Resident perceptions of crime and disorder:

How much is 'bias' and how much is social environment differences? [1]

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Abstract

This study attempts to disentangle the extent to which residents are systematically biased when reporting on the level of crime or disorder in their neighborhood. By utilizing a unique sample of households nested in household clusters, this study teases out the degree of systematic bias on the part of respondents when perceiving crime and disorder. The findings are generally consistent with theoretical expectations of which types of residents will perceive more crime or disorder, and contrast with the generally mixed results of prior studies that utilize an inappropriate aggregate unit when assuming that residents live in the same social context of crime or disorder. Estimating ancillary models on a sample of respondents nested in tracts produces mixed results that mirror the existing literature. I find that whites consistently perceive more crime or disorder than their neighbors. I also find that females, those with children, and those with longer residence in the neighborhood perceive more crime or disorder than their neighbors.

Keywords: perception of crime; social disorder; physical disorder; neighborhood.

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Given the inherent undesirability of crime and disorder in neighborhoods, residents' perceptions of the amount of crime and disorder have numerous important implications. Research suggests that perceived crime and disorder reduces residents' satisfaction with the neighborhood (Adams, 1992; Harris, 2001; Hipp, 2009; Hipp, 2010; Lu, 1999; Sampson, 1991; Woldoff, 2002), reduces attachment to the neighborhood (Austin and Baba, 1990; Sampson, 1988; Sampson, 1991; Woldoff, 2002), and can also affect residents' decisions to join with neighborhood associations in addressing issues to alter the neighborhood's trajectory (Skogan, 1986; Skogan, 1990; Skogan and Maxfield, 1981). To the extent that crime affects school choice decisions {Bayoh, 2006 #5689}, it will also affect the long-term trajectory of a neighborhood. There is also evidence that the perception of neighborhood crime or disorder increases the likelihood of mobility out of the neighborhood (Dugan, 1999; Kearns and Forrest, 2003). This residential mobility can have important implications for the long-range dynamics of the neighborhood, given that residents fleeing perceived crime can transform the racial/ethnic and economic composition of a neighborhood (Liska and Bellair, 1995; Liska, Logan, and Bellair, 1998).

For these reasons and others, there is considerable scholarly interest in understanding what types of residents are biased towards perceiving more crime or disorder in the neighborhood (Quillian and Pager, 2001; Rountree and Land, 1996; Sampson and Raudenbush, 2004; Sampson, Raudenbush, and Earls, 1997; Wilcox, Quisenberry, and Jones, 2003). Although early studies addressed this question with random surveys of individuals scattered across a state or the nation (Austin and Baba, 1990; Austin, Furr, and Spine, 2002; Marschall,

2004; Ross and Mirowsky, 1999; Ross and Mirowsky, 2001), such an approach does not take into account the actual level of crime or disorder experience by these respondents, and therefore likely conflates the degree of bias on the part of residents with the actual level of crime or disorder experienced.

Therefore, more recent scholarship often uses a nested design and attempts to account for the actual level of crime or disorder in the resident's social environment to untangle such bias effects: such studies frequently cluster residents into the geographic units of census tracts, assuming that these represent a homogeneous social environment (Quillian and Pager, 2001; Rountree and Land, 1996; Sampson and Raudenbush, 2004; Sampson, Raudenbush, and Earls, 1997; Wilcox, Quisenberry, and Jones, 2003). Nonetheless, an emerging puzzle is that studies testing various theories purporting to explain which types of residents are more likely to perceive crime or disorder often produce mixed findings. I suggest that this empirical puzzle does not necessarily imply the failing of such theories, but rather results due to a methodological problem: prior studies generally utilize an inappropriate aggregate unit when assuming that residents live in the same social context of crime or disorder. As illustrated below, if the assumption of a homogeneous level of crime or disorder *within* a particular unit is violated, any estimates of "bias" on the part of respondents will conflate the degree of bias with the degree of true crime or disorder the respondent experiences in their local environment.

Since the research question is focused on testing for bias in perceptions of crime and disorder of different types of persons, it is crucial that respondents are living in the same social environment. I argue that by using the eleven closest households--what I term a "household cluster"—I am indeed capturing housing units that live in the same social environment. I need not claim that these households constitute a geographic unit, but instead it is only important for the study that these households are reporting on the same social environment. Combining this

particular sample with an estimation approach that takes into account *all* differences across these household clusters (obviating the need to include a measure of the "true" level of crime or disorder in the household cluster) allows obtaining relatively unbiased estimates of the degree of systematic bias on the part of different types of residents, assuming that all appropriate individual-level measures are included. I compare this approach with one using a sample of households nested within census tracts—the more common strategy in such studies—to illustrate that the mixed findings found in prior studies are largely an artifact of using units of analysis that are too large and thus violate the assumption that residents share the same social environment.

