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Mapping Urban Revitalization: Using GIS Spatial Analysis to Evaluate a New Housing Policy

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This longitudinal, multimethod study uses geographical information system (GIS) software to evaluate the community-wide impact of a neighborhood revitalization project. Unsystematic visual examination and analysis of GIS maps are offered as a complementary tool to quantitative analysis and one that is much more compelling, meaningful, and effective in presentation to community and nonscientific professional audiences. The centerpiece of the intervention was the development of a new, middle-class housing subdivision in an area that was declining physically and economically. This represents three major urban/housing policy directions: (1) the emphasis on home ownership for working-class families, (2) the deconcentration of poverty through development of mixed-income neighborhoods, and (3) the clean

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up and redevelopment of contaminated, former industrial brownfields. Resident survey responses, objective environmental assessment observations, and building permit data were collected, geocoded at the address level, and aggregated to the block level on 60 street blocks in the older neighborhoods surrounding the new housing in two waves: during site clearing and housing construction (Time 1: 1993–95) and three years post-completion (Time 2: 1998–99). Variables mapped include (a) Time 1–2 change in self-reported home repairs and improvements, (b) change in the assessed physical condition of yards and exteriors of 925 individual residential properties, (c) change in residents' home pride, and (d) a city archive of building permits at Time 2. Physical conditions improved overall in the neighborhood, but spatial analysis of the maps suggest that the spillover effects, if any, of the new housing were geographically limited and included unintended negative psychological consequences. Results argue for greater use of GIS and the street block level in community research and of psychological and behavioral variables in planning research and decisions.

KEYWORDS block environmental inventory, building permits, city quarter redevelopment, collective efficacy, geographic information systems (GIS), home improvements, incumbent upgrading, place attachment, pride of place, repairs, spatial analysis, street block, urban renewal

The years following World War II on every continent saw not only a "baby boom," but also a building boom (Palen, 1997). Many of the working-class, residential neighborhoods built then have not been well maintained and are now suffering levels of physical deterioration ranging from the merely unsightly to the unsafe. The environmental decay has contributed to social decay in the form of disorder, crime, fear, a loss of capital—both economic and social, and residential and commercial instability (Perkins & Taylor, 1996). Thus, neighborhood revitalization has become a growing concern for all stakeholders in such communities—government officials, community development organizations, businesses, and residents.

NEIGHBORHOOD REVITALIZATION STRATEGIES AND POLICIES

To counteract these negative conditions, federal, state, regional, and local government agencies, as well as private community development organizations have enacted neighborhood revitalization strategies. These strategies

have included neighborhood clean-up campaigns, subsidized home improvement loans, in-fill housing (where vacant lands between already existing housing are transformed into new homes), new or refurbished public properties (parks, recreation facilities, curbs, gutters, sidewalks, etc.), and even housing demolition, if necessary. Physical improvements in the neighborhood are hypothesized to make the neighborhood a more pleasant place to live, increase community confidence and residential stability, attract economic development and a higher tax base, and even decrease crime and other social problems (Taub, Taylor, & Dunham, 1984).

Whether the intervention is public or private, the expectation is that it will lead to wider private-sector processes of gentrification and incumbent upgrading. *Gentrification* is when new, middle-, or upper-income residents replace lower-income residents in a declining neighborhood (Carmon, 1990; DeGiovanni, 1984). As housing costs throughout the neighborhood rise, it may also force other residents to relocate, especially renters and those on fixed incomes (Fried, 2000). *Incumbent upgrading* is when existing residents make repairs or improvements to their own homes. As it causes less residential disruption and instability (Clay, 1979), widespread incumbent upgrading is a sign of successful, stable neighborhood revitalization. In the United States, three related policy directions have flowed from the federal to the local levels and converged to encourage these urban revitalization policies: the "ownership society," deconcentration of poverty, and "brownfields" reclamation.

"Ownership Society"

President George W. Bush popularized this phrase during the 2004 election, but private ownership of property has always been an ascendant value in the United States. It was codified into law by the Federal Income Tax Act of 1913 and other tax benefits to home owners; the creation of the Federal Housing Administration in 1934 to insure home mortgages; and the Urban Renewal Act of 1949. The last of these led to large-scale slum clearance projects through the 1950s and 1960s that destroyed whole communities, often replacing them with higher-income housing or non-residential property (Fried, 2000). In 1975, the Department of Housing and Urban Development (HUD) launched the Urban Homesteading demonstration project (Ahlbrandt & Brophy, 1975), similar in spirit to the homesteading movement in the Western settlement of North America and Australia, where frontier land was given for free or at a very low cost to settlers. In the modern version, dilapidated or abandoned urban sites were given to mostly middle-class prospectors for free or at a very low cost on the condition that they improve the site. Government officials believed that urban homesteading would help revitalize the neighborhood by upgrading the homesteaded property and instilling neighborhood confidence so that others in the neighborhood

would be inclined to upgrade their property as well. However, past studies found such "spillover effects" of urban homesteading and other revitalization to be either negligible (Varady, 1986) or geographically limited (Ginsberg, 1983).

