structures from item P1. If all structures were considered "old," the block face received a 0 for this indicator. We also included areas under current construction that were for sale, as indicated by signage. Only Ex. 4 contains a residential unit in new condition for sale.

Figure A.1 (Continued)

Fig. 3. Converted industrial use
Address: 1962 South Halsted Street

Fig. 4. Luxury high-rise condominiums
Address: 705 North Dearborn Parkway



B1. Sign discouraging disorder (e.g., neighborhood watch, anti-littering/ loitering/ drug use/ vandalism/ graffiti [including if painted over or mural art])

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures through signs of efficacy to counter disorder. This includes street signs explicitly discouraging crime and disorder (e.g., neighborhood watch, littering, loitering, drug use, vandalism, and graffiti), security cameras, and painting over graffiti, mural or sculptural art, and community markers (e.g., structures or sculptures that signify a community). This indicator does not include banners and signs on lamp posts or signs controlling traffic and parking. Paint over graffiti is often evident due to inconsistent paintbrush strokes and coloring. Ex. 1 had painted-over graffiti.

B2. Beautification in personal frontage

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures through signs of efficacy to beautify the visible frontage of private space that is separate from the basic painting and upkeep of the building structure and façade. This includes evidence of well-kept landscaping or gardening work, patio or yard furniture, and planters and accessories beyond basic grass maintenance. For one-to-four-family residential structures, this includes modest landscaping (e.g., planted shrubs). For multi-family residential structures, we considered beautification present if there was landscaping or gardening work that was intentionally decorative, that is, beyond basic grass maintenance and planted trees and shrubs with no distinguishable design. We did not include fencing for this indicator. For commercial structures, this includes decorative signage and frontage beyond basic design or décor and with no signs of deteriorated condition or repairs needed. Ex. 2, 3, and 4 show residential landscaping or gardening work.

B3. Vacant area and public street frontage beautification, upkeep, fencing, or set for construction

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures, through signs of efficacy to beautify visible public space (e.g., vacant lot areas and frontage areas from sidewalks to the street). This includes evidence of landscaping or gardening work, yard furniture, and planters and accessories in public space and improvement of

vacant spaces, including fencing, grounds maintenance, or indication of future construction. This indicator includes basic grass maintenance but does not include planted trees without additional planters or accessories. Vacant areas are only considered if they stand alone from other residences and structures and do not appear to be established park or recreational areas. Vacant areas need only show any sign of maintenance and may also have other visible signs of disorder. The kempt grass in the vacant lot from Ex. 1, the fencing around the vacant lot in Ex. 2, the landscaped grass and trees between the sidewalk and streets in Ex. 3, and the planters in the areas between the sidewalk and streets in Ex. 4 are all indicators of public space beautification.

D1. Residential block faces lacking physical disorder (garbage, litter, graffiti, and vandalism)
This indicator captures if there are no visible aspects of physical disorder that discourage reinvestment in a neighborhood, beyond physical building structures, through signs that show a lack of efficacy to counter visible physical disorder. This includes evidence of light garbage, litter, or broken glass on the street or sidewalk; graffiti (not painted over) on buildings, signs, or walls; and vandalism of any signs, public courtesies, or objects in private or public frontage (e.g., yard furniture or planters). For garbage, litter, and broken glass, we coded this indicator as present if the block face received a score lower than 2 (light) on a scale ranging from 0 (none) to 6 (very heavy) that measured the amount of garbage, litter, and broken glass present. This rule is intended to eliminate uncertainty with small pieces of garbage, litter, and broken glass that are sometimes hard to distinguish due to the resolution of the images. We coded Ex. 1 with a 0 for this indicator due to the litter and garbage in the vacant lot, and we coded Ex. 2 with a 0 due to the graffiti on the "for sale" sign in the vacant lot. We did not code this indicator for commercial or mixed-use blocks due to the overwhelming presence of litter and garbage in commercial areas.

D2. Lacking unkempt vacant areas and public street frontage
This indicator captures if there are no visible aspects of physical disorder that discourage reinvestment in the neighborhood, beyond physical building structures, through signs that show a lack of efficacy to counter visible physical disorder in public spaces (e.g., vacant lot areas, frontage areas from sidewalks to the street). This includes overgrown grass and weeds. Vacant areas are only considered if they stand alone from other residences and structures and do not appear to be established park or recreational areas. Vacant lots can simultaneously be unkempt as well as exhibit signs of beautification for item O3 in the instrument. We coded all examples with a 1 for this indicator.

D3. Lack of structures that appear to be burned out, boarded up, abandoned, or in poor/badly deteriorated condition
This indicator captures if there are no visible aspects of physical decay of the building structures. This includes evidence of a severe lack of maintenance and upkeep of any properties, indicated by windows or doorways boarded up or burned out, serious structural repairs needed, large amounts of peeled paint, or badly deteriorated siding. We included the appearance of any boarded up windows or doors as a sign of this indicator. Ex. 1 was coded with a 0 for this item, because all the windows of the property were boarded up. This indicator only includes vacant residential or commercial properties if they meet the structural characteristics outlined above.

Figure A.1 (Continued)

G1. Google Street View image year
This is the year an image was taken and can be found in the lower-left corner of the image. Note that the month of observation was not available during this wave of Google Street View images.

G2a. Street View inconsistency
We coded block faces with a 1 for this item if there were any inconsistencies with the Google Street View images. We found the following inconsistencies during the coding process: images from different years were present for different segments of the same block face,[4] images were too blurry (e.g., a few images were taken at night), and images only covered a portion of the block or none at all.[5]

G2b. Inconsistency type (no difference between years, decline between years, improved between years, blurry image, limited Street View access, no Street View access)
For block faces that we coded with a 1 for item G2a, the type of inconsistency was recorded. For items with images from different years in different segments of the same block face, we coded block faces based on visible improvements (evidence of reinvestment based on the instrument items), decline (evidence of disinvestment and disorder based on the instrument), or no change.

The GGO Instrument was developed partly based on the following systematic field efforts:

Community Strengths Longitudinal Neighborhood Study (C-STRENGTHS): Systematic Social Observation Using Google Street View. Odgers, Candace L., Christopher J. Bates, Avshalom Caspi, Robert J. Sampson, and Terrie E. Moffitt. 2009. "Systematic Social Observation Inventory: Tally of Observations in Urban Regions (SSO i-Tour)." Irvine, CA: Adaptlab Publications.

Project on Human Development in Chicago Neighborhoods (PHDCN): Systematic Social Observation. Sampson, Robert J. and Stephen Raudenbush. 1999. "Systematic Social Observation of Public Spaces: A New Look at Disorder in Urban Neighborhoods." *American Journal of Sociology* 105(3):603–651. Access to instruments and documentation is provided online at: http://www.icpsr.umich.edu/PHDCN/.

Block Environment Inventory. Perkins, Douglas D., John W. Meeks, and Ralph B. Taylor. 1992. "The Physical Environment of Street Blocks and Resident Perceptions of Crime and Disorder: Implications for Theory and Measurement." *Journal of Environmental Psychology* 12:21–34.

Analytic Audit Tool and Checklist Audit Tool. Hoehner, Christine M., Laura K. Brennan Ramirez, Michael B. Elliot, Susan L. Handy, and Ross C. Brownson. 2005. "Perceived

[4] If there were images from different years and changes in the streetscape between years, we coded instrument items based on the most recent image year.
[5] We coded block faces with limited access when block segments were short in length and could easily be observed from adjacent streets.

Figure A.1 (Continued)

and Objective Environmental Measures of Physical Activity among Urban Adults." *American Journal of Preventive Medicine* 28(2S2):105–116.

Irvine Minnesota Inventory for Observation of Physical Environment Features Linked to Physical Activity. Day, Kristen, Marlon Boarnet, and Mariela Alfonzo. 2005. Codebook accessed at: https://webfiles.uci.edu/kday/public/index.html.

Note on Inter-rater Reliability

We conducted inter-rater reliability tests on a set of 103 block faces that we randomly selected from the coded data. This set of block faces spanned 78 census tracts in the dataset. We hired a graduate student research assistant and trained the research assistant with three weekly one-hour in-person training sessions; we used this coding guide, e-mail correspondence, and a training set of 20 randomly selected block faces from the data. The rater completed training when inter-rater reliability was established within the training set. Because Google Street View recently updated their Chicago images to 2009 through 2012, the coder who performed the original coding recoded the set of 103 block faces to allow for comparison between the same images. Trained raters reported that identifying and coding each block face took approximately one to two minutes.

The two blinded raters had an average agreement rate of 83 percent and average kappa score of .50 across 12 instrument indicators, and Pearson and intraclass correlations of .68 and .68, respectively, for the final stage scores. Agreement was lowest—60 and 68 percent, respectively—for the amount of new land uses (N_I) and physical disorder (D_I) indicators. Distinguishing between new and old structures and noticing all of the disorder present on the block face were the most inconsistent between raters. Litter was sometimes difficult to identify due to image resolution, and raters could overlook graffiti and vandalism if they did not use the full panoramic view at each location on the block face.