Crime and perceptions of crime

Why do some residents perceive more crime and disorder?

It is well-known that asking residents how much crime or disorder exists in their neighborhood will not yield error-free responses. Studies routinely obtain different responses from residents living in the same block group (Sampson and Raudenbush, 2004), or even in the same block (Taylor, 2001; Taylor, Gottfredson, and Brower, 1984). If residents provided perfectly accurate responses regarding the level of crime and disorder in the neighborhood, no such differences in these responses would exist between neighbors on the same block. The question then is what might cause *systematic* bias on the part of residents. I next turn to key extant theories purporting to explain why some residents might systematically perceive more crime and disorder in the neighborhood, but simultaneously highlight the limited supporting empirical evidence for some of these postulates.

First, lifestyles of residents should affect perceptions of crime or disorder. While both the lifestyle perspective (Hindelang, Gottfredson, and Garofalo, 1978) and the routine activities perspective (Cohen and Felson, 1979; Felson, 2002) have suggested that lifestyle decisions will

affect one's chances of victimization, lifestyle differences should also bring about differential awareness of neighborhood conditions, which will lead to different perceptions of neighborhood crime and disorder. Some residents' lifestyles may frequently take them outside the house and into the local neighborhood, whereas others may spend more of their time inside their unit. For instance, older residents likely spend more time in the unit, in part due to physical constraints (Hindelang, Gottfredson, and Garofalo, 1978). The evidence for age is generally consistent, as studies in Chicago (Sampson, Raudenbush, and Earls, 1997) and Seattle (Rountree and Land, 1996) found that older residents perceived less crime, and a study in Chicago found that older residents perceived less disorder (Sampson and Raudenbush, 2004). Nonetheless, a contrary piece of evidence was a study of three cities finding mixed effects of age on perceptions of crime (Quillian and Pager, 2001).

A second explanation, building on the insight of the community of limited liability theory, is that economic investment or simple length of residence in the neighborhood may increase one's awareness of the surroundings (Janowitz, 1952; Lee, Oropesa, Metch, and Guest, 1984). For instance, homeowners may be concerned about the physical upkeep in the neighborhood due to concerns about property values, making them particularly sensitive to physical disorder in the neighborhood. They may also spend more time around their units than do renters given the likely greater psychic investment in the unit. Despite these expectations, studies have found no evidence that owners perceive more crime (Sampson, Raudenbush, and Earls, 1997) or disorder (Sampson and Raudenbush, 2004) in Chicago.

Whereas residents who have lived in the neighborhood longer may be more aware of neighborhood problems, residents who have just moved to the neighborhood are not only likely less aware of possible crime and social problems, but they may also be inclined towards a particularly rosy view of the neighborhood given that they have just chosen to move there. This

latter notion builds on the idea of cognitive dissonance (Festinger, 1957), and implies a need to rationalize to oneself the choice of the neighborhood. Although few studies have tested whether those living longer in the neighborhood perceive more crime or disorder, one study did find such an effect for perceiving crime (Sampson, Raudenbush, and Earls, 1997) and another found it using a non-nested approach (Taylor, Gottfredson, and Brower, 1984).

Third, the fear of crime literature suggests that certain residents have a greater awareness of their surroundings for reasons of personal safety (LaGrange and Ferraro, 1989; Macmillan, Nierobisz, and Welsh, 2000; Warr, 1984). For instance, studies have consistently shown that females report more *fear* of crime (Chiricos, Hogan, and Gertz, 1997; Chiricos, Padgett, and Gertz, 2000; Eschholz, Chiricos, and Gertz, 2003; LaGrange and Ferraro, 1989; Liska, Sanchirico, and Reed, 1988; Rountree, 1998; Skogan and Maxfield, 1981). Scholars have argued that females may be particularly concerned about crime events in general given that such events can pose the additional threat of unwanted physical and sexual attack (Macmillan, Nierobisz, and Welsh, 2000; Warr, 1984). Because of this threat, females may be particularly likely to pay attention to their local neighborhood—both when making residential mobility decisions, and during daily activities in the neighborhood. As a consequence, they may have greater awareness of disorder and crime than would males in the same neighborhood. The evidence is generally supportive of this proposition: females perceived more crime than males in a study of three cities (Quillian and Pager, 2001) and a study of Seattle (Rountree and Land, 1996). There is also evidence from Chicago that females perceived more disorder (Sampson and Raudenbush, 2004), although another study of Chicago found no difference between males and females in perceiving crime (Sampson, Raudenbush, and Earls, 1997).