Deconcentration of Poverty

The lesson HUD and virtually every large- and medium-sized city across the United States took from the failures of urban renewal and limitations of urban homesteading was that it would take larger-scale injections of home owners into poor neighborhoods to reach a "tipping point" that would set revitalization processes in motion (Palen, 1997, pp. 329–331). This has led to a major policy shift away from public housing and toward large-scale, homeownership-based redevelopment programs. The largest of these is called HOPE-VI, in which large blocks of public housing are torn down and replaced by mixed-income apartments or town houses with at least some reserved for owner occupancy. Studies of this latest round of revitalization are starting to show that these projects lead to improvements in the physical, social, and economic environment of surrounding neighborhoods (Zielenbach, 2003). Such spillover effects may not be positive for residents whose cost of living rises and may even be forced to move, however. Unfortunately, both outcomes and indicators of revitalization have been limited thus far. For example, one revitalization project, sponsored by the New York City Housing Partnership (NYCHP), was successful in funneling government and private funds in order to build several new subdivisions in older, dilapidated neighborhoods. NYCHP was also successful in finding homeowners for the sites, a prospect about which public and economic policy makers were skeptical (Orlebeke, 1997). Nevertheless, little attention was paid to whether the surrounding neighborhoods benefited from the investment.

Brownfield Redevelopment and Territoriality

Many of these government neighborhood revitalization strategies involve cleaning up and converting industrialized, often contaminated nonresidential property, called "brownfields," into residential property. By replacing vacant and abandoned properties with occupied residential property, such revitalization efforts may be helped by the natural territorial and informal social control behaviors of residents. Private domains, such as homes, will be more personalized and safer than public spaces (Brown & Altman, 1983). Public places that are less likely to be personalized and defended also tend to have more physical "incivilities," such as greater amounts of litter, graffiti, and vandalism. Other studies have shown that non-residential land uses, especially vacant ones, attract more physical incivilities, and social incivilities, such as lingering teenagers and gang activity, all of which may

result in more reported crimes (Perkins, Wandersman, Rich, & Taylor, 1993; Taylor, Koons, Kurtz, Greene, & Perkins, 1995). Again, however, the key question is whether these positive effects of new residential development spill over into the older surrounding neighborhoods and, if so, what is the strength of that spillover effect and how widespread is it?

In sum, urban neighborhood revitalization strategies have received great political and economic attention over the past half-century. Despite the billions of dollars of government and private funds that are invested in revitalization programs, the impact of targeted homeowner-based projects on the residents and housing surrounding the target area have not been well studied or understood (Kaplan, 1991). Physical improvements in the target areas themselves are obvious, but few studies have analyzed the geographic effects of those strategies on existing nearby communities in terms of incumbent upgrading (home maintenance and improvements) and psychological indicators of revitalization, such as home pride and satisfaction.

THE PRESENT STUDY

This study evaluates the impact of a large, federally and locally funded, public–private neighborhood revitalization intervention on surrounding neighborhood physical conditions (home maintenance and improvements and building permit values) and home pride. The intervention exemplified each of the aforementioned urban policy directions. It involved the clearance, reclamation, and redevelopment of a contaminated brownfield, and construction of a new subdivision of detached, owner-occupied homes. The multimethod, longitudinal study included extensive quantitative data, some of which are described later and published elsewhere; but this is the first publication of geographic information system (GIS) maps used to spatially analyze the impact of the intervention and explore other geographic patterns throughout the study area.

The Research Setting

The study took place in a low-income section of Salt Lake City, Utah, USA, from 1992 to 2000, a period of significant economic growth in this and many other places. The two adjacent neighborhoods had suffered economic and homeownership decline and growing levels of dilapidation and crime. Many of those who did own their own homes were elderly on fixed incomes. The neighborhood also had the highest concentration of ethnic minorities in the state. Most of the homes in the area were built between 1945 and 1960 and were in varying states of disrepair. In the middle of this area was a large nonresidential parcel of land with an empty school and a former plant nursery. Not only were these large abandoned properties tangible evidence of

neighborhood decline, their soil had been contaminated from both pesticide use at the plant nursery and toxins from a river that runs through the property. A federal HUD grant provided initial funding for building demolition, soil cleanup, and flood plain mitigation along the river, and sufficient infrastructure to allow a private developer to build 84 single-family, detached homes for moderate-income residents. It was hoped that this new subdivision, which we will call "New West," would improve the image of the entire neighborhood, impede physical decay, and stimulate further private investment by households in the vicinity. The city also created a subsidized, low-interest loan fund for repairs and improvements to existing homes and other structures, although the fund was not well publicized and underused.