Figure A.2. *Wave 2 Google Street View Gentrification Observations Coding Guide for Chicago and Seattle*

Figure A.2 (Continued)

Coding Guide and Visual Demonstration of Google Gentrification Observation[1]

GGO Instrument (last updated 5/15/2014)

O1. Observer: _____

O3b. City (Mark one.)
- □ Chicago
- □ Seattle

O3. Block ID: _____

O4. Block face direction (e.g., north, southwest): _____

O5. Street address: _____

O6. GSV image month (most recent): _____

O7. GSV image year (most recent): _____ _____

L1. The primary land use for the block face is: (Mark one.)
- □ residential
- □ commercial
- □ institutional (e.g., school, hospital)
- □ mixed residential/commercial/institutional (> 1/3)
- □ industrial
- □ other: _____

L1b. Notes on land use if "industrial" or "other" selected:
_____
_____
_____ _____

P0. % of structures considered old: (Mark one.)
- □ None
- □ 1-25%
- □ 26-50%
- □ 51-75%
- □ 76-100%

[1] The detailed characteristics for each indicator of the instrument described are specific to Chicago and Seattle, although the GGO instrument was also tested in Boston, MA and Philadelphia, PA with similar results overall. However, due to variation between cities in building stock, public infrastructure styles, and land markets, we recommend that the specific characteristics used to identify each indicator be adjusted accordingly.

Figure A.2 (Continued)

P1. For land uses that are NOT NEW, most (>75%) appears to be in GOOD condition—well-kept, attractive, sizeable (as opposed to at least some being in fair/poor condition OR all land uses are new): (Mark one.)

- □ Yes
- □ No

N1. Amount of NEW (rehab or new construction since HW baseline year (1995 for Chicago, 1998 for Seattle) land uses: (Mark one.)

- □ 0%
- □ 1-10%
- □ 11-50%
- □ >50%

N1b. What % of structures appear to be either NEW or OLD and in good condition (well-kept, attractive, and sizeable)? (round to nearest multiple of 5) _____

N2. New signs or structures controlling traffic (e.g., speed, pedestrian crossing, bike lanes, or parking) (Mark one.)

- □ Present
- □ Absent

N3. New public courtesies (e.g., bus stop or subway entrance, street furniture, bike racks, public trash cans, street lamps, parking pay machines) (Mark one.)

- □ Present
- □ Absent

N4. New large-scale development (e.g, luxury high-rise condos, large residential/commercial developments (>75% block), converted industrial use) (Mark one.)

- □ Present
- □ Absent

B1. Signs discouraging disorder (neighborhood watch, anti-littering/loitering/drug use/vandalism/graffiti (including if painted over), art) (Mark one.)

- □ Present
- □ Absent

B2. Beautification of personal frontage (e.g., landscaping/gardening, patio/yard furniture, decorate signage) (Mark one.)

- □ Present
- □ Absent

B3. Vacant area and public street frontage, beautification, upkeep, fencing, or set for construction (e.g., landscaping/gardening, planters, vacant lot fencing or in use) (Mark one.)

- □ Present
- □ Absent

Figure A.2 (Continued)

D1. Physical disorder (e.g., garbage, litter, graffiti, or vandalism) (> 2 on a scale from 0 to 6) (Mark one.)
- □ Present
- □ Absent

D2. Unkempt vacant area or public street frontage (e.g., overgrown grass/weeds) (Mark one.)
- □ Present
- □ Absent

D3. Structures that appear to be burned out, boarded up, or abandoned or in poor/badly deteriorated condition (e.g., structural repairs needed, peeled paint, deteriorated siding) (Mark one.)
- □ Present
- □ Absent

M1. Commercial uses that align with cultural aspects of gentrification (e.g., cafes, trendy restaurants/bars, pet stores, organic food markets, boutiques, art galleries) (Mark one.)
- □ Present
- □ Absent

M1b. Please describe these commercial uses: _____
_____

M2. Indicator of foreign presence (e.g., signs in another language, for foreign/ethnic clientele, locally-owned foreign/ethnic business) (Mark one.)
- □ Present
- □ Absent

M2b. Please describe indicators of foreign presence (note ethnicity): _____
_____

M3. Are people visible on the block face? (Mark one.)
- □ Present
- □ Absent

M3b. Please describe visible people (note race/ethnicity, age, amount). _____
_____

O8. Are there distinct inconsistencies among the Google Street View images? (Mark one.)
- □ No
- □ Yes: No different between years
- □ Yes: Decline between years
- □ Yes: Improved between years
- □ Yes: Blurry image
- □ Yes: Limited Street View access
- □ Yes: No Street View access

Figure A.2 (Continued)

□ Other: _____

O9. Notes on overall block face condition: _____
_____
_____
_____
_____
_____
_____
_____

T1. Which years of images are available for this block face? (Check all that apply.)

□ 2007
□ 2008
□ 2009
□ 2010
□ 2011
□ 2012
□ 2013
□ 2014

T2. Are there major differences between previous image years and the most recent year? (e.g., new construction, demolition, change in businesses, decline or beautification of vacant lots, change in vacant or abandoned houses) (Mark one.)

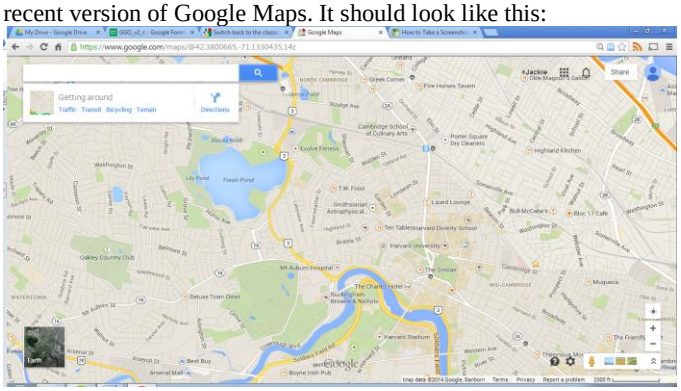
□ Yes
□ No

T2b. If answered yes above, briefly describe differences between image years. _____
_____

Figure A.2 (Continued)

Coding Procedures

1. Enter https://maps.google.com/ in your web browser. Check that you are using the most recent version of Google Maps. It should look like this:



The newer version is necessary for answering questions T1 and T2, which do not require browsing along the block. However, because the new version of Google Maps has many components, it may be slow. If this is the case, switch back to Classic Google Maps to conduct observations. Instructions to do so can be found here: https://support.google.com/maps/answer/3045828?hl=en.

2. Enter the provided longitude and latitude into the search bar and press "enter." The map will center to the location entered.

3. In each observation, only one side of the street (a *block face*) should be coded. Use the census block maps to identify which side of each block face should be coded. Below are the links for the census block maps. The first link on these pages, "_000.pdf," provides an overall map of each city with the numbered map that pertains to each area. Once you identify the numbered area that contains the block that you are coding, you can click on the map for that number and zoom into the map to identify which side of the block matches the block ID.:
   a. Chicago: http://www2.census.gov/geo/maps/blk2000/st17_Illinois/Place/1714000_Chicago/
   b. Seattle: http://www2.census.gov/geo/maps/blk2000/st53_Washington/Place/5363000_Seattle/
   c. A note on census geography: block face ϵ block (ϵ block group) ϵ tract

   d. Example: You are given the following block ID, latitude and longitude: 530330092002012, 47.6008861560001, -122.33566272.
      i. After entering the latitude and longitude into Google Maps, you see that the location appears to be in the area numbered 14 in the Seattle map "_000.pdf".

ii. Click on the link for the map "_014.pdf" from the census link above.
iii. The tract number and block number are in the block ID:
53033[**009200**]2102 – the tract number is 92.00 (labeled as 92);
53033009200[**2102]** – the block number is 2012.
iv. Zoom in on the area labeled "92" on Map 14, and you will find the block "2012". From there you can see that the block is bordered by Alaskan Way on the west, S Washington Street on the north, 1st Avenue south on the east, and S Main Street to the south. Therefore, these are the sides of the street blocks that you would want to be observing.

4. Drag the "pegman" (the orange figure in the lower right hand corner by the zoom bar) to one end of the block face. This will bring your screen to the Google Street View application.

5. To move forward and back along the street, use the up and down arrow keys on your keyboard or click along the street with your mouse. To get panoramic views, use the right and left arrow keys on your keyboard or drag on the screen with your mouse. To zoom in and out, use the scroll button on your mouse or click on the "+" and "—" buttons below the compass in the upper left-hand side of the Google Street View screen.

6. Start at one end of the block face and move up and down the street, zooming in on things that require a closer look and checking panoramic views from each location along the block face until you reach the end of the block face. For consistency, start at the end of the block face such that you will be coding the **right** side of the street.

7. View the years for which images are available by clicking on the clock image in the upper left hand corner (only available with the New Google Maps version, not Classic version). A window will drop down, and the slider below the image indicates which years have images available.

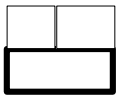
8. Code all block faces of each block. **Be sure you are coding the correct side of the street and with the most recent image year (unless instructed otherwise).**

Figure A.2 (Continued)

Detailed Description for Each GGO Instrument Item

Notes:

- Each entry is for one block face.
- For blocks in which the block face is intersected by other blocks, code each section of the block face as separate observations.
  - E.g.: The north side of the bolded block should be coded as two separate entries.



- Only code parcels on the block face and ignore structures that are visible from the observed block face but are part of parcels on adjacent block faces.
- Code the right side of the street for all block faces, i.e., start at the end of the street such that the side of the street relevant to the block id pertains to the right side.
- In some cases, street view images in one year are available for only some segments of a block face, and older images are available for other segments of the block. Code the block face for the most recent image year.
- In some cases, street view access is not available for portions or entire block face segments, but if the block face segment is visible from adjacent block faces or segments of the block face, code the block face based on what is visible utilizing the zoom features. Be sure to note this discrepancy in questions O8 and O9.