Beyond the fear for one's own safety, an altruistic fear may increase some residents' awareness of the surroundings (Warr, 1992; Warr and Ellison, 2000). For instance, parents may

be particularly aware of their surroundings, and concerned about possible problems, due to a concern for the safety of their children. But while there is evidence that the presence of children increases the *fear* of crime (Ross and Jang, 2000; Ross and Mirowsky, 2001), studies have generally failed to explore whether the presence of children affects perceptions of neighborhood crime or disorder. One study that did test this found no relationship between the presence of children and perceptions of disorder (Ross and Mirowsky, 2001).

In addition to awareness of the current neighborhood, another perspective argues that that the social background of residents—particularly their experience with conditions in *prior* neighborhoods—affects their assessment of crime and disorder in the current neighborhood. Sampson and Raudenbush (2004) articulated this position in arguing that, because of their prior background living in more disadvantaged neighborhoods, African-Americans and Latinos may have a higher threshold for perceiving crime and disorder in the current neighborhood than do whites. As a consequence, an event that may be perceived as offensive to a white resident who has spent much of their life living in more privileged neighborhoods and thus lead to an assessment of social disorder in the neighborhood may not be perceived as such by a minority resident who has been sensitized to such behavior from years living in more disadvantaged neighborhoods. Indeed, using block groups as the neighborhood clustering, Sampson and Raudenbush (2004) found that African-Americans and Latinos perceived less disorder than did whites. However, the evidence for perceiving less crime is mixed: whereas a study of Seattle found that nonwhites perceived less crime than whites (Rountree and Land, 1996) and a study found that African-Americans perceived less crime than whites in two of the three cities studied (Quillian and Pager, 2001), a study of Chicago found no difference between African-Americans and whites (Sampson, Raudenbush, and Earls, 1997). And whereas one study found that Latinos perceived less crime than whites (Sampson, Raudenbush, and Earls, 1997), another found that

Latinos perceived less crime than whites in only one of the two cities studied (Quillian and Pager, 2001).

Finally, building on this notion of expectations, the socio-economic status (SES) of a household may impact their assessment of the neighborhood. If higher SES households have higher expectations for the quality of the neighborhood, and consequently lower tolerance of crime and disorder, this will heighten their awareness of problems in the neighborhood. There is, however, little evidence that higher levels of income or education affect perceptions of neighborhood crime or disorder. One study of Seattle found that those with higher levels of income perceived *less* crime (Rountree and Land, 1996), a study of Chicago found no evidence that SES affected perceptions of crime (Sampson, Raudenbush, and Earls, 1997), and a study of three different cities found no evidence that either level of income or education affected perceptions of crime (Quillian and Pager, 2001). Similarly, a study of Chicago found no evidence that SES affected perceptions of neighborhood disorder (Sampson and Raudenbush, 2004).

How to measure difference in perceptions of crime and disorder?

While the evidence for these theories predicting which residents will perceive more crime or disorder is sometimes mixed, I suggest that this may be due to the methodological challenges of this question. Consider that residents' perceptions of crime and disorder are due to at least three components: 1) the actual level of crime and disorder in their environment, 2) systematic bias on the part of residents, 3) idiosyncratic error on the part of residents. Note that this is simply the classical measurement model (Bollen, 1989: 207). The third component is easily accounted for by treating it as random error when estimating the model. The second component—systematic bias—is what I have been focusing on up to this point, and is of considerable interest to the large aforementioned body of research studying perceptions of crime

and disorder. It is important to highlight that perceptions of crime and disorder are, at least in part, almost certainly affected by the first component here: the *actual* levels of crime and disorder. Thus, a criticism of studies using national samples is that they are implicitly comparing, for instance, the report of a resident of New York with a resident of Iowa. In such an instance, it is not clear how much of the difference in their reported perceptions of crime is due to bias and how much is due to living in different social environments.