METHODS

Sample

At Time 1 (1992–1995), 60 street blocks were sampled from within two adjacent and demographically similar neighborhoods, with probability proportionate to block population. Fifty-six blocks were randomly selected and four blocks were oversampled from within two blocks of the new subdivision to ensure an adequate sample of nearby residents. Eight homes were selected on each street block using systematic sampling to ensure representation throughout each block, and to minimize non-independence effects of next-door neighbors. At Time 2 (1997–2000), additional addresses per block were selected, resulting in a combined Time 1–Time 2 sample of 926 different addresses for which there is survey data, independent observations or both, ranging from 9 to 19 properties per block. Because names were not requested as part of the survey nor as part of the environmental inventory, assuring a true panel study was not feasible. Time-1 and Time-2 survey data show that a majority of the sampled residents were white (T1 = 67%/T2 = 61%), non-Mormon (T1 = 54%/T2 = 64%) homeowners (72%/75%). This sample excluded areas that were predominantly rental property because it is more likely that homeowners will make home improvements. Otherwise, the demographics approximate the 1990 and 2000 neighborhood Censuses. All data in the present maps are aggregated to the street block level.

Mapped Neighborhood Revitalization Indicator Measures (Dependent Variables)

There are three sources of data used in the present analyses. A resident survey and environmental assessment were taken prior to and during the

construction of the subdivision in 1993–95 (Time 1), and after, in 1998–99 (Time 2). The third source is an archive of building permits issued in the study neighborhood from 1993 to 2000. Time 2 data were collected in the same manner as Time 1 data for all of the variables used in the present analyses. All instruments are available from the authors.

The *telephone and door-to-door interview of neighborhood residents* (T1 $n = 357$, T2 $n = 618$) was conducted in English or Spanish as needed at both times. At Time-1, 74% of those who spoke English or Spanish responded, and at least four residents were interviewed on each of the sampled blocks. At Time 2, the response rate was 84.2%. It measures self-reported repairs and improvements, home pride, and many other variables not used in this analysis. *Self-Reported Home Repairs and Improvements* (alpha = .86) made during the preceding 12 months was the sum of 15 yes–no items with higher scores indicating more improvements. Items included both exterior (painting the house, roofing, gutters) and interior (carpentry, electrical work, plumbing) repairs and improvements. The average household reported having made 5.5 different kinds of home improvements at Time-1 and 5.8 at Time-2. *Home Pride* was measured with three items asking residents to rate on a 1 to 10 scale how proud they are of their house, the way their front yard looks, and the way the outside of their house looks, where 1 is not at all proud and 10 is extremely proud (T1 *mean* = 7.65, T2 *mean* = 8.0).

The *Revised Block Environmental Inventory* (RBEI; T1 $n = 488$, T2 $n = 901$) is an instrument for the systematic and objective assessment of the physical environment of street blocks and is adapted from the BEI by Perkins, Meeks, and Taylor (1992). It is an inventory of specific features of residential and nonresidential properties that are observable to pedestrians: (1) the level of physical incivilities, such as litter, graffiti, and poor exterior maintenance, (2) territorial markers, such as plantings and decorations, and (3) defensible space features, such as fencing or other barriers and lighting. Raters were trained and practiced on several hundred targeted homes in the same or similar neighborhoods to achieve an adequate level of inter-rater reliability. *Observed Exterior Conditions* (alpha = .63) were based on the residential property-level ratings from the RBEI of exterior home and property maintenance and improvements (mean of 11 items with higher values indicating better conditions). Comparisons of the two entire datasets may be unreliable as different raters were used and additional homes sampled at Time-2. However, we assume that these variations were not geographically biased, which should allow for spatial comparisons over time. Most properties had cracked brick or concrete (T1 = 71%, T2 = 72%), lawns in fair condition (T1 = 73%, T2 = 78%), and flower or vegetable gardens (T1 = 59%, T2 = 54%). The number of recent exterior home improvements doubled from Time-1 (17%) to Time-2 (35%). The average residential property had little litter

on or in front of it (1.5 pieces at T1 decreasing to 0.6 pieces at T2), little or no paint peeling (T1 = 13%, T2 = 10%), few property personalizations (T1 = 0.4, T2 = 0.3 items) and one house, yard, or window decoration (T1 = 1.34, T2 = 1.06).

Building permits issued by the city are required for most structural changes such as an additional room or bay window to a home, or a shed or a garage. Depending on the circumstances, a new sidewalk or driveway may also require a building permit. Permits issued from January 1993 through December 1995 were used at Time 1 and those from October 1997 through September 2000 were used at Time 2. The Time-2 block mean sampled household sum of *Building Permit Valuations* (as estimated in dollars by permit applicants) is used here.

GIS Procedures and Strategy of Analysis

Using ArcView geographic information system (GIS) software, each study variable was mapped and carefully examined visually for spatial patterns in the data. First invented in the 1950s for geographic and geological map production, GIS has evolved to include many other facets of spatial analysis such as geocoding addresses, linking particular points or places with tabled data, and measuring complex route and road networking distances. GIS files for the study area were provided by the Salt Lake County Recorder's office and included the spatial point, lines, and polygons that comprise the computerized map of the area and a database of all the properties that lie within, including parcel numbers and addresses, which were essential for geocoding the project data.