O1. Observer: _____

Enter coder's name.

O3b. City (Mark one.)

- □ ***Chicago***
- □ ***Seattle***

Indicate which city pertains to the block face.

O3. Block ID: _____

Enter the 15 digit block ID.

O4. Block face direction (e.g., north, southwest): _____

Enter which side of the block pertains to the data entry.

- Possible entries: west, northwest, north, northeast, east, southeast, south, southwest, middle (west), middle (northwest), middle (north), middle (northeast), middle (east), middle (southeast), middle (south), middle (southwest).
- "Middle" indicates block faces that are accessible in Google Street View but may not be on the border of the block.
- Some examples:

Figure A.2 (Continued)

O5. Street address: _____

Enter the street number and street name at the start of the block face. The address is listed in the upper left hand corner. The New Google Maps gives a range of numbers sometimes—just enter the beginning of the range.

- If there is no street number for the entire block face, simply enter the street name.
- If you do not have Google Street View access to the block face, enter "n/a".

O6. GSV image month (most recent): _____

Enter the month of the most recent image year. Google Street View defaults to the most recent image available. The month and year is listed at the bottom of the image under "Image capture" and in the upper left corner next to the clock and under the address.

O7. GSV image year (most recent): _____

Enter the year of the most recent image year. Google Street View defaults to the most recent image available. The month and year is listed at the bottom of the image under "Image capture" and also in the upper left corner next to the clock and under the address.

L1. The primary land use for the block face is: (Mark one.)

- □ ***residential***
- □ ***commercial***
- □ ***institutional (e.g., school, hospital)***
- □ ***mixed residential/commercial/institutional (> 1/3)***
- □ ***industrial***
- □ ***other:*** _____

Any land use that is at least 1/3 of the spatial area that the parcels of the block face occupy is considered to be "primary." Include areas set for construction or under construction if the land use is distinguishable (e.g., based on signage). Abandoned or vacant parcels should also be included based on its original use. Code any converted land uses as its current use.

- "Residential land use" consists of structures that appear to be used as single- or multi-family dwellings, including public or subsidized housing.
- "Commercial land use" consists of structures that appear to be used as office or retail space and also includes small (single-level) warehouse structures and parking garages.
- "Institutional land use" consists of structures that appear to be used primarily as schools (including nonresidential university buildings), religious institutions, and medical facilities.
- "Mixed" includes any blocks if more than one of the first three listed land uses is considered "primary".

Figure A.2 (Continued)

- "Industrial land use" consists of structures that appear to be used for manufacturing, assembly, and large warehouse use.
- "Other" consists of any land uses not included above (e.g., highways, subway and railway tracks, parking lots, stadiums, recreational parks and fields, brownfields, undeveloped vacant lots, miscellaneous green space between highways, and rail tracks) or if there is no Google Street View access to the block face such that the land use was indistinguishable. Enter the land use in the provided blank or "no GSV access"

L1b. Notes on land use if "industrial" or "other" selected:

_____

_____

_____ _____

Only blocks with residential, commercial, institutions, or mixed land uses will be coded for gentrification. For industrial or other land uses, enter any notes related to the other indicators in this box (e.g., litter, visible people). Leave blank for residential, commercial, institutional, or mixed land uses.

The remaining items of the instrument only pertain to residential, commercial, institutional, or mixed land uses.

For the next 4 instrument items, first categorize structures based on the exterior as "older" structures versus "new" construction/renovation. "Older" applies to anything built approximately before the baseline year for the city (Chicago—1995; Seattle—1998). The following characteristics are guides for determining if a residential or commercial structure is "new" (includes new construction or renovation):

- modern design: sleek, geometric, glass or steel exterior materials, lack of ornate detailing around window frames and façade, lack of aluminum siding, lack of outdated awnings
- sandblasted brick or paint—unstained and bright
- reconstructed or restored porches and balconies, window frames, and doors: fresh paint, well-kept and attractive, modern design; glossy windows
- new signage (e.g., house numbering, store sign)

In addition, signage will often indicate if a building is "new," such as for sale or lease signs advertising new renovations.

For large-scale multi-unit dwellings (50+ units), we used the following characteristics to determine if a structure was "new":

- modern design: sleek, geometric, glass or steel exterior materials, large windows, rectangular, no concrete
- new balconies: fresh paint, well-kept and attractive, modern design
- new signage (e.g., building name), entryways, and walkways: no cracks in pavement, fresh paint, modern design
- conversions from industrial use

Because commercial uses can change frequently and undergo renovation with each change, buildings with mixed uses may have "new" (rehabbed) commercial structures with older residential units above the storefronts.

Figure A.2 (Continued)

For all land uses, at least two characteristics should be present to be considered as "new." In addition, structures must not have any of the following: peeling or faded paint, obvious necessary structural repairs, or deteriorated or discolored siding or brick. If buildings are undergoing construction or major rehabilitation at the time of observation, these are considered to be "new."

These characteristics are consistent with accounts of gentrification as a process of preservation and restoration of older homes and converted-use warehouses, as well as new-build gentrification of modern home construction and condominiums. Because our working definition of gentrification entails reinvestment and renewal, we consider any new construction, both modest and luxury quality, as reinvestment in a neighborhood. We categorize structures that do not fit this description as older.

It is sometimes difficult to distinguish between new construction/rehabilitation and older homes that are well-kept, attractive, and sizeable. Use your best judgment, and question N1b and the way in which the scores will be eventually aggregated attempt to deal with this uncertainty. A block face categorized as having most of its older homes in well-kept, attractive, and sizeable condition would receive the same structural mix score as a block face with all of its homes, both new and old, in well-kept, attractive, and sizeable condition, even if the coder only categorized a fraction of the homes as older. In addition, the block face would receive a similar structural mix score if all of the structures were coded as newly constructed or rehabilitated.

P0. % of structures considered old: (Mark one.)

- □ ***None***
- □ ***1-25%***
- □ ***26-50%***
- □ ***51-75%***
- □ ***76-100%***

Of the total volume of buildings, including those set for construction or under construction, on the block face, check the box that best indicates the number of buildings categorized as older.

P1. For land uses that are NOT NEW, most (>75%) appears to be in GOOD condition—well-kept, attractive, sizeable (as opposed to at least some being in fair/poor condition OR all land uses are new): (Mark one.)

- □ ***Yes***
- □ ***No***

The purpose of this indicator is to determine the preexisting structural condition of the block face, particularly if structures on the block face have been in good condition for an extended period of time, i.e., if this block predominantly "middle- or upper-middle-class" at the time of the baseline surveys (Chicago—1995; Seattle—1998). If at least 75% of the structures categorized as older are "well-kept, attractive, and sizeable," mark "yes."

The following characteristics indicate if a structure is "well-kept, attractive, and sizeable":

- absence of peeling or faded paint, no obvious structural repairs needed, and no deteriorated or discolored siding or brick

- porches and balconies, windows and frames, doors, signage (e.g., house numbering, business signage), entryways, storefronts, and walkways beyond basic design or décor with luxury decor; no outdated decor (e.g., old awnings)

For older, large scale multi-unit dwellings (50+ units), buildings must have luxury entryways and updated accessories and are often accompanied by elaborate landscaping. For older, office buildings, the exterior and entryway must be well-maintained, and the exterior/architectural design should be beyond basic design or décor. For older, commercial businesses, only include businesses that cater specifically to middle- or upper-class clientele (e.g., not McDonald's). In some cases, the front façade of a building is well-kept but not the sides. Rate the building based on the side facing the block face being observed. Rate the building based on the side facing the block face being observed.

See Figures 1-11 below for examples of older houses that are not well-kept, attractive, and sizeable according to the characteristics listed above (Figs. 1 and 2); older houses that are well-kept, attractive, and sizeable according to the characteristics listed above (Figs. 3 and 4); new residences according to the characteristics listed above (Figs. 5 and 6); an older office building that is not well-kept, attractive, and sizeable according to the characteristics listed above based on its basic design (Fig. 7); a newer office building (Fig. 8); an older, larger apartment building that is not well-kept, attractive, and sizeable (Fig. 9); an older, larger apartment building that is well-kept, attractive, and sizeable (Fig. 10); and a new larger apartment building (Fig. 11).

Fig. 1. Older residence and not well-kept in Chicago
1410 W Huron St, Chicago, IL

Fig. 2. Older residence and not well-kept in Seattle
1560 NE 50th St, Seattle, WA

Figure A.2 (Continued)

Fig. 3. Older residence and well-kept in Chicago
1428 W Huron St, Chicago, IL

Fig. 4. Older residence and well-kept in Seattle
829 NE 59th St, Seattle, WA

Fig. 5. New residence in Chicago
1410 W Huron St, Chicago, IL

Fig. 6. New residence in Seattle
1308 Lakeview Blvd E, Seattle, Wa

Fig. 7. Older office building, basic design
438 12th Ave, Seattle, WA

Fig. 8. Newer office building
413 S Jackson St, Seattle, WA

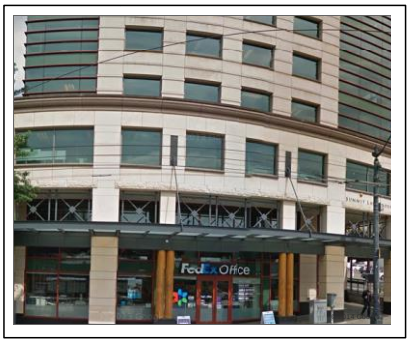


Figure A.2 (Continued)

Fig. 9. Older large apartment building, not well-kept
5039 S Champlain Ave, Chicago, IL

Fig. 10. Older large apt. building, well-kept
1019 W Foster Ave, Chicago, IL

Fig. 11. New large apartment building
901 N Kingsbury St, Chicago, IL

N1. Amount of NEW (rehab or new construction since HW baseline year (1995 for Chicago, 1998 for Seattle) land uses: (Mark one.)