Subsequent studies have therefore attempted to account for the "true" level of crime and disorder in the neighborhood to untangle this bias. Of course, capturing the appropriate "social context" is challenging. Although early research took into account the level of crime in the city when testing for bias in fear of crime (Liska, Lawrence, and Sanchirico, 1982) or perceiving crime (Block and Long, 1973), more recent studies have used smaller units of analysis such as census tracts and conditioned on the official crime rate in their model under the assumption that whatever is "left over" represents bias on the part of respondents (Quillian and Pager, 2001; Wilcox, Quisenberry, and Jones, 2003). Similarly, Taylor (2001) and Sampson and Raudenbush (2004) used systematic social observation to estimate the "true" level of social and physical disorder in neighborhoods and then conditioned on these to obtain estimates of residents' bias when assessing neighborhood disorder. While these recent studies were important contributions in that they included these independent measures of crime or disorder in the model (which prior studies often failed to do), they nonetheless relied on some nontrivial assumptions. First, to the extent that official crime rates or systematically observed disorder are not flawless measures of the true level of crime or disorder, there is the possibility that any estimates of "bias" will be conflated with the true level of crime or disorder. Likewise, failing to include important neighborhood-level predictors in the model that might account for the difference between the official rate of crime and the true rate also leaves the analysis open to the risk of obtaining biased

estimates. Second, such a strategy assumes that the geographic unit of analysis appropriately captures a social area with a homogeneous level of crime or disorder. I turn to this issue next.

The assumption of homogeneity of crime and disorder within a neighborhood

A problem confronting all studies attempting to assess biases regarding perceptions of crime or disorder is that if the *wrong unit of analysis* is used for the neighborhood, this difference in "perception" may be due to the actual amount of crime or disorder in the immediate area, and not bias. That is, when determining "bias" in the assessments of two individuals about the amount of crime or disorder in the neighborhood, a fundamental assumption is that they live in the same social environment. But what size area contains a homogeneous level of crime or disorder? Certainly two residents living next door to each other in an urban context experience the same local environment.[1] What about two residents living on adjacent blocks? What about two residents living ¼ mile apart? One mile apart? Two miles? The risk of using too-large aggregations is that a resident's assessment of the amount of crime and disorder may not reflect bias, but instead simply reflect that they experience a different environment than other residents *within* what the researcher classified as the "neighborhood." Approaches using respondents nested in census tracts assume either 1) that the amount of crime is constant across the tract, or else 2) that all residents in the tract are aware of its boundaries and therefore are reporting on their perception of the amount of crime in that specific geographic area. The first assumption implies that the rate of crime is the same across all of the blocks in the tract and therefore all respondents are reporting on a similar social environment when assessing the level of crime or disorder. The second assumption implies that even if a neighborhood has pockets of crime (i.e., hot spots), as long as residents all recognize the specific boundaries of the tract and are reporting on the crime level in the entire social area of the tract, they will be reporting on the same social environment. However, given that residents are rarely aware of the specific boundaries of the

census tract in which they reside, this seems a dubious assumption. Likewise, the assumption that two residents living at opposite ends of a tract are reporting on the exact same geographic area seems unlikely. Thus, if these quite strong assumptions do not hold, residents will not be reporting on the same social environment, conflating estimates of "bias" with the actual characteristics of the environment. This implies that such a sampling strategy is analogous to previous work simply trying to compare the assessments of residents living in different cities.

Given the considerable evidence that certain types of residents (i.e., lower income residents) live in neighborhoods with higher levels of crime, it seems likely that they are also more likely to live in blocks *within* a neighborhood that have higher levels of crime. Consequently, finding that poverty households report perceiving more crime than do non-poverty households living in the same tract could simply represent the actual conditions of their social environment. Suppressor effects are also possible: suppose that poverty households systematically perceive less crime, but also happen to live in blocks with higher levels of crime. It is possible that these effects could cancel each other out, and studies using tracts as the measure of neighborhoods would incorrectly conclude that no bias exists.

Methodological challenges to accounting for heterogeneity

To assure that residents are assessing the same social environment, one strategy would sample residents within smaller social areas to be confident that the residents experience the same social environment. However, this solution poses problems for approaches attempting to include a proxy for the true level of crime or disorder in the model. One problem is that much official data (such as official crime statistics) is simply not collected for units smaller than census tracts. A further problem is that the reliability of such measures can drop precipitously when aggregating to such small units of analysis. For instance, the relative rarity of crime events suggests that official crime statistics for very small geographic areas may have considerable

fluctuation over time, suggesting a need to collect data over a number of time points to increase the reliability (which then must assume that the rate of crime does not change over time). Likewise, studies measuring disorder through systematic social observation have found that this approach essentially breaks down when using very small units of analysis: one study obtained reliabilities of just .37 for physical disorder and zero for social disorder when aggregating to the level of blocks (Sampson and Raudenbush, 1999: 646).