Neighborhood maps were produced for each variable at both the property level (not shown) and aggregate block level (Figures 1–4) using a color gradation scale. Interpolation of block aggregates to the non-sampled regions of the study area, were made using an inverse-distance weighted formula: $Z_j = \text{Sum of } W_{ij}Z_i / \text{Sum of } W_{ij}$; "where: Z_j is the estimated value at [GIS] grid location j, Z_i is the known value [sampled block aggregate mean] at control point location i, and W_{ij} is the weight that controls the effect of control points on the calculation of Z_j" (Healy, Dowers, Gittings, & Mineter, 1998, p. 399). That is, each non-sampled location was given a new value based on the closest six sampled blocks' means, with known values farther away being given proportionately less weight by distance. Although this makes the most use of available information to estimate values for unsampled areas and facilitates easier recognition of spatial patterns in the data, it is important to recognize that unsampled blocks could have very different values in reality, which would change how those and surrounding blocks are represented. Thus it is best to concentrate on the sampled blocks (marked by numbers in small squares on the maps).

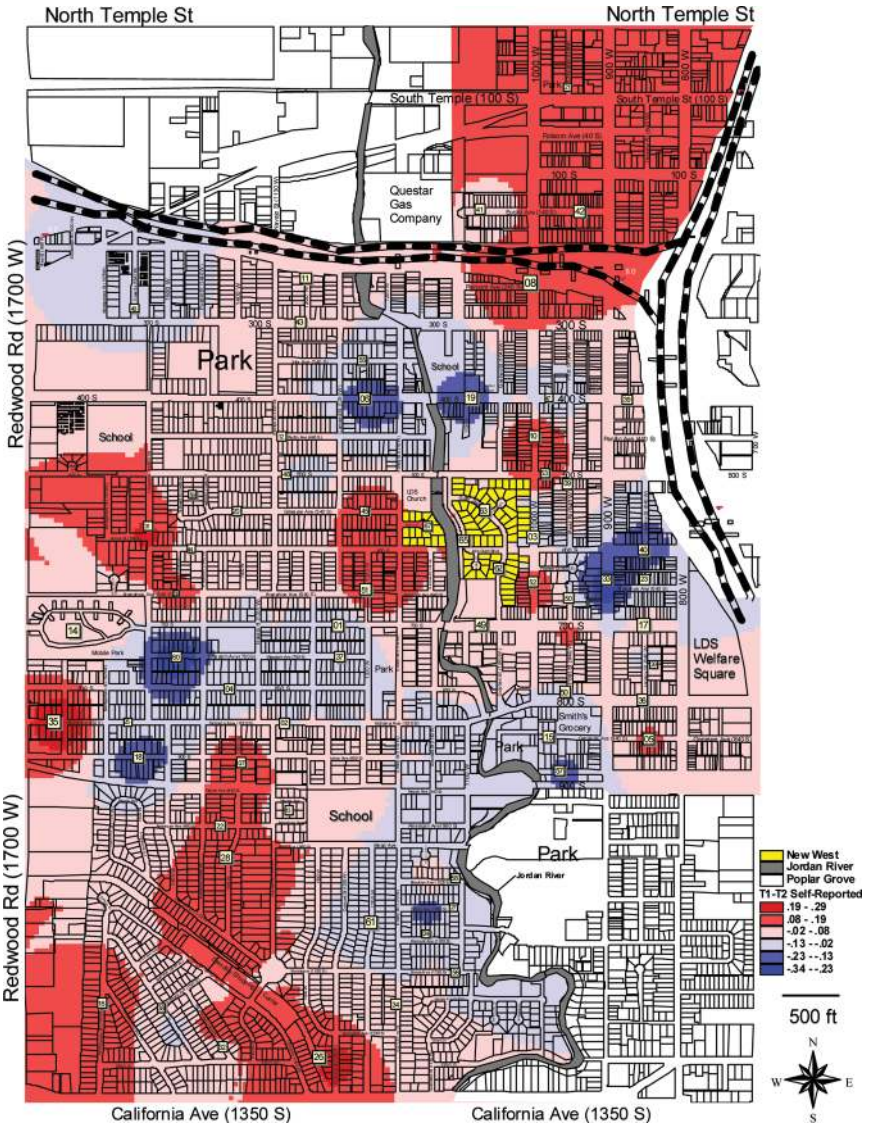

FIGURE 1 Map 1. Change (Time 1–Time 2) in residents' self-reported home repairs and improvements.

In order to highlight contrasts, color gradations in the form of red to blue, equal interval scales, were composed for the maps (1, 2, and 4) showing change from Time 1 to Time 2. By convention, red means an increased or higher value, or "hot spots," and blue means a decreased value, or "cool spots," on that variable. Figure 3, building permit valuations at Time 2, uses only shades of red (pink for lower values, dark red for highest values). New