- □ ***0%***
- □ ***1-10%***
- □ ***11-50%***
- □ ***>50%***

Of the total volume of buildings, including those set for construction or under construction, on the block face, check the box that best indicates the number of buildings categorized as new.

N1b. What % of structures appear to be either NEW or OLD and in good condition (well-kept, attractive, and sizeable)? (round to nearest multiple of 5) _____

Please give an estimate of the total percent of the total volume of buildings, including those set for construction or under construction, that are either new or older and in good condition. Round to the nearest multiple of 5.

N2. New signs or structures controlling traffic (e.g., speed, pedestrian crossing, bike lanes, or parking) (Mark one.)

□ ***Present***
□ ***Absent***

This indicator captures aspects of public reinvestment. Traffic signs and structures include speed limitation signs or speed bumps, pedestrian crosswalks and signs, bike lanes, parking limitation signs (e.g., handicap parking, no parking times), and any other public signs controlling traffic. "New" refers to signs and structures that appear to have been installed since the baseline year for the city. The following characteristics indicate new signs or structures:

- Signs: bright and unfaded paint or print
- Structures: speed bumps or crosswalks in the road without cracks or obvious repairs needed and bright and unfaded paint on the road.

Note that vandalism or graffiti is a separate indicator that does not affect the coding of the age of traffic signs and structures.

N3. New public courtesies (e.g., bus stop or subway entrance, street furniture, bike racks, public trash cans, street lamps, parking pay machines) (Mark one.)

□ ***Present***
□ ***Absent***

This indicator captures aspects of public reinvestment in public space. Public courtesies include bus stops or subway entrances, public seating, bike racks, public trash cans, newspaper stands, mailing depositories, and street lamps. "New" refers to signs and structures that appear to have been installed or rehabilitated since the baseline year for the city. The following characteristics indicate new public courtesies:

- Bright and unfaded paint without obvious repairs needed
- Bus stops, subways entrances, public trash cans, and street lamps: modern design or décor.

Note that vandalism or graffiti is a separate indicator that does not affect the coding of the age of public courtesies. Modern bus stops and modern public trash cans in Chicago appear as in Figs. 12 and 13 below. In addition, solar powered compacter trashcans are also new.

Fig. 12. Modern bus stop in Chicago
Address: 1809 West Polk Street

Fig. 13. Modern public trash can in Chicago
Address: 2986 North Sheridan Road

N4. New large-scale development (e.g, luxury high-rise condos, large residential/commercial developments (>75% block), converted industrial land use) (Mark one.)

- □ ***Present***
- □ ***Absent***

This indicator captures aspects of very large-scale reinvestment. This indicator is considered to be present if the structures that the coder considered to be "new" are also any of the following:

- luxury high-rise (10+ stories) condominiums or offices, often indicated by signage, entryways, or walkways beyond basic design or décor (see Figure 14).
- large residential or commercial plazas that occupy at least the entire block face
- large single-family homes or low-rise (<5 stories) developments that occupied at least 75% of the block face, often indicated by homogeneous architectural design with signage, entryways, and walkways beyond basic design or décor and that occupy at least the predominant land use of the block face
- warehouse buildings being used for residential or commercial purposes based on the signage, entryways, and walkways indicating converted industrial land use (see Fig. 15).

This indicator only applies to structures that are considered to be "new." This indicator is present if areas under construction have signage indicating this land use.

Fig. 14. Luxury high-rise condominiums
Address: 705 North Dearborn Parkway

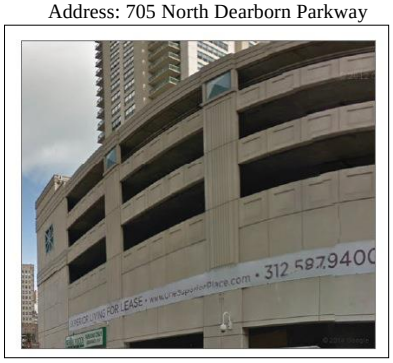
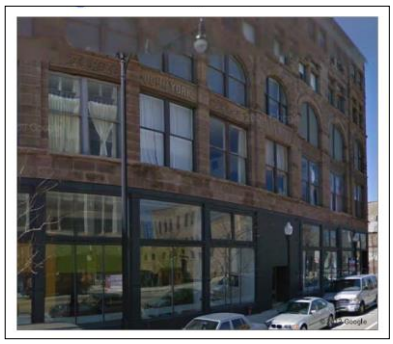


Fig. 15. Converted industrial use
Address: 1962 South Halsted Street



B1. Signs discouraging disorder (neighborhood watch, anti-littering/loitering/drug use/vandalism/graffiti (including if painted over), art) (Mark one.)

- □ ***Present***
- □ ***Absent***

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures through signs of efficacy to counter disorder. This includes street signs explicitly discouraging crime and disorder (e.g., neighborhood watch, littering, loitering, drug use, vandalism, and graffiti), painting over graffiti, mural or sculptural art, and community markers (e.g., structures or sculptures that signify a community). This indicator does not include banners and signs on lamp posts or signs controlling traffic and parking, security cameras or emergency phone stands that are often found on college and hospital campuses, or security signs

Figure A.2 (Continued)

on personal property (e.g., “no loitering”, “no trespassing”). Paint over graffiti is often evident due to inconsistent paintbrush strokes and coloring.

B2. Beautification of personal frontage (e.g., landscaping/gardening, patio/yard furniture, decorate signage) (Mark one.)

- □ ***Present***
- □ ***Absent***

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures through signs of efficacy to beautify the visible frontage of private space that is separate from the basic painting and upkeep of the building structure and façade. This indicator is present if any of the following are visible:

- evidence of well-kept landscaping or gardening work
- updated patio or yard furniture
- planters and accessories beyond basic grass maintenance

For non-large-scale residential structures, this includes modest landscaping (e.g., planted shrubs). For large-scale, multi-family residential or commercial structures (50+ units), we considered beautification present if there was landscaping or gardening work that was intentionally decorative, that is, beyond basic grass maintenance or planted trees and shrubs with no distinguishable design. Fencing is not included for this indicator. For commercial businesses, this includes decorative signage and frontage beyond basic design or décor and with no signs of deteriorated condition or repairs needed.

B3. Vacant area and public street frontage, beautification, upkeep, fencing, or set for construction (e.g., landscaping/gardening, planters, vacant lot fencing or in use) (Mark one.)

- □ ***Present***
- □ ***Absent***

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures, through signs of efficacy to beautify visible public space (e.g., vacant lot areas and frontage areas from sidewalks to the street). Areas are only considered to be vacant if they are clearly separate from other residences and structures and do not appear to be established park or recreational areas. This indicator is present if any of the following are visible:

- evidence of landscaping or gardening work, yard furniture, and planters and accessories in public space, including basic grass maintenance or planters on the sidewalk
- improvement of vacant spaces, including fencing, grounds maintenance, or indication of future construction

This indicator does not include planted trees without additional planters or accessories. Vacant areas need only show any sign of maintenance and may also have other visible signs of disorder (e.g., litter).

D1. Physical disorder (e.g., garbage, litter, graffiti, or vandalism) (> 2 on a scale from 0 to 6) (Mark one.)

- □ ***Present***
- □ ***Absent***

Figure A.2 (Continued)

This indicator captures if there are any visible aspects of physical disorder that discourage reinvestment in a neighborhood, beyond physical building structures, through signs that show a lack of efficacy to counter visible physical disorder. Based on the following criteria, rate the degree of physical disorder present on the block face on a scale from 0 (none) to 6 (very heavy):

- light garbage, litter, or broken glass on the street or sidewalk
- graffiti (not painted over) on buildings, signs, or walls
- vandalism of any signs, public courtesies, or objects in private or public frontage (e.g., yard furniture or planters).

If the coder considers the amount of physical disorder on the block face to be greater than 2 (light), then this indicator is considered to be present. This rule is intended to eliminate uncertainty with small pieces of garbage, litter, and broken glass that are sometimes hard to distinguish due to the resolution of the images.

D2. Unkempt vacant area or public street frontage (e.g., overgrown grass/weeds) (Mark one.)

□ ***Present***
□ ***Absent***

This indicator captures if there are any visible aspects of physical disorder that discourage reinvestment in the neighborhood, beyond physical building structures, through signs that show a lack of efficacy to counter visible physical disorder in public spaces (e.g., vacant lot areas, frontage areas from sidewalks to the street). Areas are only considered to be vacant if they are clearly separate from other residences and structures and do not appear to be established park or recreational areas. This indicator is considered to be present if any of the following are visible:

- overgrown grass and weeds

Vacant lots can simultaneously be unkempt as well as exhibit signs of beautification/upkeep (e.g., fencing).

