

Managing the Urban Commons

The Relative Influence of Individual and Social Incentives on the Treatment of Public Space

Daniel Tumminelli O'Brien

Published online: 24 October 2012
© Springer Science+Business Media New York 2012

Abstract All communities have common resources that are vulnerable to selfish motives. The current paper explores this challenge in the specific case of the urban commons, defined as the public spaces and scenery of city neighborhoods. A theoretical model differentiates between individual incentives and social incentives for caring for the commons. The quality of a commons is defined as the level of physical (e.g., loose garbage) and social (e.g., public disturbances) disorder. A first study compared levels of disorder across the census block groups of a single city; the second compared the disorder generated by individual addresses in two neighborhoods. Each study found that homeownership, an individual incentive, was the main predictor of disorder. Owner-occupied parcels generated less disorder than their renter-occupied neighbors, but both parcel types produced less disorder in a neighborhood with greater homeownership. The results emphasize the need for considering both individual and social incentives for group-beneficial behaviors.

Keywords Collective efficacy · Homeownership · Neighborhoods · Prosociality · Social dilemma · Urban studies

In any community, certain items are held in common. Some resources are shared, and some spaces are identified as public. These items are available to all members of the community but also must be maintained by those who share them. It is this need for maintenance that makes for Hardin's (1968) "Tragedy of the Commons": maintenance is costly, and individuals might see more benefit in the pursuit of immediate gain, in turn jeopardizing both the commons and the group's way of life. The ensuing "tragedy" might come in the form of depleted resources or denigrated spaces, but the root cause is an imbalance wherein the perceived benefits of contributing to the public good are outweighed by immediate self-interest. For any community, then, the

The research published here was done while the author was at Binghamton University (New York).

D. T. O'Brien (✉)
Radcliffe Institute of Advanced Study, Harvard University, Cambridge, MA 02138, USA
e-mail: Daniel_obrien@radcliffe.edu

question is how the local ecology shapes these competing benefits, and what mechanisms might best encourage all members to act in the interest of the common good, be they direct personal incentives or social mechanisms, such as punishment for transgressions.

The current study takes up this question in modern urban neighborhoods. The urban commons is distinguished by its high population density, placing properties close enough together as to blur the distinction between public and private. Consequently, one might expect individual incentives to best motivate maintenance. Nonetheless, urban researchers often find that the local community is vital for managing public behavior, a role that may extend to the treatment of public space. The current paper compares these two hypotheses, evaluating the relative impacts that individual and social incentives have on the conditions of a given urban commons.

The first section describes the urban commons in greater detail, followed by a more detailed model of the forms that individual and social incentives might take. This is followed by two studies conducted in Binghamton, a small city in New York state. The first study pursues the question at an ecological level, comparing conditions and incentives across neighborhoods. The second study goes deeper, comparing the conditions of the individual parcels (i.e., lots) of two adjacent neighborhoods, permitting inference about the behaviors of individuals. The discussion explores the implications for urban neighborhoods, as well as for commons situations writ large.

The Urban Commons

The U.S. Census defines cities as settlements of more than 50,000 people, and they tend to be densely populated. A typical city block (a region enclosed by four street segments) is home to at least 50 people, and often more where there are apartment buildings. Most urbanites report that their neighborhood consists of multiple blocks, an area with a few hundred residents, and often including some quantity of commercial or industrial zoning (Coulton et al. 2001; Sastry et al. 2002; Guest and Lee 1984). A striking consequence of this ecology is an abrupt transition between private and public space. Outside the house, an individual's behaviors become part of the daily lives of the others living there. Public behavior can also leave an imprint on the physical environment—for example, littering. In addition, the proximity of buildings means that their fronts, along with yards and porches, form the backdrop against which public interaction occurs. In turn, the maintenance of certain traditionally private spaces is also relevant to the community as a whole.

This shared space represents the urban commons, though the evolutionary dynamics surrounding it differ slightly from those described by Hardin (1968). Hardin's examples focus on common pool resources, which can be depleted over time. The urban commons, rather, is a non-excludable, non-depletable public good, an element whose maintenance can impact the well-being of all who must use it. In either case, there is the concern that self-interested behavior might pose a threat to long-term upkeep. When urbanites make themselves a public nuisance (e.g., loitering, public drunkenness) or degrade the physical space, they contribute to what sociologists refer to as *disorder* (e.g., Sampson and Raudenbush 2004). Disorder has long been used as an indicator of important issues within a community that are less easy to measure,

such as high crime, physical and mental health deficiencies, and weakened community (Booth 1903; Jacobs 1961; Mayhew 1862; Sampson and Raudenbush 1999; Wilson and Kelling 1982).

More than just an indicator, aspects of disorder may in fact have direct impacts on health. Extensive litter and deteriorating infrastructure pose clear sanitation concerns since they can provide homes to pests that may spread disease or induce respiratory ailments such as asthma (Cagney and Browning 2004). The elements of disorder also have an important psychological component. In a set of experiments by O'Brien and Wilson (2011), naive observers used disorder as a signal of a community's overall quality, a broad judgment encompassing everything from the nature of relationships between neighbors to the local crime rate to the trustworthiness of individual residents. This attention to community quality can manifest itself physically, generating stress and predisposing those who experience disorder regularly to a variety of mental health problems, including depression (Haney 2007; Ross and Jang 2000; Ross et al. 2001; Wen et al. 2006). Such findings are typically independent of socioeconomic status at both the individual and neighborhood levels.

The interpretations derived from disorder are also used to make adaptive social decisions. Just as individuals are unlikely to invest in unhealthy or low-quality social partners (Krupp et al. 2011), they eschew prosociality when in disorderly neighborhoods (O'Brien and Wilson 2011) and are less likely to frequent or invest economically in such areas (Nasar 1990). Similarly, disorder tends to beget more disorder; for example, pedestrians are more likely to litter in areas that are already littered (Cialdini et al. 1990; Reno et al. 1993). As in Hardin's examples, if residents shirk their responsibility to maintain the neighborhood, or contribute to either physical or social disorder themselves, they can negatively impact the health of their neighbors, and the future of the community as a whole.

A Model for Maintenance of the Urban Commons

The optimal outcome for the community is clear: a clean, orderly neighborhood is a neighborhood with healthier residents and greater potential for social and economic development. Achieving this goal relies on the behavioral processes that generate or prevent disorder, and the costs and benefits associated with them. Maintaining one's house takes time, energy, and resources. The same is true of keeping a lawn tidy, or sweeping the sidewalk. Regulating one's public behavior so as not to disturb other neighbors and pedestrians may also be perceived as burdensome, if not costly in the traditional sense. As alluded to above, these perceived costs might be counteracted by either social incentives that leverage community relationships or individual incentives that arise directly from the resident's dependence on the space itself. The current section explores these two types of incentive, and how each might manifest itself in the urban context.

Theoretical models of social dilemmas regularly find that interpersonal regulations and consequences can be effective in minimizing free-rider behavior (Boyd et al. 2003; Eldakar et al. 2007; Nakamaru and Iwasa 2006). Likewise, empirical work finds that humans are sensitive to the possibility of punishment, something often demonstrated through behavioral economics "games" that simulate social interactions

(Fehr and Fischbacher 2004; Fehr and Gächter 2002; Henrich et al. 2006). Regardless of the specific game, if there are social consequences for selfish behavior, more sharing occurs. In the public goods game, an example that closely resembles a commons, the advent of punishment can more than double cooperation (Fehr and Gächter 2002). Though these games highlight the impact monetary sanctions can have on behavior, other work has shown that social repercussions, such as gossip, shaming, or, if necessary, direct confrontation, are adequate in compelling people to adhere to social norms (Bowles and Gintis 1998). Even the mere suggestion that someone is watching can encourage greater cooperation, as shown by studies that have placed an image of eyes in the room while participants make decisions (Ernest-Jones et al. 2011; Oda et al. 2011). In one example relevant to the focus here, Ernest-Jones et al. (2011) found that when a university cafeteria was decorated with posters that had a pair of eyes (as opposed to flowers), more people properly bussed their trays and less garbage was left on tables.