Because of the difficulty of obtaining good estimates of the true level of crime or disorder in smaller geographic units of analysis, an alternative approach is to simply compare residents living in the same geographic unit with a fixed effects model. All neighborhood-level differences between geographic units are accounted for by including a series of dummy variables indicating the neighborhood in which the resident resides. An advantage of this approach is that it does not run the risk of using an imperfect measure of crime or disorder, or of omitting important neighborhood-level variables that could lead to biased estimates. It therefore compares differences in lifestyles of residents in the same geographic unit that lead to different perceptions, rather than comparing differences in such perceptions across neighborhoods. A downside of such an approach is that it is less efficient given that it is effectively only comparing the reported level of perceived crime or disorder of residents living within the same neighborhood. If the sample is large enough this loss of information is a small price to pay for accounting for all neighborhood differences. For instance, Sampson and Raudenbush (2004) used such an approach with block groups as the unit of analysis for perceptions of disorder.[2] Although block groups are smaller than census tracts, they have, on average, 1,400 persons living in them, which may still be too large a unit to assume that the disorder within them is truly homogeneous.

As an even stricter test of such bias effects, the strategy here compares the assessments of neighborhood crime and disorder by the 11 physically closest households to one another. An advantage of this sample is that it does not need to assume that the crime rate is homogeneous within the tract, but only that these 11 nearby housing units experience the same social environment. This latter assumption is plausible. Of course, to the extent that respondents differ in what they define to be the "neighborhood", even members of the same household cluster can differ in their perceptions of what social environment they are evaluating. Nonetheless, by estimating a fixed effects model accounting for all differences across these household clusters, this approach does not require a measure of true crime or disorder. It is therefore only comparing households in the same cluster.

It should be pointed out that this approach is only focusing on the potential bias in such reports between residents living in the same household cluster, and is not asking whether certain neighborhood characteristics may affect these perceptions. Although this latter question is certainly an interesting research question in its own right, the fixed effects approach precludes testing this. Furthermore, it is outside the scope of the present study. Nonetheless, I highlight that researchers wishing to estimate such neighborhood effects encounter the same assumptions regarding the homogeneity of crime within the geographic unit. That is, a fundamental assumption of the multilevel approach for such studies is that the households are clustered into specific "units." Although this may be reasonable for some research questions (i.e., viewing students nested into classrooms, in which students are clearly in the same classroom), doing so in a neighborhood study rests crucially upon the assumption that the census tract (or whatever geographic unit is used as the second level unit) indeed represents a true unit for such nesting. To the extent that this is not the case, such studies will obtain biased estimates when attempting to tease out the differential effects of households and "neighborhoods."

Summary

This study exploits a unique sample that allows obtaining relatively accurate estimates of the degree of bias on the part of residents when assessing the level of crime and disorder in the neighborhood. This allows us to test the theoretical expectations outlined above regarding which types of households are most likely to perceive more crime or disorder. By comparing the responses of eleven nearby households, there is little reason to expect that they are assessing different contexts. I compare these results to those obtained using an ancillary sample with households nested within tracts—the more common research strategy--to assess the plausibility of the assumption that households in the same tract share the same social environment.

Data and methodology

Data

Household-level data from the American Housing Survey (AHS) is used, which includes a national sample of about 60,000 housing units every two years, as well as surveys of about 4,000 housing units from each of a large number of metropolitan areas across the U.S in various years. To assess bias when residents report on their perception of crime and disorder, I employed two different sampling strategies.

The main sampling strategy surveys households nested within household clusters from the national sample. The national neighborhood sub-sample of the American Housing Survey (AHS) initially randomly selected 663 housing units in 1985 from the full AHS that were located in either urban or suburban locations, and then interviewed the ten closest neighbors of the initial respondent as well.[3] I refer to these eleven households as a household cluster. The same housing units were re-interviewed in 1989 and 1993 (the samples were augmented in each of the two latter years with new household clusters such that overall there are 27,000 household time

points within 2,378 household cluster time points). This national sample allows overcoming the limited generalizability of studies that employ a sample from a single city.