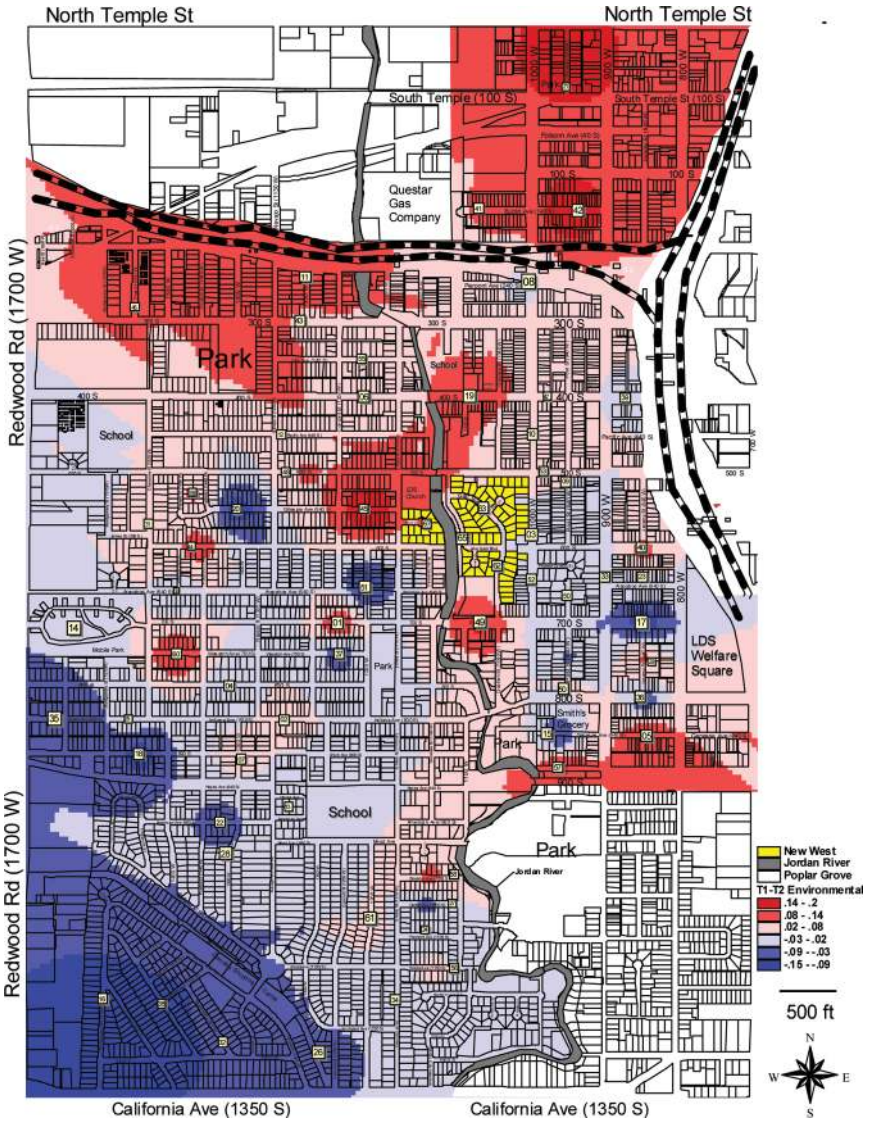

FIGURE 2 Map 2. Change (T1–T2) in independently rated home and yard exterior conditions.

West (the new subdivision, or intervention site) is marked in yellow. The river runs through the middle of the neighborhood and through New West. The I-15 freeway can be seen on the right side of the maps and I-80 cuts through the Northern part of the neighborhood. The Northwest and Southeast corners of the maps are white because they were excluded when the study area was defined due to their dissimilar income and home ownership levels (otherwise, area demographic differences might be mistaken