All evidence suggests that informal governance is a human universal, though the exact mechanisms by which it functions, and the behaviors it seeks to motivate, vary between cultures. Ostrom (1990) has amassed a library of thousands of cases in which communities have developed a system for sharing a vital resource. In every one of these cases an essential ingredient is a clear, well-enforced set of rules. Work done by urban sociologists has illustrated that the same dynamics are true for city neighborhoods. Neighborhoods with a strong sense of community are characterized by established social norms, and neighbors who are comfortable enforcing them when necessary, a capacity referred to as *collective efficacy* (Sampson et al. 1997). Collective efficacy is directly related to the regulation of public space and is often higher in neighborhoods characterized by more community organizations, neighborhood associations, and local activism (Ohmer 2007; Sampson et al. 2005). Neighborhoods with higher levels of collective efficacy are often successful in suppressing local levels of crime and delinquency (Maimon and Browning 2010; Molnar et al. 2004; Sampson et al. 1997, 1999; Yonas et al. 2010), and some have argued that it also plays a role in discouraging social disorder (Sampson and Raudenbush 1999). This hypothesis might extend to physical disorder as well, being that neighborhood associations regularly establish rules regarding the state and decoration of one's house and land (Nelson 2003).

The urban commons is distinctive in that parts of the “public” space are in fact private property, and the upkeep of a house or lawn falls to the owner. Residents cannot assume that others in the community will maintain it, as is sometimes seen when responsibility appears to be distributed across many individuals (Latané and Darley 1968). This suggests that individual incentives might play a prominent role in neighborhood maintenance. There are three conditions that might serve to increase or decrease these incentives. First, individuals who perceive themselves as dependent on a space for the foreseeable future will have greater incentive to maintain it. Take the example of a public goods game that frames the current dilemma in a single experiment where the outcomes are monetary. Fehr and Fischbacher (2004) found that individuals who played the game with the same social partners repeatedly were far more cooperative than those who perceived the game as a one-time interaction with strangers. Second, those who might derive greater material benefit from a space in the future will be more inclined to invest in it. Third, the costs of maintaining the

public good may be higher for some individuals than for others, depending on their access to the requisite resources.

These first two conditions are embodied by the distinction between homeowners and renters. Purchasing a home is a long-term decision to settle permanently in a place. Homeowners establish a relationship with both the community and the space that is analogous to a repeated game. They have also made a significant monetary investment, one that will increase or decrease with the overall quality of the neighborhood. Renters do not have these same incentives. By analogy to the Fehr and Fischbacher (2004) experiment, they have the option of playing a short-term game, since they can leave more easily and may not see the value in contributing to the local community and space. This disinterest could be further intensified by the lack of any material investment in their home or the surrounding neighborhood. Indeed, homeowners tend to participate in more local organizations and politics (Fischel 2005), and the same pattern of engagement may extend to the space they share with their neighbors.

The third condition mentioned, the ability to afford maintenance, is best approximated by socioeconomic status. Painting one's house requires the purchase of materials. Tending one's lawn is easier if others can be hired to do so. Thus, those with lower income may have difficulty staving off the deterioration of property. Also, low-income neighborhoods are characterized by small living spaces, meaning that a large amount of socializing occurs in the public view (Duneier 1999; Fagan and Davies 2000; Stinchcombe 1963), creating a situation in which public disturbances are more likely to occur. This could also be exacerbated by the greater consumption of intoxicants in these areas, both in private and in public (Nettle 2011). If such processes lead to a culture that is more tolerant of disorder, it may be allowed to accumulate, regardless of the local capacity for collective efficacy.

To summarize, the studies that follow evaluate the relative impact of social and individual incentives on the level of social and physical disorder across urban neighborhoods (illustrated in Fig. 1). The analysis treats them as having direct effects on behavior and does not consider any interaction between them. Though such an interaction seems feasible, it is necessary to first establish their independent

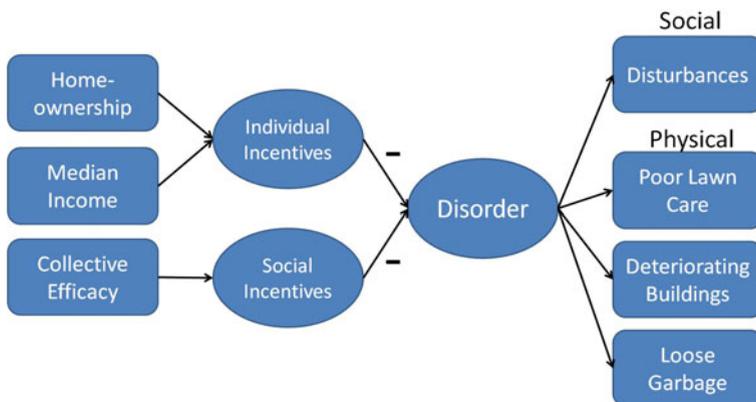


Fig. 1 Theoretical model of the relationship between individual and social incentives and neighborhood disorder, including both conceptual variables (*ovals*) and measurable variables (*rectangles*). Note: Negative relationships are denoted with “-”; all lines indicate positive relationships

relationships with maintenance. In the case of the urban commons, social incentives for public maintenance are argued to arise from a neighborhood's level of collective efficacy, while individual incentives are estimated using homeownership and median income. The following section provides more detail as to how these various variables are operationalized.

Study 1

This first study compares physical and social disorder across the neighborhoods of Binghamton, a small city in upstate New York. Physical disorder was measured by assessing the upkeep of houses and lawns, and the accumulation of garbage. Social disorder was measured using disturbance reports to the Binghamton Police Department—non-criminal events that have inconvenienced one or more people in the neighborhood. Cross-neighborhood variation in these measures was then analyzed to evaluate the relationships in Fig. 1. Collective efficacy is estimated by a citywide survey, and homeownership and median income are accessed from administrative data. The fact that Binghamton is a college town with a high student renter population could have its own independent effect on neighborhood maintenance. College students rarely plan to settle after graduation in the same place they attended college, especially in a city that is small and struggling economically, as is Binghamton. Whereas some renters may consider themselves long-term members of the community, college renters almost certainly do not. For this reason, student renter population is included as a factor that may predict higher levels of disorder in a neighborhood.

Methods

Study Site

Binghamton is the center of a metropolitan region that is home to about 250,000 people, with a population of 47,376 in the city proper as of the 2010 census. Neighborhoods are approximated by census block groups (CBGs), of which there are 62 in Binghamton with substantial population. They are drawn so as to distribute population evenly between CBGs, with each having about 800 residents, and they largely follow major landmarks. This is a relatively fine scale for urban research, which more commonly uses the census tract (population around 3,000–5,000). The measure of collective efficacy was only available for 59 of the CBGs (see below), so analyses are limited to this subset.

Measures

Physical Disorder From the 62 CBGs, 128 addresses were chosen at random, with each CBG represented at least twice. In September 2009, four digital photos were taken at each of these addresses: one facing the address, one looking across the street from the address, and one looking each way down the street. When placed together, these approximate a 360° view from the street in front of the address. No photo

included images of people. The average CBG contains ~20 street segments, so this design samples ~10% (2 of 20) of the available street segments. Five paid research assistants rated each photo on four characteristics: care for the lawn's grass, care for other front lawn vegetation, the presence of loose garbage, and the quality of the paint on the house's exterior. This procedure was identical to that described in O'Brien and Wilson (2011). Ratings were left blank if inapplicable for a given image (e.g., rating lawn quality in a picture of a street).

