Evolution of racial diversity in newly built American housing subdivisions

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City scale

Neighboorhood

Atlanta, Georgia subdivision mostly black scale mostly white mixed

U.S. diversity

- At the country level: Multiethnic and racially diverse
- At local scale: Segregated.

Local scale segregation

- Previously studied for a whole metropolitan area using aggregated demographic data (census tracts).
- Spatial resolution of aggregated data makes it impossible to study racial diversity and its temporal change at the level of individual neigboorhood.

<u>Aim of this study</u> Evolution of racial diversity at the neighboorhood level

- Comparing racial diversity of newly built housing subdivision with the existing surrounding neighborhoods.
- (2) Tracking the evolution of racial diversity in newly built housing subdivsion during decade 2000-2010.

Newly built housing subdivision in th U.S.



- Inhabited during short period of time (few months)
- No information about racial composition in this neighboorhood.

We can hypothesize that in the beginning newly built housing subdivision should be more diverse than the older one and racial diversity will decrease with time.

Racial diversity maps



- Shows spatial character of racial diversity across the U.S.
- It is three dimensional classification of grid cells into 40 categories based on racial diversity level, dominant race and population density

Available to downolad at *sil.uc.edu*

A.Dmowska, T.F. Stepinski, P. Netzel (2017) *Comprehensive framework for visualizing and analyzing spatio-temporal dynamics of racial diversity in the entire United States.* PLoS ONE 12(3): e0174993. doi:10.1371/journal.pone.0174993



Uninhabited, Medium High low

Control sample: Identify neighboorhod of each NBAHS

Comparing racial diversity of NBAHS with the existing surrounding neighborhoods

Tracking changes of racial diversity for each NBAHS between 2000 and 2010

Criterion for selecting newly built housing subdivision:

(1) Built in 1990s (after 1990)

1990: uninhabited and low density (< 3 people/km²),
2000: high density (> 30 people/km²)

(2) Areas: min. 0.225 km² (250 cells)

(3) Population density: min 1 people/cell





Uninhabited, low density High density



Areas built between 1990 and 2000

Newly built housing subdivision

Control sample: Identify neighboorhod of each NBAHS

Comparing racial diversity of NBAHS with the existing surrounding neighborhoods

Tracking changes of racial diversity for each NBAHS between 2000 and 2010

Control sample:

- A set of housing subdivisions build before 1990 located in the "neighboorhoods" surrounding each NBAHS within the radius of 4km.
- Minimum area = 250 cell





Radius of 4km for newly built housing subdivision Control sample: housing subdivision surronding NBAHS

Each NBAHS and control sample housing subdivisions were assigned class of diversity level:

otherwise







Race<50% E>0.73

Control sample: Identify neighboorhod of each NBAHS

Comparing racial diversity of NBAHS with the existing surrounding neighborhoods

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Diversity level in housing subdivision

We classify subdivisions in control sample into 3 classes:

- 1: NBAHS more diverse than control sample
- 2: NBAHS less diverse than control sample

3: the same level of diversity in NBAHS and control sample.

Based on the class of the **majority** housing subdivision in control sample we assign to NBAHS one of these 3 classes.



Results summary



Number of surronding subdivisions



- 3382 newly built housing subdivision (NBAHS) across the entire U.S.; most of them is located in metropolitan urban areas.
- 48976 housing subdivision in the control sample.
- Each NBAHS is surrounded by 1-52 housing subdivision, 14 on average.

Comparing racial diversity of NBAHS with the existing surrounding neighborhoods



Control sample: Identify neighboorhod of each NBAHS

Comparing racial diversity of NBAHS with the existing surrounding neighborhoods

Tracking changes of racial diversity for each NBAHS between 2000 and 2010

Changes of racial diversity level in housing subdivisions between 2000 and 2010

We track changes in racial diversity level of NBAHS and subdivisions in the control sample:

Racial diversity in 2000

Racial diversity in 2010



Changes in racial diversity level between 2000 and 2010



More diverse (7) Less diverse (0) No change (14)

Changes of racial diversity between 2000 and 2010

	LOW 2010 (31.9%)	MED 2010 (61.9%)	HIGH 2010 (6.1%)
LOW 2000 (45.9%)	30.6	15.3	0.0
MED 2000 (51.2%)	1.3	45.7	4.2
HIGH 2000 (2.8%)	0.0	0.9	1.9

Newly build American housing subdivisions

- **78%** maintaned diversity category after 10 years,
- **19%** increased their diversity,
- 3% decreased diversity

The most frequent change is low -> medium

	LOW 2010 (30.3%)	MED 2010 (64.2%)	HIGH 2010 (5.5%)
LOW 2000 (51.2%)	27.1	23.9	0.3
MED 2000 (45.1%)	3.2	39.0	3.0
HIGH 2000 (3.7%)	0.02	1.4	2.2

Control sample: older surrondings neighboorhoods

- **68%** maintaned diversity category after 10 years,
- 27% increased their diversity,
- 5% decreased diversity

Tracking changes of racial diversity for each NBAHS between 2000 and 2010



Conclusion

- Using new high resolution (30m) U.S. population grids (<u>http://sil.uc.edu/webapps/socscape_usa/</u>) we studied racial diversity changes at levels of individual neighborhoods over the entire U.S.
- First, we demonstrated that subdivisions **newly built** in the 1990s are, on average, **more racially diverse** than **preexisting**, **older subdivisions** in the same neighborhoods.
- Second, by tracking 2000-2010 changes of subdivisions built in 1990s and their surrounding older subdivisions we show that the initial difference in race diversity between them has decreased during the 2000s. Both new and older subdivisions increased diversity during the 2000s, but the increase in older subdivisions was larger enabling them to catch up with the levels of diversity in the new subdivisions.
- We didn't notice any significant geographical preferences for the above conclusions. It appears that the same social dynamics operates across the entire urban U.S.
- We hypothesize that a racial composition of a newly built subdivision reflects a prevailing societal attitude of the times they are built. However, change in residential racial diversity lags behind change in societal attitudes.
- **Time is needed** for older subdivisions, formed at the time when racial diversity was less acceptable, **to catch up** with diversity levels in the younger subdivisions.
- The overall trend in the U.S. is toward increasing acceptance of racially diverse neighborhoods. We predict that subdivisions **built during 2000s** were, in 2010, again **more diverse** than preexisting surroundings (subdivisions built before 2000).