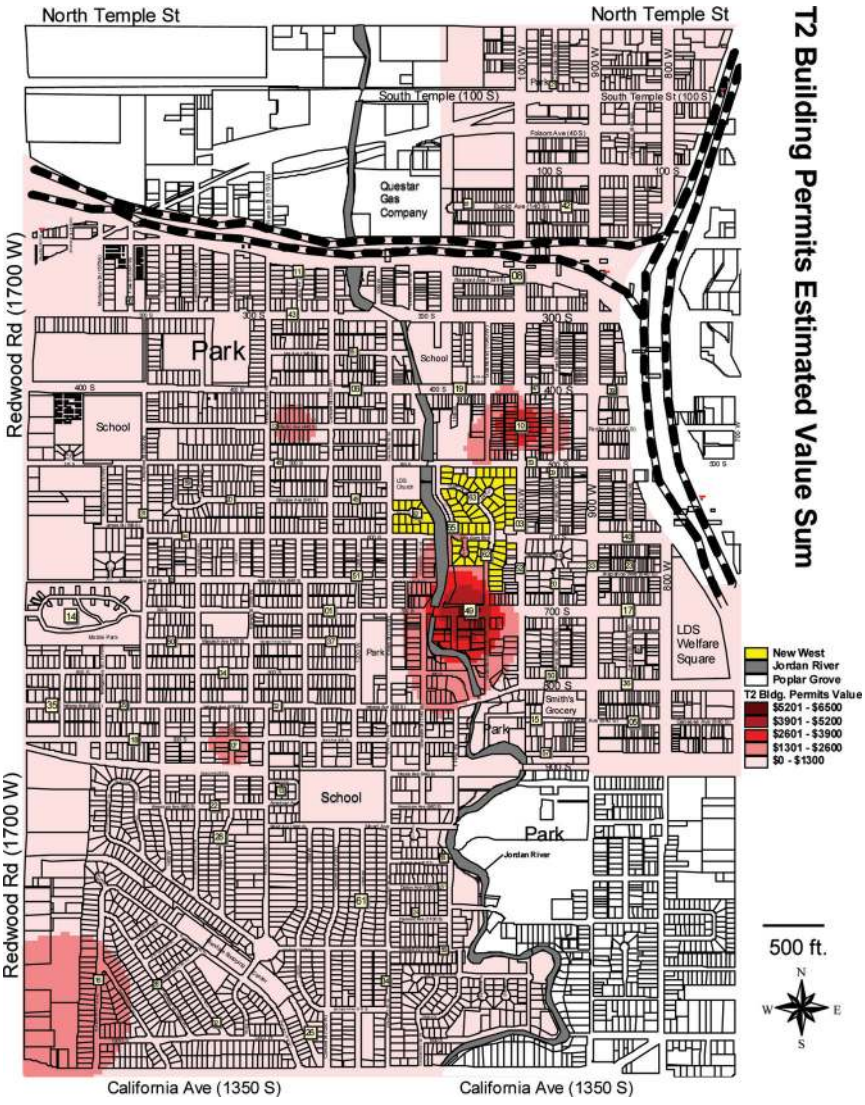

FIGURE 3 Map 3. Time-2 block-level total cost estimates of building permits issued.

for distance-from-intervention effects). Three of the maps reflect change in aggregate block raw scores from Time-1 to Time-2. All major variables at Time-1, Time-2, and change over time were mapped. A visual analysis was then made for locating spatial patterns in the data. Only selected maps are presented here. The blocks closest to the new subdivision were of particular interest as Ginsberg (1983) found spillover revitalization effects to be limited to within 1/16th of a mile, or one short block, of targeted interventions.

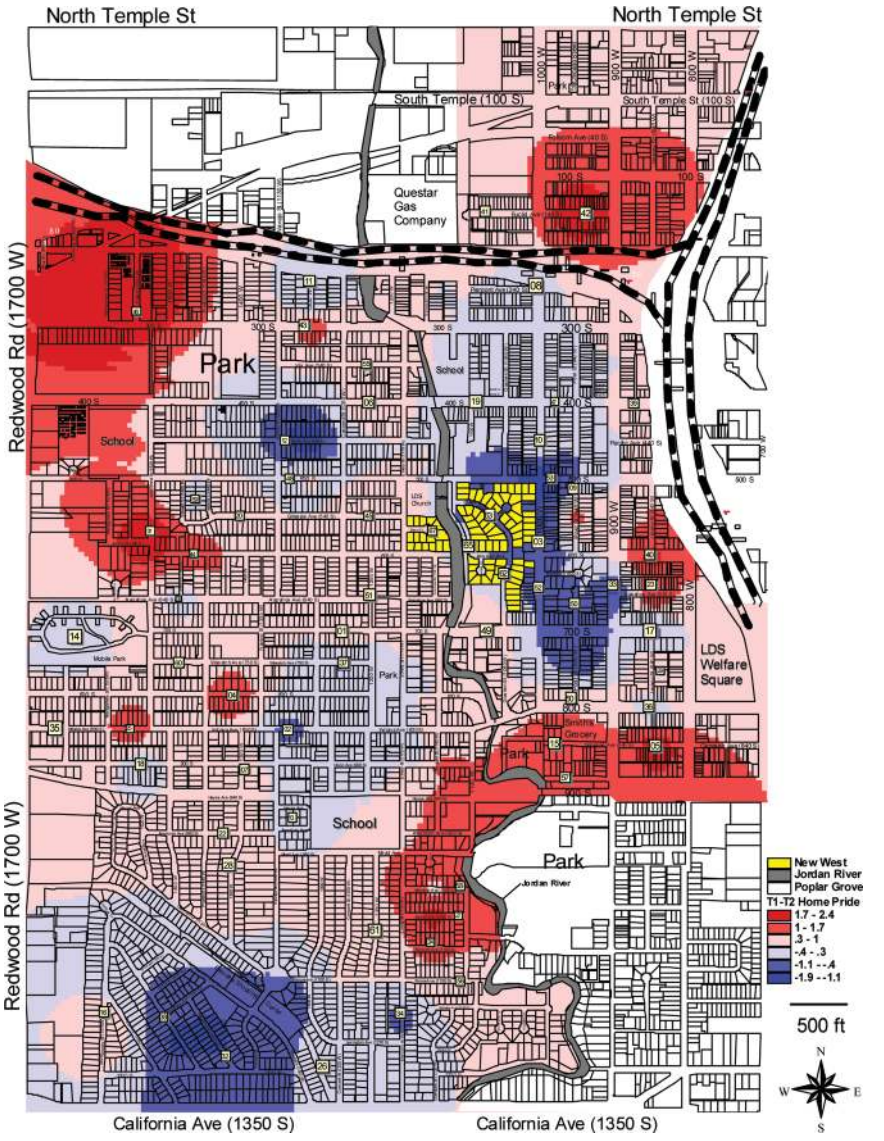

FIGURE 4 Map 4. Change (T1–T2) in residents' home pride (interior, exterior, yard).