Inter-rater reliability was strong for all measures ($\alpha=0.78-0.87$), permitting the averaging of individual ratings of an image to create an image-specific score for each measure. These scores were then averaged at two additional levels. First, an address-specific score was calculated by averaging across the four images taken at a given address. A CBG score was then calculated by averaging the scores from each of the two (in some cases three) addresses photographed in that CBG.

In order to simplify these measures before analysis, the two items referencing vegetation were averaged to create a single measure, as the two were highly correlated ($r=0.82$). Paint and garbage were treated as singleton items.

Social Disorder The Binghamton Police Department provided an archive of all disturbances reported during 2009, and the address at which each occurred. The number of disturbances in each CBG was tabulated. This variable was log-transformed before analyses to adjust for a strong negative skew ($M=70.46$, $SD=59$, $min=1$, $max=251$).

Collective Efficacy In January 2009, 703 students at Binghamton High School responded to a modified version of the Developmental Assets Profile (DAP), a survey developed by Search Institute (<http://www.search-institute.org/>) to assess the quality of life in adolescents (see O'Brien et al. 2012 for more detail on survey). This survey included measures of the two main components of collective efficacy: social cohesion (3 items: e.g., "People in my neighborhood are willing to help each other") and social control (3 items: e.g., "If there were a fight in my neighborhood, neighbors would break it up") in one's neighborhood. Items were based in large part on the survey used by Sampson et al. (1997). The scales were combined to form a single measure of collective efficacy, based on a 0–100 scale ($\alpha=0.83$). Using ArcGIS (v. 9.6), each response was mapped to the CBG of residence. A neighborhood measure of collective efficacy was calculated by averaging the responses of all respondents residing in a CBG. The sample included students from 59 of the city's 62 CBGs.

Homeownership Broome County GIS provided a data set approximating for each residence whether it was owner-occupied or rented. If a building owner's home address was different from that of the building itself, then the building was assumed to be rented. If the two addresses coincided, it was assumed to be owner-occupied. The proportion of owner-occupied addresses in a CBG was then calculated.

Median Income Socioeconomic status was estimated using the median household income of a CBG, as provided by the 2005–2009 estimates from the Census'

American Community Survey. It was log-transformed before analyses to adjust for outliers.

Student Renter Population Student renter population was estimated through records held by the Binghamton University Registrar. These data were supplemented with an internet survey asking off-campus students to report their current addresses. These methods covered about 70% of off-campus students, giving a reasonable approximation of the number of student renters in each region (McGovern 2009). This was then standardized by region population. Since student renters were concentrated in a small number of CBGs (a Poisson distribution), it was recoded as a dichotomous variable, with “1” denoting a CBG with greater than 10% student renter population (“0”=less than 10%). This cutoff was chosen because it was the point at which the slope of the distribution curve flattened out.

Results

Descriptive statistics for the predictor variables and correlations between them are reported in Table 1. All forms of physical disorder were correlated (Pearson’s r values=0.46–0.52, p values<0.001; see Table 2), though at magnitudes low enough to suggest that the conditions of vegetation, house paint, and garbage were sufficiently independent to be analyzed individually. The relationship between physical and social disorder was less prominent (Pearson’s r values=0.13–0.28, p values<0.05, except in the case of vegetation, where p =ns). Four separate regressions were run, each using collective efficacy, homeownership, median income, and student renter population to predict one of the measures of disorder, the results of which are summarized below. The same models were run controlling for a neighborhood’s ethnic composition to test for any cultural effects not considered by the foregoing model. These did little to change the main results, and are presented in the Appendix. Though the independent variables share a considerable amount of variation (see Table 1), collinearity diagnostics found that this should not be strong enough to

Table 1 Descriptive statistics for predictor variables and correlations (Pearson’s r) between them

	Collective Efficacy	Homeownership	Median Income	High Student Population
Collective Efficacy	–	0.63***	0.60***	–0.13
Homeownership		–	0.73***	–0.37**
Median Income ^a			–	–0.36**
High Student Population ^b				–
Mean (SD)	46.93 (10.29)	0.52 (0.19)	\$29,426 (\$14,563)	0.24
Range	17.86–71.43	0.13–0.89	\$8,430–\$73,000	–

$N=63$ Census block groups; in correlations with collective efficacy, $N=59$

^a Log-transformed before correlations

^b Dichotomous variable with “1”=variable name. Proportion reported in place of mean

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 2 Descriptive statistics for disorder measures and correlations (Pearson's r) between them

	Vegetation	Paint	Garbage	Disturbances
Vegetation	–	0.52***	–0.47***	–0.13
Paint		–	–0.46***	–0.27*
Garbage			–	0.28*
Disturbances ^a				–
Mean (SD)	10.83 (0.95)	4.02 (0.45)	4.22 (0.33)	70.46 (59.00)
Range	9.00–12.50	4.75–4.85	3.12–4.68	1–251

$N=59$ Census block groups

^a Log-transformed before correlations

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

exclude any variables with a significant relationship (no condition index had more than one variable load at a level >0.5).

Physical Disorder

The regression estimates (standardized betas) in Table 3 show that homeownership was a better predictor of all forms of physical disorder than collective efficacy. The former explained between 25% and 35% of the variance across neighborhoods (magnitude of $\beta=0.52$ – 0.62 , p values <0.001 , $N=59$), whereas the latter was a non-significant predictor in all cases (magnitude of $\beta=0.03$ – 0.10 , p values = ns, $N=59$). Similarly, median income did not significantly predict any of the measures of physical disorder (magnitude of $\beta=0.02$ – 0.15 , p values = ns). Against the above predictions, neighborhoods with a high student renter population had superior upkeep of vegetation ($\beta=0.32$, $p<0.01$), independent of other predictors.

Table 3 Standardized betas from a regression model using neighborhood descriptors to predict levels of physical and social disorder

	Physical Disorder			Social Disorder
	Vegetation	Paint	Garbage	Disturbances ^a
Collective Efficacy	0.02	–0.03	0.10	–0.17
Homeownership	0.62***	0.50***	0.52***	–0.65***
Median Income ^a	0.12	0.15	–0.06	–0.02
High Student Population ^b	0.32**	0.17	0.00	0.06
Adjusted R^2	0.46	0.28	0.23	0.61

$N=59$ CBGs for all models

^a Log-transformed to maintain normality

^b Dichotomous variable with “1” equal to the variable's name

** $p<0.01$, *** $p<0.001$

Social Disorder

The same pattern held for social disorder. The quantity of disturbance reports in a neighborhood was predominantly explained by homeownership ($\beta = -0.61$, $p < 0.001$), with homeowner neighborhoods having far fewer disturbances than renter neighborhoods. Again, collective efficacy was not significant in the model, as were median income and student renter population (see Table 3, column 4).

Discussion

The regressions found that all forms of disorder were lowest in neighborhoods with high levels of homeownership, suggesting that the treatment of the urban commons is impacted more by individual incentives than by the social processes associated with collective efficacy. Particularly notable is the strength and consistency of homeownership's relationship with disorder: all effect sizes were greater than 0.5, and only one other predictor was significant in any of the four models. This one exception, though, is a curious point. Going against the initial hypotheses, neighborhoods with many student renters had better-kept vegetation. It is difficult to interpret this in terms of the theoretical model, and it may be an artifact of the different options available to student renters and to local renters. Landlords tend to cater to one or the other, and the former group is likely more picky. Students at this particular university tend to come from more affluent parts of the state and often have more money to spend on rent. Landlords trying to woo student renters may keep better lawns and hedges for this reason, but this remains an empirical question. It may also be an indication of a socioeconomic effect, as student renters tend to have access to higher-quality apartments than local residents. Nonetheless, the inconsistency of this effect across models makes any broad interpretation difficult.