In ancillary models, a second sampling strategy is employed that follows the convention of most existing research as it has households nested within census tracts. These alternative models allow us to assess the consequences of assuming that all tract residents are referring to the same social environment. The household information comes from the AHS metropolitan samples, and a particular metropolitan area is surveyed approximately every four years given that only a subset of the metropolitan areas is surveyed in any particular year. Because of this variability in the actual year of the survey, I am sometimes combining metropolitan areas from slightly different years. Although the surveys are from the "waves" 1987, 1991, 1995, and 1999, these "waves" actually contain the data for the nearest year in which a particular metropolitan area was surveyed. For instance, in the 1987 wave some of the metropolitan areas were actually surveyed that year and some were surveyed in 1985. This difference in the actual year is a minor issue in general, and is particularly unproblematic since I condition out differences across metropolitan areas in the analyses, as described more fully below. In these ancillary analyses, there are an average of 9,985 census tracts in each wave with 8 households in each tract on average (10,091 tracts in 1987, 9,994 tracts in 1991, 10,015 tracts in 1995, 9,840 tracts in 1999). The households were placed into their respective census tract through access to the Triangle Census Research Data Center.

Outcome measures

The American Housing Survey (AHS) asks respondents a series of three questions regarding crime in the neighborhood (as defined by the respondent): is crime a problem, is it so much of a problem that it's a bother, and is it such a bother that the respondent wishes to move. These responses were combined into a four point response in which the respondent either replies

"no" to all questions, replies "yes" to one, "yes" to two, or "yes" to all three. Physical disorder was created as a factor score combining the responses of a four-category variable assessing street noise (not a problem; problem; bothersome; wish to move) and three yes/no questions assessing whether the following issues are bothersome in the neighborhood: 1) litter/housing deterioration; 2); poor city services; 3) noise in general. The factor loadings for these analyses are provided in Table A1 in the Appendix. The social disorder scale combines two yes/no questions asking whether the following are bothersome: 1) people in the neighborhood and 2) undesirable non-residential users. In all instances, the definition of "neighborhood" was left to the respondent.

Household and individual characteristics

To test for systematic bias on the part of respondents when assessing perceived crime and disorder, several individual- and household-level demographic measures based on the theoretical discussion above are included. Lifestyle differences are accounted for with the age of the respondent. Because economic investment might affect awareness, I constructed an indicator of homeowners. Knowledge of the neighborhood is captured with a measure of the length of time in the residence natural log transformed (since this knowledge likely increases at a diminishing rate over time), and an indicator for households living less than one year in their residence. A dichotomous measure coded one for females accounts for safety concerns that may cause females to be more aware of dangers in the environment. An indicator of the presence of children less than 18 years of age in the home captured altruistic fear. Social background effects are account for with dichotomous indicators for African-Americans, Latinos, and other race (with whites as the reference category). SES was captured with measures of household income (logged) and years of education of the respondent. Finally, dichotomous indicators were included for marital status (married, divorced, or widowed, with single as the reference category). The summary statistics for the variables used in the analyses are presented in Table 1.

The characteristics of respondents in the tract-clustered metropolitan sample were similar, and are also shown here.

<<<Table 1 about here>>>

Methodology

Fixed effects models were estimated. For the sample of households nested within household clusters (HC), the model for perceived crime is:

(1) $$y_{ij} = \alpha + HC_j\Gamma_{HC} + X_{ij}\Gamma_X + YR\Gamma_{YR} + \varepsilon_{ij}$$

where y_{ij} is the combined four-point response in the AHS regarding the level of crime reported by the *i*-th respondent of *I* respondents in the *j*-th household cluster, α is an intercept, HC_j is an indicator of the household cluster in which the respondent lives, Γ_{HC} is a vector of the effects of these household clusters on the perceived crime, X is a matrix of exogenous predictors with values for each individual i_j of *I* individuals in household cluster *j*, Γ_X is a vector of the effects of these predictors on the subjective assessment, YR is the year of the survey which has a Γ_{YR} effect on perceived crime, and ε_{ij} is a disturbance term. Note that these residents are all assessing the level of crime while living in the same household cluster.[4] The standard errors were corrected using the robust estimates provided by Stata based on this cluster by household groups, though the uncorrected estimates were extremely similar.