D3. Structures that appear to be burned out, boarded up, or abandoned or in poor/badly deteriorated condition (e.g., structural repairs needed, peeled paint, deteriorated siding) (Mark one.)

□ ***Present***
□ ***Absent***

This indicator captures if there are any visible aspects of physical decay of the building structures. This indicator is considered to be present if any of the following are visible:

- severe lack of maintenance and upkeep of any properties
- boarded up or burned out windows or doors
- serious structural repairs needed
- large amounts of peeled paint or badly deteriorated siding

The degree of deterioration must be so severe that the place is not habitable, though sometimes the property may be occupied.

M1. Commercial uses that align with cultural aspects of gentrification (e.g., cafes, trendy restaurants/bars, pet stores, organic food markets, boutiques, art galleries) (Mark one.)

□ ***Present***

Figure A.2 (Continued)

□ ***Absent***

This indicator is considered to be present if any commercial uses are visible that align with the cultural aspects of gentrification, such as cafes, trendy restaurants/bars, upscale fast food, pet stores, organic food markets, boutiques, art galleries, bike stores, etc.

M1b. Please describe these commercial uses: _____
_____ _____

Briefly identify the commercial uses that align with the cultural aspects of gentrification (e.g., "café, art gallery"). This question must be answered if indicator M1 is marked as present.

M2. Indicator of foreign presence (e.g., signs in another language, for foreign/ethnic clientele, locally-owned foreign/ethnic business) (Mark one.)

□ ***Present***
□ ***Absent***

This indicator is considered to be present if any commercial uses or signs are visible that indicate a foreign presence, such as signs in another language, foreign/ethnic restaurants, or businesses catering to a foreign clientele.

M2b. Please describe indicators of foreign presence (note ethnicity): _____
_____ _____

Briefly identify the foreign presence (e.g., "Asian restaurant"). This question must be answered if indicator M2 is marked as present.

M3. Visible people? (Mark one.)

□ ***Present***
□ ***Absent***

This indicator is considered to be present if any people are visible on the block face.

M3b. Please describe visible people (note race/ethnicity, age, amount). _____
_____ ____

Briefly and generally describe the visible people (e.g., "few, mostly black, elderly"). Note the following if distinguishable:

- race/ethnicity: mixed, mostly black, mostly white, mostly latino, mostly Asian, etc.
- age: mixed, children/teens (<20), young adults (20s, 30s), middle-aged (40s, 50s), elderly (60s+)
- amount of people: few (<5), some (5-20), many (>20)

This question must be answered if indicator M3 is marked as present.

O8. Are there distinct inconsistencies among the Google Street View images? (Mark one.)

□ ***No***

Figure A.2 (Continued)

- □ ***Yes: No different between years***
- □ ***Yes: Decline between years***
- □ ***Yes: Improved between years***
- □ ***Yes: Blurry image***
- □ ***Yes: Limited Street View access***
- □ ***Yes: No Street View access***
- □ ***Other: _____***

Indicate whether there were issues with Google Street View that may have affected one's ability to code the block face. The following options are most common:

- If street view images in one year are available for only some segments of the block face, and older images are available for other segments of the block, indicate if there were any substantial differences between years based on the indicators (e.g., the presence of N1, N2, N3, N4, B1, B2, B3 would be considered "improvements," and the present of D1, D2, or D3 would be considered "declines").
- If the observer coded the block face but images were blurry (e.g., some images taken at night), select "Yes: Blurry image."
- If street view was only accessible for a portion of the block face, even if the entire block was visible from various adjacent points of the block face, or the structures were not visible (e.g., trees covering the view of an entire house), select "Yes: Limited Street View access." If street view was not accessible at all for the block face, even if the entire block was visible from various adjacent points of the block face, select "Yes: No Street View access."

If there are other issues with Street View that may have affected one's ability to code the block face, select "Other," and briefly note the issue.

O9. Notes on overall block face condition: _____

_____ _____
_____
_____
_____
_____
_____

Describe the overall condition of the block face, including specific visible items that justify decisions in the coding process. This description allows the option for creating further codes without revisiting every entry on Street View.

- Example: "new mid-rise apt developments under construction--one is almost built and for senior housing, several lots sectioned off for construction, new low-rise apts, beautification"

T1. Which years of images are available for this block face? (Check all that apply.)

- □ ***2007***
- □ ***2008***
- □ ***2009***
- □ ***2010***

Figure A.2 (Continued)

□ ***2011***
□ ***2012***
□ ***2013***
□ ***2014***

This indicator is based on the new Google Street View Timeline feature. Select a point in the middle of the block face. Click on the clock or the words "Street View – [Month] [Year]." An image will drop down, and the slider below the image indicates which years have images available. Each white dot indicates an available image. Check all years that apply.

T2. Are there major differences between previous image years and the most recent year? (e.g., new construction, demolition, change in businesses, decline or beautification of vacant lots, change in vacant or abandoned houses) (Mark one.)

□ ***Yes***
□ ***No***

Use the panoramic feature to assess the block face from the selected point in the middle of the block face for each image year. Indicate if there are major differences between previous image years and the most recent year, such as new construction or demolition, change in businesses, major decline or beautification of vacant lots, major changes in vacant or abandoned houses.

T2b. If answered yes above, briefly describe differences between image years. _____

If answered "Yes" in Question T2, very briefly describe the differences (e.g., "new apts constructed"). "). This question must be answered if indicator T2 is marked as yes.

Figure A.2 (Continued)

The GGO Instrument was developed partly based on the following systematic field efforts:

Community Strengths Longitudinal Neighborhood Study (C-STRENGTHS): Systematic Social Observation Using Google Street View. Odgers, Candace L., Christopher J. Bates, Avshalom Caspi, Robert J. Sampson, and Terrie E. Moffitt. 2009. "Systematic Social Observation Inventory: Tally of Observations in Urban Regions (SSO i-Tour)." Irvine, CA: Adaptlab Publications.

Project on Human Development in Chicago Neighborhoods (PHDCN): Systematic Social Observation. Sampson, Robert J. and Stephen Raudenbush. 1999. "Systematic Social Observation of Public Spaces: A New Look at Disorder in Urban Neighborhoods." *American Journal of Sociology* 105(3):603–651. Access to instruments and documentation is provided online at: http://www.icpsr.umich.edu/PHDCN/.

Block Environment Inventory. Perkins, Douglas D., John W. Meeks, and Ralph B. Taylor. 1992. "The Physical Environment of Street Blocks and Resident Perceptions of Crime and Disorder: Implications for Theory and Measurement." *Journal of Environmental Psychology* 12:21–34.

Analytic Audit Tool and Checklist Audit Tool. Hoehner, Christine M., Laura K. Brennan Ramirez, Michael B. Elliot, Susan L. Handy, and Ross C. Brownson. 2005. "Perceived and Objective Environmental Measures of Physical Activity among Urban Adults." *American Journal of Preventive Medicine* 28(2S2):105–116.

Irvine Minnesota Inventory for Observation of Physical Environment Features Linked to Physical Activity. Day, Kristen, Marlon Boarnet, and Mariela Alfonzo. 2005. Codebook accessed at: https://webfiles.uci.edu/kday/public/index.html.

Note on Inter-rater Reliability

We conducted inter-rater reliability tests on a set of 103 block faces that we randomly selected from the coded data. This set of block faces spanned 78 census tracts in the dataset. We hired a graduate student research assistant and trained the research assistant with three weekly one-hour in-person training sessions; we used this coding guide, e-mail correspondence, and a training set of 20 randomly selected block faces from the data. The rater completed training when inter-rater reliability was established within the training set. Because Google Street View recently updated their Chicago images to 2009 through 2012, the coder who performed the original coding recoded the set of 103 block faces to allow for comparison between the same images. Trained raters reported that identifying and coding each block face took approximately one to two minutes.

The two blinded raters had an average agreement rate of 83 percent and average kappa score of .50 across 12 instrument indicators, and Pearson and intraclass correlations of .68 and .68, respectively, for the final stage scores. Agreement was lowest—60 and 68 percent, respectively—for the amount of new land uses (N_I) and physical disorder (D_I) indicators. Distinguishing between new and old structures and noticing all of the disorder present on the block face were the most inconsistent between raters. Litter was sometimes difficult to identify due to image resolution, and raters could overlook graffiti and vandalism if they did not use the full panoramic view at each location on the block face.