There is a need for a few caveats to the interpretation here. First, all of the independent variables are strongly correlated. The collinearity diagnostics suggested that this was not sufficient to block meaningful predictors from attaining significance in the model, which is promising. Nonetheless, it is important to consider that, if homeownership indeed has the strongest causal relationship with disorder, it might consume the variation generated by other variables with which it correlates strongly. Second, homeownership might be confounded by age. Older individuals are more inclined to worry about the future (Steinberg et al. 2009), an important component of the individual incentives described above. Older individuals are also more likely to be homeowners. Unfortunately, census data do not provide the median age of homeowners and of renters for each CBG.

Study 2

Though the results in Study 1 are robust within and across types of disorder, the proper interpretation is not immediately apparent. Because comparisons were made at the level of neighborhoods, it is difficult to determine whether the underlying process is one of individual behavior or collective dynamics (Sampson et al. 2002). On the one hand, individuals who own their homes may be more considerate of the public

space. On the other, Study 1 cannot rule out the possibility that communities of homeowners give rise to more stringent expectations for the public space. The fact that a neighborhood's level of collective efficacy was not predictive of disorder in Study 1 suggests that the residents of homeowner communities are not compelling each other to maintain the neighborhood through informal sanctions. There are, however, more subtle ways in which such norms can be transmitted. Humans have a well-documented tendency to conform to local norms, even when those norms are not made explicit (Richerson and Boyd 2004; Cialdini and Goldstein 2004). In the case of disorder, Cialdini et al. (1990) showed that individuals inferred local norms for littering behavior from the conditions of the physical environment and then behaved accordingly. When exposed to a littered environment, pedestrians were more likely to litter. If the same space was cleaned, pedestrians were less likely to litter. Thus, if homeowners are generally more likely to care for the public space, their prevalence may encourage similar behavior from others, be they homeowners or renters. Likewise, if renters are less considerate, others will see evidence for this behavior and follow suit.

Study 2 aims to adjudicate between these two hypotheses by comparing disorder across the developed parcels (i.e., addresses with buildings) of two neighborhoods. By comparing the appearance of an individual parcel, and the number of disturbances reported there, to the surrounding parcels, one can ascertain if homeowners do indeed take better care of the urban commons than renters. Further, one of the neighborhoods in this study has a moderate level of homeownership while the other has low homeownership. This design allows a comparison of homeowners and renters across neighborhoods, evaluating whether those living in a homeowner neighborhood take better care of the public space than those with the same ownership status in a renter neighborhood. Study 2, like Study 1, utilizes a mixture of administrative data and field observations.

Methods

Study Sites

Study 2 focuses on two neighborhoods in the same region of Binghamton, each flanking one side of Main St. Both neighborhoods are almost exclusively residential. They differ in level of homeownership, however, with one being centered around a CBG with 51% homeownership (Neighborhood 1) and the other including parts of three CBGs with 32–39% homeownership (Neighborhood 2). Neighborhood 2 also has a higher proportion of student renters. These communities were chosen for two reasons. First, they are very close to each other, and close to the same business district, which controls for spatial dependence as much as possible. Second, neither neighborhood's residences are overwhelmingly resident- or renter-occupied, permitting within- and between-neighborhood comparisons of the effect of homeownership. Each neighborhood consisted of ~20 street blocks.

Data Collection

Data were collected on each parcel in the study area that had a building. The sample consisted of 306 privately owned parcels in Neighborhood 1 and 326 in Neighborhood 2.

Physical Disorder A team of seven unpaid raters (consisting of faculty, staff, and graduate and undergraduate students) walked a given street, rating each parcel on the same characteristics described in Study 1, the only difference being that raters assessed the quality of grass and vegetation with a single measure, given the strong correlation between these two items. The measure of house paint was rephrased to reference the maintenance of exterior walls in general because certain parcels contained buildings with stone walls (this was not an issue in the images in Study 1). Again, variables for *garbage*, *walls*, and *vegetation* were calculated. Before data collection, raters were trained on example photos that were calibrated to specific ratings on the 1–5 scale.

Ratings were left blank if not relevant for a given parcel (vegetation: 14 parcels in Neighborhood 1, 16 in Neighborhood 2; garbage:¹ 3 parcels in Neighborhood 1, 5 in Neighborhood 2). Abandoned parcels were also noted. Neighborhood 1 contained 14 abandoned parcels, and Neighborhood 2 contained 12. These were analyzed separately.

Social Disorder As in Study 1, the Binghamton Police Department’s archive of disturbance reports provided the measure of social disorder. The number of disturbances was tabulated for each parcel in the study area.

Homeownership Homeownership for each parcel was accessed from the Broome County GIS database described in Study 1.

Results

Physical Disorder

The individual effect of homeownership on disorder was first tested by comparing the level of disorder between owner- and renter-occupied homes within each neighborhood. These analyses excluded abandoned buildings. In both neighborhoods, owner-occupied parcels had better-maintained houses and vegetation, and lower levels of garbage (all p values < 0.05; see Table 4 for t -test results). A mixed model then tested the competing hypothesis that residents of neighborhoods with greater levels of homeownership take better care of the neighborhood, independent of their own ownership status. A mixed model was used, rather than a two-way ANOVA, so neighborhood of residence could be treated as a random effect. Homeownership and neighborhood were both significant for each of the three forms of physical disorder (homeownership’s significance evaluated using an F -test; neighborhood’s significance derived by evaluating the change in the log-likelihood function when introduced to the model via a χ^2 test; all p values < 0.001, see Table 5 for complete results). As can be seen in Fig. 2, although owner-occupied parcels had less disorder than their renter-occupied neighbors, both owner- and renter-occupied parcels in Neighborhood 1 had less disorder than their counterparts in Neighborhood 2. An interaction effect between neighborhood and homeownership was not significant in any model (all p values = ns; see Table 5).

¹ “Garbage” was left blank if the building fronted directly on the sidewalk, leaving no room for garbage to accumulate.

Table 4 Means and standard deviations for disorder at owner- and renter-occupied parcels in each neighborhood and *t*-tests comparing these values

	Owner-Occupied	Renter-Occupied	<i>t</i>	<i>N</i> ^a
Neighborhood 1				
Vegetation	3.89 (0.98)	3.60 (1.00)	2.48*	170/114
Walls	3.89 (0.88)	3.64 (1.00)	2.24*	173/119
Garbage	4.12 (0.95)	3.81 (1.01)	2.42*	174/117
Neighborhood 2				
Vegetation	3.46 (1.27)	3.06 (0.97)	3.05**	103/196
Walls	3.62 (0.98)	3.20 (0.82)	4.07***	109/205
Garbage	3.86 (1.02)	3.28 (1.19)	4.33***	109/201

^a Owner-occupied/Renter-occupied* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Social Disorder

The distribution of disturbance counts was highly skewed, with 77% of parcels instigating zero calls. Chi-square analyses found that renter-occupied parcels in both neighborhoods were more than twice as likely to have one or more disturbance calls than their owner-occupied neighbors (Neighborhood 1: 13% vs. 29%, $\chi^2_{df=1}=10.72$, $p < 0.01$; Neighborhood 2: 15% vs. 32%, $\chi^2_{df=1}=10.78$, $p < 0.01$). This analysis was repeated on an ordinal variable with three categories: no disturbance calls (77%), one call (13%), and more than one call (10%). Again, the chi-square analysis indicated that owner-occupied parcels had fewer disturbance reports than renter-occupied parcels (Neighborhood 1: $\chi^2_{df=2}=11.26$, $p < 0.01$; Neighborhood 2: $\chi^2_{df=2}=11.74$, $p < 0.01$). Of the owner-occupied parcels with any reports, 35% in Neighborhood 1 and 37% in Neighborhood 2 had two or more reports. The corresponding proportions for renter-occupied parcels were 46% and 54%. Categorical logistic regressions were then used to measure differences between the two neighborhoods while controlling for homeownership. Both found that parcels in the two neighborhoods produced