RESULTS

Observed and, to a lesser extent, reported physical conditions improved overall in the neighborhood from pre- to post-construction. Multilevel linear analyses, including GIS-measured distance[1] from New West as a predictor of revitalization, show that linear distance from the intervention was not a significant predictor of any revitalization indicator, however. This is why GIS is particularly useful to look for geographic patterns that would be obscured by

linear analyses (e.g., skewed effects that are geographically limited, effects in one direction but not others; or (curvilinear) effects at a middle distance but not close or far).

Figure 1 shows block-level change from Time-1 to Time-2 in resident self-reported interior and exterior home repairs and improvements. The lack of a clear linear relationship between distance from New West (marked in yellow) and incumbent upgrading is apparent. If there is any spatial pattern, it may be curvilinear in which increased upgrading occurred both close to and furthest from New West, but generally not at a moderate distance. Of the eight closest blocks, five show a moderate increase in self-reported repairs and improvements (medium red) and the others show little change (two are pink, one light blue). Consistent with Ginsberg (1983), the beneficial spillover effect applies to just a one block radius—about the distance at which residents can see the new homes from their own blocks. Approximately one block East and one block North of New West, there are four blocks showing a decrease in reported upgrading, including one block with a large decrease (dark blue).

Figure 2 shows block-level change from Time-1 to Time-2 in objectively rated exterior conditions of properties based on the RBEI. The most noticeable pattern is that the Northern half of the map shows widespread improvement in objective conditions whereas the Southern half, especially the Southwest corner, shows widespread deterioration in property maintenance. The pattern close to New West is less clear, with blocks immediately to the East showing little change, close ones to the North, South, and West showing improvement, and one to the Southwest and one slightly further Southeast showing physical decline.

A comparison of Figures 1 and 2 demonstrates the importance of triangulating multiple sources of data as some blocks that are red in Figure 1 are blue in Figure 2 and vice-versa. This does not mean that the measures are invalid or unreliable; they simply measured different physical features from different perspectives, with Figure 1 including many interior, and other difficult to observe, repairs and improvements and Figure 2 reflecting entirely observable exterior conditions.

Figure 3 shows block-level per-household estimated construction costs of work for which building permits were issued to sampled households during the three-year duration of Time-2. Only two blocks showed a large financial investment in construction costs. Most likely those were due to houses being rebuilt at sampled addresses. Both of those blocks are adjacent to the New West subdivision. Similar to Figure 1, these results support Ginsberg's 1/16th of a mile revitalization spillover effect.

Figure 4 shows block-level change from Time-1 to Time-2 in the pride residents feel in their home interiors, exteriors, and yards. The geographic pattern is again fairly remarkable. Although there are distant patterns of both increasing and declining home pride, and the blocks immediately to the

North, West, and South showed little change, several adjacent blocks East of the target site show a marked and consistent drop in home pride.

Other maps (not shown) suggest that blocks near the brownfields site (a) had more crime to begin with and some became safer (Brown, Perkins & Brown, 2004) and (b) experienced a decrease in collective efficacy (Brown, Perkins, & Brown, 2003).

Finally, there are other patterns, probably unrelated to the intervention, worth noting in the various maps. Figure 2 suggests that the Northern half of the study area was undergoing widespread, observable improvements whereas the Southern half was deteriorating. The former is surprising in that the Northern half is dominated by freeways, railroad lines, and industrial properties—possibly conditions started worse there and regressed to the mean. That the Southwest corner was getting more dilapidated is less surprising in that it experienced more turnover and an influx of lower-income families who are more likely to rent their homes. This area also shows a decrease in the pride residents have in their home interior, exterior, and yard (Figure 4). Interestingly, however, that same area shows an *increase* in self-reported repairs and improvements (Figure 1). Although the survey included both interior and exterior work, it focused more on interior upgrading than the other mapped variables. Thus, taken together, the maps suggest that residents in the Southwest may have worked more on the inside than the outside of their homes.

DISCUSSION

Taken as a whole, use and analysis of GIS maps to evaluate the impact of a large-scale neighborhood revitalization intervention on the surrounding neighborhood suggest that the New West subdivision had mixed and geographically limited results. The first three maps suggest some of the hoped-for increase in incumbent upgrading and maintenance on blocks close the target site, but no apparent effects beyond one block away. This confirms Ginsberg's (1983) finding of a 1/16th of a mile limit to revitalization spillover effects, even with this relatively large building project. But even this nearby effect was not perfectly consistent across maps, with some blocks switching from positive to negative or no change depending on the revitalization indicator.

The effects also varied depending on the direction from New West. There was some evidence of improvements to the North, West, and South and mixed or limited signs of improvement to the East of the new subdivision. Most troubling, however, is that several blocks immediately East of New West showed a marked decrease in the pride residents felt in their own homes and yards (Figure 4). Consistent with social comparison theory (Festinger, 1954), when people with limited incomes (including renters but

mostly working-class homeowners) are faced with having to "keep up with" suddenly much wealthier "Joneses" and they cannot afford to, their pride of place pays the price.