Figure A.2 (Continued)

Examples and Explanations for Coding Decisions

Example block face 1

803 North Cambridge Avenue, Chicago, IL

Example Block Face 1: 803-869 N. Cambridge Avenue, Chicago, IL 60610 (east block face)

O1. jh	P1. No	D3. Present	boarded up, boarded
O3b. Chicago	N1. 0%	M1. Absent	up entry area with
O3. 170310819001010	N1b. 0	M1b.	graffiti painted over
O4. West	N2. Absent	M2. Absent	and litter
O5. 821 N Cambridge	N3. Absent	M2b.	T1. 2007, 2011
Ave	N4. Absent	M3. Present	T2. Yes
O6. Jun	B1. Present	M3b. one young adult	T3. More boarded up
O7. 2011	B2. Absent	black woman	windows in 2011
L1. Residential	B3. Absent	O8. No	
L1b.	D1. Present	O9. older low-rise apt	
P0. 76-100%	D2. Absent	buildings—look	

- The block face consists of low-rise apartments that are part of a larger apartment development.
- We categorized all of the structures as older due to their lack of modern design, no sandblasted brick, no new signage or walkways, and the presence of deteriorated and discolored brick. The deteriorated brick and basic design of windows and frames, doors, and entryways, as well as the small size of units based on the spacing between exterior doors indicate these are not all "well-kept, attractive, and sizeable" units, i.e., middle- and upper-middle class residential areas since 1995. Therefore, we coded this as "76-100%" for P0, "No" for P1, "0%" for N1, and "0" for N1b.
- There are no visible new signs or public courtesies on the block face. The signs for street names are well-kept but are not traffic signs. Given that there are no "new" structures, there are no new developments present on the block. Therefore, we coded N2, N3, and N4 as "Absent."
- There appears to be painted over graffiti towards the end of the block (870 N. Cambridge Ave), indicated by the uneven paint color and brush strokes and faint black paint underneath. Therefore, we coded B1 as "Present." There is no beautification in front of these houses or in the public space (e.g., sidewalk). Therefore, we coded B2 and B3 as "Absent."
- There is some litter present at the beginning of the block and in the middle of the block and therefore coded D1 as "Present." Given that there are no vacant lots or public street frontage

grass, there were not any unkempt areas. Therefore, we coded D2 as "Absent." There are boarded up windows throughout the block and in the structure at the beginning of the block that appears to be once used for security/entry. Therefore, we coded D3 as "Present."

- Given that there are no commercial uses, commercial uses related to gentrification are absent. There are no indicators of foreign presence. Therefore, we coded M1 and M2 as "Absent." A young adult black woman is visible walking around 835 N Cambridge Ave, and we therefore coded M3 as "Present."
- The images are from 2011 for the entire block and the block face is fully visible. Therefore, we coded O8 as "No." Based on 835 N Cambridge Ave, the timeline has images for 2007 and 2011. The 2007 image has a family sitting outside of a house and some more litter. There appear to be more boarded up windows in 2011.

Example block face 2
Address: 524 North Bishop Street, Chicago, IL

Example Block Face 2: 503–598 N. Bishop Street, Chicago, IL 60642 (East block face)

O1. jh	N1b. 90	M2. Absent	building with updated
O3b. Chicago	N2. Present	M2b.	entryway—appears
O3. 170312433003000	N3. Absent	M3. Yes	rehabbed, two other
O4. west	N4. Absent	M3b. one young adult	houses/split-levels—
O5. 803 N Bishop St	B1. Absent	white male	one with modern
O6. Sep	B2. Present	O8. No	design, the other has
O7. 2013	B3. Present	O9. new townhouses,	updated entryways
L1. Residential	D1. Present	large vacant lot for	T1. 2007, 2009, 2011,
L1b.	D2. Present	sale—fenced and well-	2013
P0. 1-25%	D3. Absent	kept but litter,	T2. Yes
P1. No	M1. Absent	unkempt public	T3. Vacant lot for sale
N1. >50%	M1b.	frontage, low-rise apt	in 2013

- The block face consists of five newer townhouses, a large fenced vacant lot for sale, a townhouse with modern design, a smaller townhouse that has an older design, and a low-rise apartment building.
- We categorized all of the structures as new except the tan house, due to its lack of modern design and sandblasted brick. This structure is well-kept and has some features that are updated but not luxury beyond basic design or décor (e.g., window frames and entryway), but it appears to be a split-level home. One could arguably consider this home to be rehabbed

since 1995—with its newer entryway and window frames—and if this was the case, the block would still receive the same structural mix score. While relatively modest in design (rather than luxury), the townhomes in the image still appeared to be newly constructed. Another apartment building on the street is difficult to distinguish between older and newer, but based on its sandblasted brick and the absence of peeling paint, no obvious structural repairs needed, no deteriorated siding or brick, and well-kept entryway, we categorized the building as having been rehabilitated since 1995. Therefore, we coded this block face as "1-25%" for P0, 0 for P1, ">50%" for N1, and "90" for N1b.

- The stop sign appears to be new due to its bright paint, even though it has been vandalized with stickers, and the crosswalk at the southern end of the block is newly painted. There are no public courtesies present, and there are not new large-scale developments. The new townhouses only occupy a small fraction of the block face. Therefore, we coded this block face as "Present" for N2 and "Absent" for N3 and N4.
- There are no visible signs of efforts countering disorder, but there are planters in front of some of the townhouses and on the public street frontage between the sidewalk and street by the new townhouses. In addition, the vacant lot is fenced off and contains generally well-kept grass. Therefore, we coded B1 as "Absent" and B2 and B3 as "Present."
- There is some litter visible throughout the block, particularly at the corners and by the vacant lot. In addition, there are stickers on the stop sign. The public street frontage between the sidewalk and street is unkempt by the new townhomes and in front of the vacant lot. There is no evidence of vacant, boarded up, or decaying properties. Therefore, we coded D1 and D2 as "Present" and D3 as "Absent."
- Given that there are no commercial uses, commercial uses related to gentrification are absent. There are no indicators of foreign presence. Therefore, we coded M1 and M2 as "Absent." A young adult white man with his dog is visible in front of the new townhouses, and we therefore coded M3 as "Present."
- The images are from 2013 for the entire block and the block face is fully visible. There is some limited view of the tan house due to a tree, but because the structure is still visible from various angles, one can still determine the condition of the structure. Therefore, we coded O8 as "No." Based on 531 N Bishop St, the timeline has images for 2007, 2009, 2011, and 2013. The vacant lot is more unkempt in earlier years and has a for sale sign in the 2013 image.

Example block face 3

Address: 1445 South Peoria Street, Chicago, IL

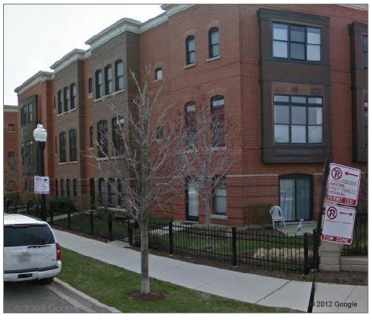


Figure A.2 (Continued)

Example Block Face 3: 1445–1519 S. Peoria Street, Chicago IL 60608 (West block face)

O1. jh	N3. Present	M3b. few middle-aged	development with
O3b. Chicago	N4. Present	white males in	modern design, next to
O3. 170312837002002	B1. Present	construction	el tracks, graffiti on
O4. east	B2. Present	O8. Yes: Improved	side of building by
O5. 1445 S Peoria St	B3. Present	between years	tracks, some litter,
O6. Sep	D1. Present	O9. Large new	security cameras,
O7. 2012	D2. Absent	townhouse	graffiti painted over in
L1. Residential	D3. Absent	development—	2012 image but not
L1b.	M1. Absent	"university village"-	2011
P0. None	M1b.	nice beautification, a	T1. 2007, 2009, 2011,
P1. No	M2. Absent	few white workers	2012
N1. >50%	M2b.	visible doing	T2. No
N1b. 100	M3. Yes	construction, large new	T3.
N2. Present		mid-rise apt	

- The block face consists of a large new townhouses/apartments complex and a new mid-rise apartment building.
- We categorized all the structures as new based on the modern design, sandblasted brick, new entryways and walkways, absence of peeling paint, no obvious structural repairs needed, and no deteriorated siding or brick. Therefore, we coded this block face as "None" for P0, "0" for P1, ">50%" for N1, and "100" for N1b.
- All of the parking signs appear to be new based on the bright paint. There are also new lampposts throughout the block face. The houses are clearly part of a large-scale development—they take about more than 75% of the block face and have identical design to each other and to buildings across the street. Therefore, we coded this block face as "Present" for N2, N3, and N4.
- There is graffiti painted over on the apartment building based on the uneven paint—only visible from 1519 S Peoria St, and there is decorative landscaping in front of all of the houses and the public street frontage between the sidewalk and street is well-maintained. Therefore, we coded B1, B2, and B3 as "Present."
- There is some graffiti on the apartment building right by the el tracks. There is no evidence of unkempt public frontage or vacant, boarded up, or decaying properties. Therefore, we coded D1 as "Present" and D2 and D3 as "Absent."
- Given that there are no commercial uses, commercial uses related to gentrification are absent. There are no indicators of foreign presence. Therefore, we coded M1 and M2 as "Absent." Several middle-aged white men are visible doing construction work, and we therefore coded M3 as "Present."
- The images are from 2012 for most of the block face and only go to 2011 by the apartment building. However, there are no major differences between years—one cannot tell if the graffiti by the el tracks disappeared, but there appears to be new graffiti painted over. Therefore, we coded O8 as "Yes: Improved between years." Based on 1496 S Peoria St, the timeline has images for 2007, 2009, 2011, and 2013, but there are no substantial differences between image years.