Table 5 Results of mixed models comparing disorder between owner- and renter-occupied parcels and neighborhoods

	Neighborhood ^a		Occupant Status	Interaction	<i>N</i>
	<i>F</i>	χ^2_{diff}	<i>F</i>	<i>F</i>	
Vegetation	29.93	143.8***	15.30***	0.35	582
Walls	21.38	60.6***	19.62***	1.34	605
Garbage	18.78	60.7***	15.35***	2.32	600

^a Analyzed as a random effect. Significance evaluated by subtracting the log likelihood of the model with only occupant status (null model) from that with neighborhood introduced (alternative model) using a chi-square test ($df=1$)*** $p < 0.001$

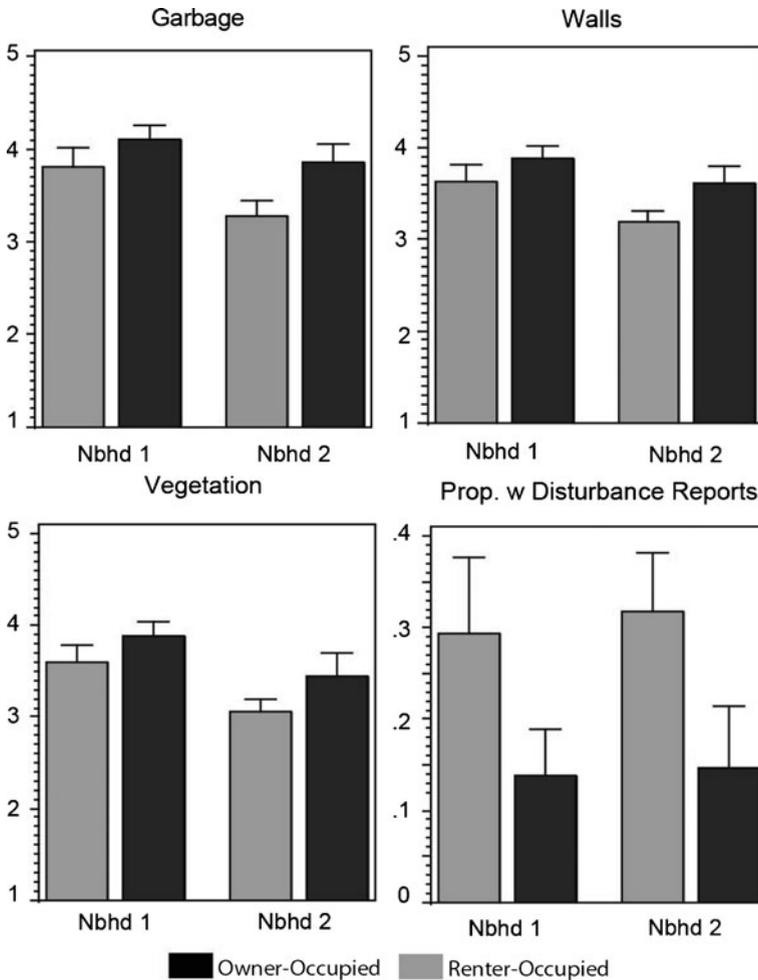


Fig. 2 Comparison of disorder levels between owner- and renter-occupied parcels in Neighborhoods 1 & 2

approximately the same amount of disturbance (binary measure: $\chi^2_{df=1}=0.18$, $p=ns$; ordinal measure: $\chi^2_{df=1}=0.73$, $p=ns$).

Abandoned Parcels

Abandoned parcels provide an interesting opportunity to examine neighborhood-level patterns. Litter in occupied parcels can be attributed to their residents, whether it was dropped by them or not, since they are the ones responsible for picking it up. Abandoned parcels, however, have no such caretaker, and the litter that accumulates there is representative of the overall littering in the neighborhood. Abandoned parcels were about equally common in the two neighborhoods (4–5% of parcels).

Abandoned parcels in Neighborhood 2 had more litter than those in Neighborhood 1 (Neighborhood 1: 3.15/5 average rating; Neighborhood 2: 1.67/5 average rating; $t=3.49$, $p<0.001$). However, there was no information on how long the parcels had

been abandoned, and garbage tends to accumulate in vegetation, especially when it is overgrown. Thus, a parcel may have more litter because it has been abandoned for longer. To control for this, an ANCOVA compared litter between the abandoned parcels in the two neighborhoods while controlling for quality of vegetation. Abandoned parcels in Neighborhood 2 still had higher levels of litter ($F_{1,23}=16.89$, $p<0.001$), though vegetation quality strongly predicted less litter ($F_{1,23}=10.22$, $p<0.01$).

Discussion

Study 1 found that neighborhoods with higher levels of homeownership were cleaner, better maintained, and experienced fewer public disturbances. Study 2 extended these findings, demonstrating that indeed renter-occupied households were a greater source of all forms of disorder than their owner-occupied neighbors, providing evidence that differences between neighborhoods were fueled in part by individual incentives. One challenge to interpreting this result is the question of who in fact maintains renter-occupied properties—the renter or the landlord. For example, the landlord is more likely to be responsible for the upkeep of the building itself. Litter in the front yard, however, is something that would need daily attention, a responsibility that falls to the tenant in most leases. Public disturbances at an address are clearly generated by the residents themselves. The broad set of disorder measures used here suggests that both renters and landlords are less attentive to the neighborhood than homeowners living there.

That renters might have a comparatively negative impact on the commons adds to a substantial literature on the way ownership enhances how a person treats an object or space. This effect has been identified and named in a variety of contexts, including greater community or political engagement in homeowners (the homevoter hypothesis: Fischel 2005); over-valuation of personal belongings (the endowment effect: Kahneman et al. 1990; the mere ownership effect: Beggan 1992); and the ceding of contested resources to the individual who arrived first (an ownership convention; Descioli and Wilson 2011). In this instance, greater attention on the part of owners had the emergent property of impacting the conditions of a public good. In the case of landlords, poorer care may stem from less personal incentive to maintain properties they do not occupy, in neighborhoods where they do not live. This could be driven by sheer rational calculation or by an emotional mechanism, such as a lack of personal identification with the property, neighborhood, or both. Unfortunately, the data here cannot distinguish between these and other possible mechanisms for this pattern.

Differences between owner- and renter-occupied parcels, however, were not sufficient to explain the overall differences in disorder between the two comparison neighborhoods. Both owner- and renter-occupied parcels in Neighborhood 1, where homeownership was more prevalent, were better maintained than their counterparts in Neighborhood 2. Additionally, vacant properties in Neighborhood 1 had less litter. Although these results suggest that Neighborhood 1 had stronger norms regarding the treatment of public space, Study 1 found that collective efficacy did not predict differences in disorder across neighborhoods. Though it is possible that the survey measure did not fully capture social enforcement mechanisms within the neighborhood, this finding also implies that more subtle methods were responsible for the transmission of these norms.

One of the main methods for the transmission of cultural norms is conformity bias, which does not necessarily require direct communication (Richerson and Boyd 2004). Cialdini et al. (1990) have demonstrated that this dynamic is apparent in littering behavior as well. Notably, participants did not need to see another person litter; instead, the mere presence of discarded papers on the ground was enough to encourage littering. Extending this to societal patterns, the scenery of a neighborhood is a record of how the residents treat the public space, and it communicates these behaviors as the local norms. Neighborhood 2, with its many renters, has a higher baseline level of disorder, a condition that could then influence all pedestrians to be less considerate of the public space than they might otherwise be. If this same effect becomes an ingrained part of daily life, the residents may develop routines that generate more disorder than their counterparts in Neighborhood 1. Mathematical models have shown that conformity of this sort, when operating alone, can lead to the complete fixation of a particular norm (Boyd and Richerson 1982, 1985). In this case it is diluted by individual incentives, permitting the within-neighborhood variation observed, but it is still strong enough to amplify between-group differences. This would explain the substantial correlation between homeownership and disorder seen at the neighborhood level in Study 1.