For the sample of households nested within tracts, equation 1 is modified such that the indicator variables for household clusters are replaced with indicators for tracts. The model also includes a matrix indicating the Standard Metropolitan Statistical Area (SMSA) in which the observation is located:

(2) $$y_{ij} = \alpha + T_j\Gamma_T + X_{ij}\Gamma_X + SMSA_j\Gamma_{SMSA} + \varepsilon_{ij}$$

where all terms are defined as before, T_j is an indicator of the tract in which the respondent lives, Γ_T is a vector of the effects of these tracts on the perceived crime, $SMSA_j$ indicates the SMSA in

which the tract is located which has a Γ_{SMSA} effect on perceived crime. This compares tracts within the same SMSA. These models are estimated separately for each year, and the average of the four waves of results are reported (the estimated coefficients were very similar over the four waves).

Missing data is accounted for through the use of multiple imputation (Rubin, 1987).[5] Such an approach requires the less stringent assumption of missing at random (MAR) rather than the missing completely at random (MCAR) assumption of listwise deletion. Given the modest amount of missing data (ranging from 3 to 6% for the variables), imputing five datasets provided enough information; the combined results utilize appropriate standard errors that account for the uncertainty introduced by the nonresponse (Schafer, 1997). The standard errors of the five imputations are then combined using the standard formulas to take into account the variability both within imputed datasets, and across datasets (Rubin, 1987; Schafer, 1997).

Results

Variability of crime and disorder within tracts

I begin by asking whether residents in the same *household cluster* in the national sample have more similar assessments of the level of crime or disorder than do residents living in the same *tract* in the metropolitan samples. This is assessed by estimating multilevel models without any predictors.[6] There was evidence of greater agreement among those living in the same household cluster: the average intra-class correlation for perceived crime over the three waves is .212 in the household cluster clustered sample, but just.089 over the four waves in the tract clustered sample (these translate to reliabilities of .75 and .52 respectively for 11-household clusters). Thus, there is more than twice as much agreement regarding the amount of crime in the neighborhood when assessed by residents in the same household cluster than when assessed

by residents in the same tract. The ratios for physical disorder and social disorder were similar. This suggests that these respondents are more likely to be assessing the same social context when sharing the same household cluster of eleven nearby housing units than when sharing the same census tract. It also emphasizes that prior work aggregating households to the same tract in an attempt to assess bias are sometimes combining together households that are living in social environments with differing levels of crime or disorder even though they share the same tract.

Seeing crime and disorder

I next turn to the question of possible systematic bias based on the theoretical considerations above by estimating the main models. Regarding social background effects, whites perceive more crime and social disorder than do Latinos and African Americans living in the same household cluster, as seen in Table 2. Viewing the magnitude of the effects, African-Americans perceive .233 standard deviations less crime, .092 less social disorder, and .121 less physical disorder than do whites.[7] The analogous values for Latinos compared to whites are .254, .095, and .164.

<<<Table 2 about here>>>

It is worth highlighting that these robust effects for social background differ from the more mixed findings in the literature. To explore whether this is due to prior studies implicitly assuming a uniform level of crime or disorder across the census tract, I estimated similar fixed effects models for households nested within tracts. Mimicking the literature, mixed results were found for these models. Whereas these models implied that Latinos indeed perceived less crime than whites, the magnitude of this effect was 1/3 the size of that in the household cluster models, as shown in Table A2 in the Appendix. The size of the effect was ½ the size for social disorder, and less than ¼ the size for physical disorder. Likewise, in these tract-clustering models the magnitude of the effect for African-Americans perceiving less social disorder than whites was ¼

the size, and they actually appeared to perceive *more* crime. One possible explanation for these findings is that the household clusters within a tract are not uniform in their level of crime and disorder and that these minorities tend to live in household clusters that indeed *have* more crime and disorder.

Those who have resided longer in their residence perceive, on average, more crime and disorder. Each one-unit increase in logged length of residence is associated with .076 standard deviations more perceived crime and physical disorder, on average. Beyond the effect of length of residence, there is an additional effect consistent with the cognitive dissonance perspective, as residents new to the neighborhood in the last year perceive less crime. These new residents, on average, perceive .136 standard deviations less crime. It is notable that these misperceptions are observed for the more ephemeral construct of crime that is harder to assess in a neighborhood, and are not observed when assessing the more tangible construct of physical disorder. Again, the tract clustered models in Table A2 suggest an inappropriate conclusion, as new residents appear to perceive *more* social and physical disorder.