Table A.1. *Google Street View Gentrification Observation Instrument and Block-Face Frequency Distributions*

Observer ID				
Date				
Census Tract Number				
Census Block Number				
Block Face Address				
City		Chicago		Seattle
Survey		Wave 1	Wave 2	Wave 2
Indicator	Category	Freq.	Freq.	Freq.
L1. Land Use[a]	resid.	974	874	564
	commerc.	369	481	219
	instit.	202	170	19
	mixed	562	571	198
	indust.	71	13	3
	other	531	580	76
P1. For land uses that are not new, most or all appear to be in good condition (well-kept, attractive, sizable)	0	1,427	1,483	579
	1	478	613	421
N1. Amount of new land uses (rehab or new construction appearing to be done within approximately the last 10-15 years)	0%	727	987	335
	1-10%	125	70	43
	11-50%	419	479	297
	>50%	634	560	325
N1b. Percent of structures that appear either new or old and in good condition	Mean	n/a	64.0	73.5
	Std. Dev.	n/a	39.8	33.4
N2. New signs or structures controlling traffic (e.g., speed, pedestrian crossing, bike lanes, or parking)	0	365	217	268
	1	1,540	1,879	732
N3. New public courtesies (e.g., bus stop or subway entrance, street furniture, bike racks, public trash cans)	0	1,432	1,353	812
	1	473	743	188
N4. New large-scale development (e.g., luxury condos, large res./comm. area developments, or converted indust. use)	0	1,598	1,744	895
	1	307	352	105
N5. Residential or commercial units for sale or lease in new condition or under construction	0	1,531	n/a	n/a
	1	374	n/a	n/a
B1. Signs discouraging disorder (e.g., neighborhood watch, anti-littering/loitering/drug use/vandalism/graffiti (including if painted over or mural art))	0	1,738	1,804	787
	1	167	292	213
B2. Beautification in personal frontage	0	593	470	114
	1	1,312	1,626	886
B3. Vacant area and public street frontage beautification, upkeep, fencing, or set for construction	0	833	940	379
	1	1,072	1,156	621

Table A.1 (Continued)

D1. Lack of physical disorder (garbage, litter, graffiti, vandalism)	0	232	1,208	379
	1	743	888	621
D2. Lack of unkempt vacant areas or public street frontage	0	141	475	220
	1	1,764	1,621	780
D3. Lack of structures that appear to be burnt out, boarded up, or abandoned or in poor/badly deteriorated condition	0	222	188	78
	1	1,683	1,908	922
G1. Google Street View image year	2007	223	33	1
	2007/2009	129	n/a	n/a
	2008	n/a	0	6
	2009	1,553	127	4
	2010	n/a	0	0
	2011	n/a	1,816	1028
	2012	n/a	88	39
	2013	n/a	32	0
G2a. Street View inconsistency	0	1,658	1,956	868
	1	244	140	132
G2b. Inconsistency type	No diff. b.t. yrs	81	4	41
	Decline b.t. yrs	2	7	3
	Improved b.t. yrs	34	18	16
	Blurry image	21	5	0
	Limited Street View access	103	41	72
	No Street View access	3	65	0
Total observed block faces		1,905	2,096	1,000

Notes: Only block faces with residential, commercial, or mixed land uses were observed. The remainder of the frequency distributions presented in this table only consider the observed block faces. Google Street View access was limited particularly in block faces surrounding President Obama's home. Block faces were only coded if the indicators were discernible from all aspects of the block face. Preliminary analysis revealed that inconsistencies were unrelated to the measurement properties of the gentrification stage score.

Table A.2. *Inter-rater Reliability Results for Wave 1 and Wave 2*

	Wave 1	Wave 2
Average item agreement	0.83	0.74
Average item kappa score	0.50	0.30
Structural mix intraclass correlation	0.55	0.30
Beautification efforts intraclass correlation	0.64	0.46
Lack of disorder/decay intraclass correlation	0.46	0.39
Gentrification stage score intraclass correlation	0.68	0.47
Block faces tested	103	95

Note: Wave 2 scores presented are constructed using the same methods as Wave 1. Most disagreement occurred in distinguishing between whether buildings were new and old. Following these tests, I implemented indicators for the overall percentage of buildings in well-maintained physical condition, and measures and scores relying on Wave 2 data used this indicator in the main analyses instead.

Table A.3. *Descriptive Statistics for GGO Indicators by Census Tracts*

	Chicago, Wave 1					Chicago, Wave 2					Seattle, Wave 2				
Indicator	N	Mean	SD	Min.	Max.	N	Mean	SD	Min.	Max.	N	Mean	SD	Min.	Max.
Old structures in good condition (P_1)	140	0.26	0.25	0.00	1.00	144	0.28	0.24	0.00	1.00	42	0.42	0.21	0.07	0.86
New amount (N_1)	140	0.44	0.23	0.00	1.00	144	0.34	0.24	0.00	1.00	42	0.45	0.18	0.05	0.80
Percent new or old in good condition (N_{1b})	n/a	n/a	n/a	n/a	n/a	144	61.60	22.80	0.00	100.00	42	73.56	14.30	40.80	95.00
New traffic signs/structures (N_2)	140	0.80	0.16	0.28	1.00	144	0.92	0.13	0.35	1.00	42	0.74	0.20	0.25	1.00
New public courtesies (N_3)	140	0.26	0.24	0.00	0.85	144	0.37	0.28	0.00	1.00	42	0.18	0.22	0.00	0.83
New large developments (N_4)	140	0.16	0.20	0.00	0.79	144	0.15	0.21	0.00	0.94	42	0.12	0.19	0.00	0.71
New construction for sale (N_5)	140	0.19	0.15	0.00	0.67	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Efforts discouraging disorder (B_1)	140	0.09	0.11	0.00	0.50	144	0.14	0.15	0.00	0.65	42	0.21	0.13	0.00	0.53
Personal frontage beautification (B_2)	140	0.67	0.24	0.00	1.00	144	0.77	0.21	0.00	1.00	42	0.88	0.14	0.45	1.00
Vacant/public space beautification (B_3)	140	0.57	0.21	0.00	1.00	144	0.23	0.26	0.00	1.00	42	0.62	0.24	0.08	0.97
Lack of physical disorder (D_1)	128	0.77	0.25	0.00	1.00	144	0.39	0.23	0.00	0.90	42	0.63	0.23	0.21	1.00
Lack of unkempt vacant/public space (D_2)	140	0.92	0.14	0.15	1.00	144	0.77	0.22	0.00	1.00	42	0.78	0.14	0.50	1.00
Lack of decaying structures (D_3)	140	0.89	0.14	0.37	1.00	144	0.9	0.14	0.33	1.00	42	0.62	0.24	0.08	0.97

Notes: Face- and block-level descriptive statistics are similar at the face- and block-levels but span the full range of the 0 to 1 scales. Details are available upon request.

Table A.4. *Descriptive Statistics for Tract-level Gentrification Measures and Hierarchical Linear Model Variance and Measurement Properties for GGO Stage Scores for Block Faces within Blocks and Blocks within Tracts*

	Chicago, Wave 1				Chicago, Wave 2				Seattle, Wave 2			
Measure	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
Structural mix	0.53	0.19	0.12	1.00	0.61	0.18	0.14	1.00				
Physical condition of buildings									0.74	0.14	0.41	0.95
Degree of new structures									0.50	0.19	0.14	0.92
Beautification efforts	0.66	0.12	0.29	0.91	0.66	0.15	0.00	0.93	0.76	0.11	0.48	0.90
Lack of disorder and decay	0.81	0.15	0.30	1.00	0.55	0.18	0.11	0.94	0.68	0.16	0.37	1.00
Total stage score	0.67	0.12	0.35	0.95	0.63	0.11	0.30	0.89	0.68	0.08	0.53	0.81
Block faces (Level-1) within blocks (Level-2):												
Variance		0.03				0.02				0.01		
Reliability		0.61				0.64				0.68		
Intra-class correlation		0.39				0.46				0.42		
Blocks (Level-1) within tracts (Level-2):												
Variance		0.01				0.02				0.01		
Reliability		0.73				0.63				0.68		
Intra-class correlation		0.37				0.25				0.18		
Census tract units		140				122				42		
Block units		682				320				296		
Block face units		1,905				1,472				1,000		

Construction of Gentrification Measures from Instrument Indicators

To calculate the structural mix measure used in the Chicago analyses, we assign a block face a score of 1 if its older structures are in good condition (P_1); otherwise, we assign the block face the average score of indicators for the degree of new and rehabilitated structures (N_1, N_2, N_3, N_4, and N_5; N_5 is not included in Wave 2).[2] Formally: $Structural\ mix = max(P_1, N), where\ N = \frac{N_1 + N_2 + N_3 + N_4 + N_5}{5}$ for Wave 1 and $N = \frac{N_1 + N_2 + N_3 + N_4}{4}$ for Wave 2. Therefore, an area with all of its older structures in good condition will be at the top of the structural mix score distribution, or at the end stage of the neighborhood life cycle of gentrification in our typology. Because determining whether structures are old or new/rehabilitated is uncertain, particularly for older structures in good condition, this approach assigns block faces with most or all older housing in good condition similar scores to block faces with some new/rehabilitated structures mixed with older housing in good condition. Combining indicators for old and new structures attenuates potential problems resulting from this uncertainty in coding. For example, even if a coder had difficulty distinguishing between old and new structures on a block face with a mix of old and new structures that are all in good condition, the block face would receive the same structural mix score whether the observer considered all or just some of the structures to be older. Consistent with our typology, disinvested neighborhoods that became fully middle-or upper-middle-class either in the past decade or many years earlier yield similar structural mix scores.