The same pattern of social influence was not apparent for social disorder. Owner- and renter-occupied parcels in each neighborhood differed in the number of disturbance calls they provoked, but these numbers were relatively even across the two neighborhoods. This may speak to the different mechanisms underlying the treatment of physical space and social behavior. One's attitudes about disturbing behaviors, such as public drunkenness, domestic disputes, or late-night noise, are probably less mutable than attitudes about inanimate objects. Thus, though behavior such as littering is easily manipulated by seeing others do the same, the same sort of imitation may be less likely in the case of social disorder.

General Discussion

Hardin's (1968) "tragedy of the commons" is one of costs and benefits. When the incentives for selfishness outweigh the incentives for group-beneficial behavior, deterioration and degradation become inevitable. The question then is less about the tragedy itself than the behaviors that precede it, and the mechanisms that might avert it. As illustrated above, such mechanisms might encourage group-beneficial behavior by providing direct benefits to individuals or by leveraging social relationships. The current paper evaluates the relative importance of these social and individual incentives in determining the conditions of a given urban commons. Studies 1 and 2 provided ample evidence that individual incentives had a greater impact than social incentives. Homeowners took better care of their own houses than non-resident landlords. They were also less tolerant of litter, and less likely to disturb the peace than their renter neighbors. On the other hand, a community's collective efficacy was not predictive of disorder. However, Study 2 did reveal that social context could impact commons behavior, albeit via a process that was not included in the original hypotheses. The care that homeowners invested in the public space was seemingly contagious, encouraging more of the same from each other and from renters.

These results highlight the value of a two-pronged model when considering the commons problem. Much commons research to date has emphasized that a community needs to agree on a set of norms that will permit local sustainability and develop a system that effectively enforces these norms (see Ostrom 1990, 2005 for summaries). This approach has been quite productive, providing a better understanding of a range of examples from the rationing of groundwater in arid regions (e.g., Maass and Anderson 1986) to the collective harvesting of fisheries (e.g., Alexander 1977). On the other hand, there has been some discussion that policies that account for people's basic motivations and biases might make for more successful environmental policy (Penn 2003). For example, in efforts that complement the current findings, reforms emphasizing property rights in developing countries have been successful in preserving forests, the argument being that property owners feel a greater responsibility than tenants and will thus be more inclined toward sustainable practices (Alcorn and Toledo 2000; Mendelsohn 1994; Holmgren et al. 1994).

Though these two classes of mechanisms, the social and the individual, coexist in most situations, they are often treated independently. First, surely the ways in which a community compels its members to behave in group-beneficial ways can be operationalized and measured. Likewise, measures of property rights and ownership might be supplemented by analogous measures that capture the emotional or personal relationship individuals develop with public spaces and resources. Bowles, Gintis, and colleagues (Bowles 2008; Bowles and Gintis 1998; Gintis et al. 2003, 2005) have argued that residential stability, local attachment, or perceived group membership can inspire these moral sentiments, driving behaviors that benefit the group as a whole. In some cases, they have argued, these feelings of connection to a community or partnership can be more effective in sustaining cooperation than the specter of punishment (Bowles 2008). A complete analysis of any commons dilemma would seek out measures from both of these categories, and evaluate their relationship to the outcomes of interest. Researchers might also explore the possibility of interactions: for example, are social incentives more effective when an individual is also incentivized by property ownership, or vice versa?

The relative importance of these two types of incentive will likely vary across commons situations. In the urban commons example, individual incentive appears to be the primary motivator for treatment of the physical space. The results here suggest that it also gives rise to the one social pattern identified. This relationship may be a consequence of the fine line between public and private in the urban commons, and it will be less apparent in other commons where this is not the case, making them more reliant on active monitoring and sanctions. Variation of this sort is even apparent in the current study, as the behaviors that impact the physical environment and those that impact the social environment were responsive to different factors. Future research could uncover the meta-variables that predict the balance between these two classes of factors across contexts. For example, McCulloch et al. (1998) examined the individual and collective inclination to adopt new technologies for resource management and found that individuals were amenable to technologies with long-term implementation, provided they saw their property tenure as stable. Conversely, technologies that entailed a broad spatial scale were only adopted if the local community was capable of collective coordination.

Specifically with regard to the urban commons, the findings reported here could have the sort of policy impact that other commons research has had in non-Western societies. The current example makes the case for homeownership in general, as well as for the thoughtful patterning of renter- and owner-occupied parcels throughout the city. As mentioned above, the level of physical disorder can have a number of impacts on the physical and psychological health of local residents, and recent work has shown that this can operate at multiple geographic scales. In a study of south Dallas, TX, Leonard et al. (2011) found that self-reported health was independently predicted by the level of disorder of one's own building, and of the broader neighborhood (defined by census tract). Thus, an individual in a predominantly homeowner neighborhood is benefited directly by the better maintained commons, and also because it encourages the upkeep of one's own living space.

Limitations

A major limitation to the conclusions here is a selection bias. The fact that people have some level of choice when moving to a neighborhood has been a prominent concern throughout the history of neighborhood-based research (Sampson et al. 2002). Without an experimental program by which people are randomly assigned to neighborhoods, it is difficult to rule out the alternative hypothesis that individuals who are tolerant of disorder are more likely to purchase houses in disorderly neighborhoods that, in turn, have more renters. There is also the possibility that those who generate more disorder prefer to rent because that is the more adaptive strategy for behaviors that lead to the eventual deterioration of a living space. Or, as mentioned above, the unmeasured variable of age may act as a linkage between rentership and poor maintenance. Nonetheless, human behavior in these regards tends to be sensitive to context, and there is currently no evidence of a stable personality trait that links disorder production and rentership. Because experiments that eliminate this interpretation are very expensive, such as the Movement to Opportunity initiative, which has spent millions to give residents of high-poverty neighborhoods vouchers for housing in low-poverty neighborhoods (see Clark 2005 for a review), the data here present what seems to be the strongest available case.

Also, the current analysis assumes that collective efficacy is enforcing the same norms in all neighborhoods. It may be that a neighborhood has a strong capacity for community governance but does not focus this energy on particular types of disorder. As mentioned above, those with little income may not have the resources to care for their house and yard, and those with multiple jobs may not have the time to do so. Income and homeownership are strongly correlated in general, and this study is no exception. Though homeownership was the more salient predictor of disorder in a statistical sense, this does not preclude the possibility that low socioeconomic status might play a role, and that its impact on local norms is subsumed by homeownership in the regression analysis. This is especially true if homeowners of a lower socioeconomic status end up living in neighborhoods with more renter-occupied buildings, further conflating what might be two distinct processes governing disorder.

Another important limitation is the use of one measure, collective efficacy, to approximate community governance. The consensus in urban research is that collective efficacy is a latent characteristic that can be called upon for any local problem, ranging from collective child rearing to community activism. The same survey measure used here has been linked to these and other measures of community-level activity, including neighborhood organizations and community gardens (e.g., Teig et al. 2009). Thus, it is probably the strongest stand-alone measure of the potential strength of community dynamics in a neighborhood. That said, it has two main weaknesses. First, the substance of the items focuses on the regulation of delinquent behavior, actions that may not be entirely congruent with attitudes about physical disorder. Second, it is still a stand-alone measure and does not completely capture other processes that may be related. As noted, some communities regulate house and lawn upkeep through neighborhood associations and other, more formal organizations, and future work on the urban commons should explore more explicit measures of these and other contributors to neighborhood governance. Additionally, adolescents may not have a complete view of a neighborhood's social dynamics, and that surveys of adults might be more valid. To the author's knowledge no direct comparison of these two approaches of measuring collective efficacy has been made in any locale, but the current measure has been found to correlate with a variety of outcomes that are usually associated with measures of collective efficacy based on adult respondents (Wilson et al. 2009; O'Brien and Wilson 2011).