The home pride results (as well as multilevel analyses of place attachment, sense of community, collective efficacy, social capital, and perceived crime and disorder problems; Brown, Perkins & Brown, 2003, 2004) confirm the importance of measuring and analyzing the psychological aspects of neighborhood revitalization, which are ignored in most housing and urban policy/planning research. What are the effects of the loss of such pride? There has been much theorizing and research on the psychological importance of place attachment and place identity (Altman & Low, 1992; Brown et al., 2003; Brown, Brown & Perkins, 2004; Cuba & Hummon, 1993; Fried, 2000; Pretty, Chipuer & Bramston, 2003; Proshansky, Fabian & Kaminoff, 1983; Puddifoot, 1995; Twigger-Ross & Uzzell, 1996), but very little on pride of place, which may similarly affect people's well-being but deserves more empirical attention.

More generally, this study confirms the utility of geocoding program evaluation and policy data and of the informal visual analysis of GIS maps to provide a fuller, more nuanced understanding of the impact of programs and polices. It also confirms that street blocks are ecologically valid units of analysis that vary significantly and thus permit more fine-grained spatial analyses than do higher units such as neighborhoods, census tracts, or even block groups, which, for example, would not necessarily have allowed us to identify the geographically limited effects in the present analyses or in Ginsberg's (1983) study. In other words, blocks are places, behavior settings, and proximal communities that hold great meaning and importance to residents and can be spatially analyzed using GIS.

STRENGTHS AND LIMITATIONS

The strengths of this study include the multiple methods used (survey, independent systematic observation, building permits); a longitudinal natural experiment design measuring change related to an important, geographically targeted intervention over a seven-year period; a representative and relatively large (for a local neighborhood study) cluster sample of 925 addresses on 60 blocks; and the geocoding of all data sources into a GIS to permit both precise distance measures and the kinds of visual spatial analyses presented, although more systematic and sophisticated spatial and quantitative analyses are certainly possible.

One of the main limitations of the study concerns the building permit data (Figure 3). Building permits are only required for major structural remodeling, such as a building addition. Smaller, cosmetic jobs, such as wall papering, painting, or new flooring do not require a permit, but can have

a great impact on the appearance of a property and thus on the occupants and their neighbors. Furthermore, even jobs requiring a permit are often done without one as owners may be unaware of the requirements or ignore them. Building permits are uncommon enough that if sampling is used (as in this study), many properties with permits will be missed, which makes it an unreliable measure at the aggregate (block or neighborhood) level. Use of estimated building costs with permit data is helpful as it provides a way of weighting larger jobs, such as a new structure, more heavily than smaller jobs. Valuations may be a crude measure of environmental change, however. For example, demolition costs little but can have a great influence on an area whereas one new home may cost as much as remodeling an entire block. There is no reason to believe that these limitations were systematically biased in relation to the intervention site, however; thus, the pattern of costly improvements close to the site is still noteworthy.

CONCLUSIONS

Prior to construction, the New West subdivision was touted in the local news as helping the entire neighborhood "blossom like a rose." Yet according to the GIS maps presented, there were no significant revitalization spillover effects beyond one block of the new housing and even the effects on adjacent blocks were not entirely significant or positive. These results beg many questions about the propriety and effectiveness of spending millions of public dollars on private, middle-class homes and whether other revitalization strategies might have had a wider, more beneficial impact on the entire community. Perhaps most residents of the existing neighborhood did not respond to the new subdivision precisely because the new residents were unlike them, thus hindering the social influence (Galster & Hesser, 1982). Low-income housing would have helped alleviate the local homelessness and affordable housing crises. A mixed-income project, including both subsidized rental and moderate-income ownership opportunities, would likely have been an effective compromise. Either option would likely have blended into the existing neighborhood better. A park, new school, or community center might have had a wider impact by bringing the whole neighborhood together.

Although the world is full of modest, deteriorating, post–World War II residential neighborhoods and the revitalization project shared several important aspects with recent policy trends, our intent was not to generalize the above conclusions to similar interventions in other cities. (See "Research Setting" for some of the peculiarities of this setting and project that may limit our external validity.) Rather, we offer this as a relatively simple example of aggregating and applying different data sources to GIS at the street block level to create color-coded maps that may be easily presented to, and understood

by, community groups, human service organizations, and city officials. GIS maps provide a quick and clear means of detecting the precise location of environmental improvements and deterioration just as they have been widely used to identify crime hot spots in neighborhoods.

NOTE

1. Distance was measured two ways using GIS—direct aerial (linear) distance and walking distance by streets. It is also possible to measure driving distance which would also account for one-way streets. "Psychological proximity" (awareness of the new subdivision and feeling that it is in one's neighborhood) was correlated r = .10 with observed conditions and r = .11 with self-reported improvements, but no linear distance or proximity measures were significant in multivariate HLM analyses predicting the same variables mapped in the present study. This paper is under review and available from the first author.

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