In the Seattle analyses, we did not construct a structural mix score to improve upon relatively lower rater agreement for distinguishing between new and old buildings. Instead, the

[2] We also calculated Wave 1 scores excluding new construction for sale, N_5, which may reflect effects of the housing crisis rather than upward neighborhood trajectories, and the resulting composite stage scores were nearly perfectly correlated with the stage scores presented and yielded nearly identical results.

condition of physical building structures (N_{1b}), new or old, is considered as a separate measure, and the degree of new and rehabilitated structures is constructed with the average of the remaining indicators (N_2, N_3, and N_4). Composite stage scores between the method used in Chicago and Seattle are strongly correlated (see Table A.5). We also calculated the structural mix score using only the condition of old structures (P_1) and new construction and rehabilitation (N_1) to align with Hammel and Wyly's instrument, which emphasizes investments in building structures over other forms of reinvestment. This alternative measure makes some difference for the composite stages scores (see Table A.5), but regression results for our variables of interest remain similar.

We combine indicators for beautification efforts (B_1, B_2, and B_3) and the lack of disorder and decay (D_1, D_2, and D_3) for their respective summary measures. Because the presence of any indicator for each summary measure is conceptually more significant than having multiple kinds of indicators, we construct summary measure scores using a quadratic fit, such that the number of indicators present has decreasing weight for the summary beautification measure and increasing weight for the summary lack of disorder measure. Using a linear rather than quadratic fit makes little difference for the composite stage scores (see Table A.5). The summary measure scores range from 0 to 1 with the maximum scores representing the presence of all three indicators of beautification efforts and the absence of all three indicators of disorder/decay, respectively. Because residential and commercial/mixed-use streets yield different means for the instrument items due to the unequal levels of foot traffic that take place in these land uses and differences in the physical disorder instrument item (D_1) used in the first wave of data collection, we standardized scores between residential and commercial/mixed-use streets and then normalized them to scales ranging from 0 to 1.

Table A.5. *Correlation Matrix for Alternative Measures and Stage Scores*

	Struct. mix (unwtd.)	Struct. mix (struct.)	Beauti-ficaiton (linear)	Beauti-fication (quad.)	Lack of disorder (linear)	Lack of disorder (quad.)	Stage score (equal)	Stage score (housing)
Chicago, Wave 1								
Structural mix (unweighted)	1.00							
Structural mix (structures only)	0.80	1.00						
Beautification efforts (linear)	0.35	0.20	1.00					
Beautification efforts (quadratic)	0.34	0.19	0.98	1.00				
Lack of disorder/decay (linear)	0.51	0.47	0.11	0.11	1.00			
Lack of disorder/decay (quadratic)	0.51	0.47	0.11	0.12	0.99	1.00		
Stage score (equal weights)	0.87	0.72	0.55	0.56	0.73	0.74	1.00	
Stage score (weighted housing)	0.81	0.88	0.47	0.47	0.73	0.74	0.93	1.00

Chicago, Wave 2	Struct. mix (unwtd.)	Struct. mix (struct.)	Beauti-ficaiton (linear)	Beauti-fication (quad.)	Lack of disorder (linear)	Lack of disorder (quad.)	Stage score (equal)	Stage score (housing)
Structural mix (unweighted)	1.00							
Structural mix (structures only)	0.83	1.00						
Beautification efforts (linear)	0.29	0.08	1.00					
Beautification efforts (quadratic)	0.32	0.12	0.98	1.00				
Lack of disorder/decay (linear)	0.59	0.49	0.08	0.09	1.00			
Lack of disorder/decay (quadratic)	0.58	0.46	0.08	0.09	0.97	1.00		
Stage score (equal weights)	0.88	0.68	0.48	0.51	0.81	0.81	1.00	
Stage score (weighted housing)	0.87	0.86	0.37	0.40	0.78	0.78	0.94	1.00

Seattle, Wave 2	Physical condition	Struct. mix (unwtd.)	Struct. mix (struct.)	New (linear)	New (quad.)	Beauti-ficaiton (linear)	Beauti-fication (quad.)	Lack of disorder (linear)	Lack of disorder (quad.)	Stage score (equal)	Stage score (equal, Chicago)	Stage score (housing, Chicago)
Physical condition of buildings	1.00											
Structural mix (unweighted)	0.88	1.00										
Structural mix (structures only)	0.92	0.91	1.00									
Degree of new structures (linear)	0.35	0.47	0.40	1.00								
Degree of new structures (quadratic)	0.60	0.43	0.36	0.98	1.00							
Beautification efforts (linear)	0.20	0.06	0.14	-0.13	-0.11	1.00						
Beautification efforts (quadratic)	0.22	0.09	0.17	-0.16	-0.14	0.98	1.00					
Lack of disorder/decay (linear)	0.59	0.65	0.61	0.08	0.03	0.08	0.19	1.00				
Lack of disorder/decay (quadratic)	0.54	0.61	0.57	0.03	-0.02	0.04	0.15	0.99	1.00			
Stage score (equal weights, new measures)	0.86	0.87	0.85	0.52	0.49	0.26	0.32	0.79	0.75	1.00		
Stage score (equal weights, Chicago measure)	0.79	0.85	0.81	0.21	0.16	0.28	0.36	0.92	0.89	0.92	1.00	
Stage score (weighted housing, Chicago measure)	0.82	0.82	0.87	0.19	0.15	0.31	0.39	0.89	0.86	0.92	0.98	1.00

Notes: Seattle scores are constructed using different measures (see Appendix A on "Construction of Gentrification Measures from Instrument Indicators"). "Stage score (equal weights)" for Chicago and "Stage score (equal weights, new measures)" for Seattle are used in analyses presented in main text.

Table A.6. *Construct Validity of Gentrification Stage Score*

	Chicago, Wave 2	Seattle, Wave 2	
Correlations	Tracts	Tracts	Block groups
% white	0.51**	0.16	0.20**
% black	-0.40**	-0.22	-0.23**
% Hispanic	-0.19*	-0.13	-0.10
% Asian	-0.02	0.02	0.02
% foreign-born	0.04	-0.16	n/a
% families below poverty	-0.35**	0.06	-0.14
Median household income (logged)	0.41**	-0.11	0.14
% college-educated	0.52**	0.04	0.14†
% professionals	0.48**	0.18	0.28**
% homeownership	0.20*	-0.17	0.08
Median home value (logged)	0.29**	0.03	0.30**
Median rent (logged)	0.45**	-0.03	0.02
Starbucks	0.30**		
Green roofs	0.31**		
Coffee shops		0.28†	0.23**
Building permits		0.24	0.28**
Gentrification Stage Score Poisson Regression Results Predicting Alternative Indicators			
Starbucks/Coffee shops	5.30** (1.06)	4.09** (0.99)	4.17** (0.72)
Green Roofs/Permits	4.75** (0.82)	1.08** (0.17)	1.96** (0.13)
N	143	42	136

Notes: **p<0.01; *p<0.05; †p<0.10. All analyses presented use 2005-2009 American Community Survey 5-year estimates. Regression models include controls for population density, % black, % Hispanic (Chicago), % Asian (Seattle), % families below poverty, % homeownership.

Figure A.3. *Google Street View Timeline Survey for Chicago and Seattle*

Figure A.3 (Continued)

GGO Timeline Survey

. Please enter your name.

. Please enter the Unique ID.

Q1. Which years of images are available for this block face? (Check all that apply.)

2007	2008	2009	2010	2011	2012	2013	2014	N/A
☐	☐	☐	☐	☐	☐	☐	☐	☐

Q2.
Which of the following differences are present from previous image years to the most recent year? Weather-related changes are not applicable. (check all that apply)

- ☐ new construction or full property renovation
- ☐ demolition of property
- ☐ addition of vacant lots
- ☐ disappearance/repurposing (e.g., turned into a park) of vacant lots
- ☐ repair of visibly abandoned and blighted property (e.g., boarded up, burnt out)
- ☐ addition of visibly abandoned and blighted property (e.g., boarded up, burnt out)
- ☐ changes in commercial use (e.g., store name change; store use change)
- ☐ none of the above

.
Instructions:

For the URL and ending street/landmark listed, click on the URL link. This link will place you at the corner of a street block in Google Street View facing the right side of the street. You should see a clock image on the upper left hand corner of the screen.

If you do not see a clock image, click on this link to run the newer version of Google Maps (no downloads are necessary): http://www.google.com/maps/tt/optin?status=invite and reopen the URL listed below. If a clock image still is not visible, then answer with the year that is available for Question 1 and "none of the above" for Question 2.

For Question 1: Click on the clock image in the upper left hand corner. A window will drop down. Click on each dot in the slider below the image to see which years have images available. Check the boxes of the years available in Question 1.
- **If only one year is available**, answer "none of the above" in Question 2 and continue to the next link.
- **If the street contains multiple lanes**, click on the pavement of each lane to make sure that there are not more years available on other lanes.

Starting with the most recent year, for each year of available images: Click on one of the dots in that year in the drop-down window. (There may be multiple dots per year.)
- Then, click on the image in the drop-down window above the slider. This switches the entire street view to the month and year indicated by the dot.
- Quickly move forward along the street **until you reach the "Ending Street or Landmark"** listed using the up arrow key on your keyboard or clicking along the street with your mouse. The ending street or landmark can be viewed easily using the small map on the lower left corner of the screen.

Figure A.3 (Continued)

- Note the present buildings, vacant lots, abandoned or blighted property, and commercial uses on the right-hand side of the street only.

For Question 2: Indicate if there are differences between ANY of the previous image years to the most recent image year in the presence of buildings (e.g., new construction or demolition), vacant lots, abandoned or blighted property, and commercial uses.