Conclusion

In closing, the current study had two goals. One was to evaluate the specific patterns of the urban commons. The second was to advance an approach to commons research that differentiated between social and individual mechanisms. That each of these was possible is a testament to a main advantage of urban research. Cities contain a vast array of ecologies, each acting as home to a particular population who simultaneously construct and respond to their surroundings. The use of Binghamton as a study site permitted the comparison of 59 different urban commons, though its variation is modest alongside Chicago, Los Angeles, or Boston, each of which has an ongoing whole-city research project, and an infrastructure for investigating differences across hundreds of ecologies (Azrael et al. 2009; Sampson et al. 1997; Sastry et al. 2006). This diversity made the quantitative inferences reported here possible. Social scientists and health researchers have long used this wealth of information to simultaneously explore the individual and ecological variables that influence human behavior and well-being, and a few evolutionists have recently begun to do the same (Kruger et al. 2008; Nettle 2011; Wilson et al. 2009). The hope is that this trend continues to grow.

Acknowledgments The author would like to acknowledge members of the Binghamton Neighborhood Project for their collaboration in developing the database that made this study possible, most importantly David Sloan Wilson, Susan Seibold-Simpson, Rick Kauffman, and Jim DeVona. Thanks also to Andrew Gallup, Omar Eldakar, Yasha Hartberg, and two anonymous reviewers for their valuable comments on earlier drafts.

Appendix

Table 6 Standardized betas from a regression model using neighborhood descriptors, including ethnic composition, to predict levels of physical and social disorder

	Physical Disorder			Social Disorder
	Vegetation	Paint	Garbage	Disturbances ^a
Collective Efficacy	0.02	−0.06	0.11	−0.12
Homeownership	0.58**	0.46*	0.44*	−0.65***
Median Income ^a	0.16	0.18	0.08	0.01
High Student Population ^b	0.31**	0.17	−0.02	0.04
Proportion White	−0.04	0.09	−0.18	−0.19
Proportion Black	−0.10	−0.04	−0.04	−0.02
Proportion Hispanic	0.02	0.09	−0.08	−0.09
Adjusted R^2	0.44	0.25	0.20	0.61

$N=59$ CBGs

^a Log-transformed to maintain normality

^b Dichotomous variable, with “1” equal to the variable’s name

** $p < 0.01$, *** $p < 0.001$

References

- Alcorn, J. B., & Toledo, V. M. (2000). Resilient resource management in Mexico’s forest ecosystems: The contribution of property rights. In F. Berkes, C. Folke, & J. Colding (Eds.), *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge: Cambridge University Press.
- Alexander, P. (1977). South Sri Lanka sea tenure. *Ethnology*, *16*, 231–255.
- Azrael, D., Johnson, R. M., Molnar, B. E., Vriniotis, M., Dunn, E. C., Duncan, D. T., et al. (2009). Creating a youth violence data system for Boston, Massachusetts. *Australian and New Zealand Journal of Criminology*, *42*(3), 406–421.
- Beggan, J. K. (1992). On the social nature of nonsocial perception: the mere ownership effect. *Journal of Personality and Social Psychology*, *62*(2), 229–237.
- Booth, C. (1903). *Life and labour of the people in London*. London: Macmillan.
- Bowles, S. (2008). Policies designed for self-interested citizens may undermine “the moral sentiments”: evidence from economic experiments. *Science*, *320*(5883), 1605–1609.
- Bowles, S., & Gintis, H. (1998). The moral economy of communities: structured populations and the evolution of pro-social norms. *Evolution and Human Behavior*, *19*(1), 3–25.
- Boyd, R., & Richerson, P. J. (1982). Cultural transmission and the evolution of cooperative behavior. *Human Ecology*, *10*(3), 325–351.
- Boyd, R., & Richerson, P. J. (1985). *Culture and the evolutionary process*. Chicago: University of Chicago Press.
- Boyd, R., Gintis, H., Bowles, S., & Richerson, P. J. (2003). The evolution of altruistic punishment. *Proceedings of the National Academy of Sciences of the United States of America*, *100*, 3531–3535.
- Cagney, K. A., & Browning, C. R. (2004). Exploring neighborhood-level variation in asthma and other respiratory diseases - The contribution of neighborhood social context. *Journal of General Internal Medicine*, *19*(3), 229–236.
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: compliance and conformity. *Annual Review of Psychology*, *55*, 591–621.

- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58(6), 1015–1026.
- Clark, W. A. V. (2005). Intervening in the residential mobility process: neighborhood outcomes for low-income populations. *Proceedings of the National Academy of Sciences of the United States of America*, 102(43), 15307–15312.
- Coulton, C. J., Korbin, J., Chan, T., & Su, M. (2001). Mapping residents' perceptions of neighborhood boundaries: a methodological note. *American Journal of Community Psychology*, 29(2), 371–383.
- Descioli, P., & Wilson, B. J. (2011). The territorial foundations of human property. *Evolution and Human Behavior*, 32, 297–304.
- Duneier, M. (1999). *Sidewalk*. New York: Farrar, Straus and Giroux.
- Eldakar, O. T., Farrell, D. L., & Wilson, D. S. (2007). Selfish punishment: altruism can be maintained by competition among cheaters. *Journal of Theoretical Biology*, 249, 198–205.
- Ernest-Jones, M., Nettle, D., & Bateson, M. (2011). Effects of eye images on everyday cooperative behavior: a field experiment. *Evolution and Human Behavior*, 32(3).
- Fagan, J., & Davies, G. (2000). Street stops and broken windows: terry, race and disorder in New York city. *Fordham Urban Law Journal*, 28, 457–504.
- Fehr, E., & Fischbacher, U. (2004). Third-party punishment and social norms. *Evolution and Human Behavior*, 25(2), 63–87.
- Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, 415, 137–140.
- Fischel, W. A. (2005). *The homeowner hypothesis: How home values influence local government taxation, school finance, and land-use policies*. Cambridge, MA: Harvard University Press.
- Gintis, H., Bowles, S., Boyd, R., & Fehr, E. (2003). Explaining altruistic behavior in humans. *Evolution and Human Behavior*, 24(3), 153–172.
- Gintis, H., Bowles, S., Boyd, R., & Fehr, E. (Eds.). (2005). *Moral sentiments and material interests*. Cambridge, MA: The MIT Press.
- Guest, A. M., & Lee, B. A. (1984). How urbanites define their neighborhoods. *Population and Environment*, 7(1), 32–56.
- Haney, T. J. (2007). "Broken windows" and self-esteem: subjective understandings of neighborhood poverty and disorder. *Social Science Research*, 36(3), 968–994.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243–1248.
- Henrich, J., McElreath, R., Barr, A., Ensminger, J., Barrett, C., Bolyanatz, A., et al. (2006). Costly punishment across human societies. *Science*, 312(5781), 1767–1770.
- Holmgren, P., Masakha, E. J., & Sjöholm, H. (1994). Not all African land is being degraded: a recent survey of trees on farms in Kenya reveals rapidly increasing forest resources. *Ambio*, 23(7), 390–395.
- Jacobs, J. (1961). *The death and life of great American cities*. New York: Random House.
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1990). Experimental tests of the endowment effect and the Coase theorem. *Journal of Political Economy*, 98(6), 1325–1348.
- Kruger, D. J., Reischl, T., & Zimmerman, M. A. (2008). Time perspective as a mechanism for functional developmental adaptation. *Journal of Social, Evolutionary and Cultural Psychology*, 2(1), 1–22.
- Krupp, D. B., DeBruine, L. M., & Jones, B. C. (2011). Apparent health encourages reciprocity. *Evolution and Human Behavior*, 32(3), 198–203.
- Latané, B., & Darley, J. M. (1968). Group inhibition of bystander intervention. *Journal of Personality and Social Psychology*, 10, 215–221.
- Leonard, T. C., Caughy, M. O., Mays, J. K., & Murdoch, J. C. (2011). Systematic neighborhood observations at high spatial resolution: methodology and assessment of potential benefits. *PLoS One*, 6(6).
- Maass, A., & Anderson, R. L. (1986). *And the desert shall rejoice: conflict, growth and justice in arid environments*. Malabar, Fla.: R.E. Krieger.
- Maimon, D., & Browning, C. R. (2010). Unstructured socializing, collective efficacy, and violent behavior among urban youth. *Criminology*, 48(2), 443–474.
- Mayhew, H. (1862). *London labor and the London poor*. London: Griffin, Bohn.
- McCulloch, A. K., Meinzen-Dick, R., & Hazell, P. (1998). Property rights, collective action and technologies for natural resource management: A conceptual framework. SP-PRCA Working Paper: International Food Policy Research Institute. Accessible at <http://www.ifpri.org/publication/property-rights-collective-action-and-technologies-natural-resource-management>.
- McGovern, B. (2009). *An analysis of Binghamton University off-campus and non-permanent population: modal choice and economic impact*. Dept. of Geography: Binghamton University.
- Mendelsohn, R. (1994). Property rights and tropical deforestation. *Oxford Economic Papers*, 46, 750–756.

- Molnar, B. E., Miller, M. J., Azrael, D., & Buka, S. L. (2004). Neighborhood predictors of concealed firearm carrying among children and adolescents - Results from the Project on Human Development in Chicago Neighborhoods. *Archives of Pediatrics & Adolescent Medicine*, 158(7), 657–664.
- Nakamaru, M., & Iwasa, Y. (2006). The coevolution of altruism and punishment: role of the selfish punisher. *Journal of Theoretical Biology*, 240, 475–488.
- Nasar, J. L. (1990). The evaluative image of the city. *Journal of the American Planning Association*, 56(1), 41–55.
- Nelson, R. H. (2003). The rise of the private neighborhood association: A constitutional revolution in local government. In D. Netzer (Ed.), *The property tax, land use, and land use regulation*. Northampton, MA: Edward Elgar Publishing.
- Nettle, D. (2011). Large differences in publicly visible health behaviours across two neighbourhoods in the same city. *PLoS One*, 6(6).
- O'Brien, D. T., & Wilson, D. S. (2011). Community perception: the ability to assess the safety of unfamiliar neighborhoods and respond adaptively. *Journal of Personality and Social Psychology*, 100, 606–620.
- O'Brien, D. T., Gallup, A. C., & Wilson, D. S. (2012). Residential mobility and prosocial development within a single city. *American Journal of Community Psychology*, 50, 26–36.
- Oda, R., Niwa, Y., Honma, A., & Hiraishi, K. (2011). An eye-like painting enhances the expectation of a good reputation. *Evolution and Human Behavior*, 32(3), 166–171.
- Ohmer, M. L. (2007). Relationship to volunteers self- and collective efficacy and sense of community. *Social Work Research*, 31(2), 109–120.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge, MA: Harvard University Press.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton, NJ: Princeton University Press.
- Penn, D. J. (2003). The evolutionary roots of our environmental problems: toward a Darwinian Ecology. *The Quarterly Review of Biology*, 78(3), 275–301.
- Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social norms. *Journal of Personality and Social Psychology*, 64(1), 104–112.
- Richerson, P. J., & Boyd, R. (2004). *Not by genes alone: How culture transformed human evolution*. Chicago: University of Chicago Press.
- Ross, C. E., & Jang, S. J. (2000). Neighborhood disorder, fear, and mistrust: the buffering role of social ties with neighbors. *American Journal of Community Psychology*, 28(4), 401–420.
- Ross, C. E., Mirowsky, J., & Pribesh, S. (2001). Powerlessness and the amplification of threat: neighborhood disadvantage, disorder, and mistrust. *American Sociological Review*, 66(4), 568–591.
- Sampson, R. J., & Raudenbush, S. W. (1999). Systematic social observation of public spaces: a new look at disorder in urban neighborhoods. *American Journal of Sociology*, 105(3), 603–651.
- Sampson, R. J., & Raudenbush, S. W. (2004). Seeing disorder: neighborhood stigma and the social construction of "broken windows". *Social Psychology Quarterly*, 67(4), 317–342.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science*, 277, 918–924.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1999). Beyond social capital: spatial dynamics of collective efficacy for children. *American Sociological Review*, 64, 633–660.
- Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing "neighborhood effects": social processes and new directions in research. *Annual Review of Sociology*, 28, 443–478.
- Sampson, R. J., McAdam, D., MacIndoe, H., & Weffer-Elizondo, S. (2005). Civil society reconsidered: the durable nature and community structure of collective civic action. *American Journal of Sociology*, 111(3), 673–714.
- Sastry, N., Pebley, A. R., & Zonta, M. (2002). *Neighborhood definitions and the spatial dimensions of daily life in Los Angeles. Paper presented at the Annual Meeting of the Population Association of America*. MN: Minneapolis.
- Sastry, N., Ghosh-Dastidar, B., Adams, J., & Pebley, A. R. (2006). The design of a multilevel survey of children, families, and communities: the Los Angeles family and neighborhood survey. *Social Science Research*, 35(4), 1000–1024.
- Steinberg, L., Graham, S., O'Brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009). Age differences in future orientations and delay discounting. *Child Development*, 80(1), 28–44.
- Stinchcombe, A. (1963). Institutions of privacy in the determination of police administrative practice. *American Journal of Sociology*, 69, 150–160.
- Teig, E., Amulya, J., Bardwell, L., Buchenau, M., Marshall, J. A., & Litt, J. S. (2009). Collective efficacy in Denver, Colorado: strengthening neighborhoods and health through community gardens. *Health & Place*, 15(4), 1115–1122.

- Wen, M., Hawkey, L. C., & Cacioppo, J. T. (2006). Objective and perceived neighborhood environment, individual SES and psychosocial factors, and self-rated health: an analysis of older adults in Cook County, Illinois. *Social Science and Medicine*, *63*, 2575–2590.
- Wilson, J. Q., & Kelling, G. L. (1982). The police and neighborhood safety: broken windows. *Atlantic Monthly*, *127*, 29–38.
- Wilson, D. S., O'Brien, D. T., & Sesma, A. (2009). Human prosociality from an evolutionary perspective: variation and correlations at a city-wide scale. *Evolution and Human Behavior*, *30*, 190–200.
- Yonas, M. A., Lewis, T., Hussey, J. M., Thompson, R., Newton, R., English, D., et al. (2010). Perceptions of neighborhood collective efficacy moderate the impact of maltreatment on aggression. *Child Maltreatment*, *15*(1), 37–47.

Daniel Tumminelli O'Brien PhD, is the Director of Research for the Boston Area Research Initiative (Radcliffe Institute for Advanced Study, Harvard University) and a research associate with the Binghamton Neighborhood Project (Binghamton University), both of which foster research-policy collaborations that advance theory on human behavior while also addressing the challenges of urban life. His empirical focus is on prosocial behavior, particularly the individual and ecological variables that generate differences in the social functioning of the neighborhoods of a city.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.