There is also evidence consistent with the hypotheses that fear, and altruistic fear, increase the awareness of neighborhood problems. Females on average perceive more crime and disorder, consistent with the hypothesis that females' greater fear of crime leads to a greater perception of physical threats in their surroundings. It is again notable that this robust finding using the household cluster sample contrasts with the tract clustered sample in which we would inappropriately conclude that females do not perceive any more crime in the neighborhood than males (see Table A2). There is also evidence that those with children perceive more crime and disorder, on average, which may occur due to a concern for the safety of their children. In the tract-clustered sample, we would incorrectly conclude that those with children are no more likely to perceive crime.

Although there is evidence consistent with the proxy for lifestyle effects, we see minimal evidence that owners have a greater awareness of neighborhood conditions due to their economic investment. On the one hand, older residents consistently perceive less crime, physical disorder and social disorder than do younger residents. On the other hand, there is only modest evidence that owners perceive more physical disorder in the neighborhood compared to renters, although they do appear to perceive less crime in the neighborhood than do renters. The tract-clustered sample again leads to faulty conclusions, as it implies that owners are biased towards perceiving less social and physical disorder.

Finally, there are some effects for SES. Those with higher levels of education perceive more crime, social disorder, and physical disorder in their neighborhoods than do those with lower levels of education. An increase in three years of education increases perceiving social and physical disorder and crime about .06 standard deviations of within-household cluster variability. The effects of household income are weaker: although higher household income is associated with more perceived crime, it has little relationship with perceptions of disorder. Nonetheless, the findings from the tract clustered sample inappropriately imply that high income residents do not perceive any more crime. And while the tract-clustered sample finds that those with more education perceive less crime, the size of these effects is less than half the size of the household cluster sample. This is likely due to the level of crime in the household clusters in which they live.

Sensitivity Analyses: Within neighborhood variability

Next, although fixed effects models are powerful in that they compare the perceptions of households within the same household cluster, a limitation is that homogeneous clusters on a particular characteristic cannot provide information for this model. For instance, when comparing the differing perceptions of crime between whites and African Americans, only

household clusters that contain both whites and African Americans can provide information on this particular comparison. In the national sample, whereas 5% of the household clusters have no white residents, about 64% have no Latino residents and about the same have no African American residents. This suggests limited statistical power to detect effects for these latter two groups, although the models illustrate that this effect is nonetheless robust.

However, a related issue is the possibility that households that are isolated (based on a particular characteristic) within a household cluster may differ systematically from households who are not isolated. If such households are either the first household of a particular characteristic moving into a cluster that is beginning to change, or the last household of a particular characteristic to leave a cluster that is transitioning, they may differ systematically in their perceptions from other households of the same race/ethnicity. This arguably raises little concern when estimating the perceptions of white residents: of household clusters with any white residents, just 5% have a single white resident, and 8.5% have one or two white residents. However, this may be an issue for the two racial/ethnic minority groups: of household clusters with any African Americans, 39% have just a single black household and 53.5% have one or two black households. These values for Latinos are 49% and 69%. Given the segregation by housing units, it is also possible that this pattern would be observed by ownership status: for instance, about 16% of the household clusters have no owners and 16% have no renters. Furthermore, of those with any owners, 7% have just one owner and 11% have one or two; the same figures for renters are 17% and 29%.[8]

This issue was addressed by creating indicators of "isolation" based on race/ethnicity, ownership status, and household income. For race/ethnicity and ownership status, I defined an isolated household as one in which there is no more than one other household of the same race/ethnicity (or ownership status) in the household cluster.[9] For household income, I defined

isolated households as those with income 7 times greater than the cluster mean (thus, > |ln(2)| from the cluster mean): about 15% of the overall sample. I re-estimated the models allowing the coefficients for isolated individuals to differ from those who are not isolated. .

Turning to the effect of racial/ethnic isolation, Latinos who are isolated perceive significantly more crime and physical disorder than Latinos who are not isolated (the reference category), as seen in models 1 and 3 in Table 3. Thus, Latinos living in a household cluster with several other Latinos perceive less crime and physical disorder compared to those living in clusters in which they are ethnically isolated. On the other hand, there is no evidence that whites' or African Americans' assessment of crime or disorder differs based on the racial/ethnic isolation of the household (statistical tests showed no significant differences in these coefficients). Note that these effects for isolated Latinos are not enough to overcome the racial/ethnic differences of the main models, as whites still perceive significantly more crime and disorder than even these isolated Latinos.[10]

<<<Table 3 about here>>>

Turning to the effects of isolation based on ownership status and income, note in the bottom panel of Table 3 that renters who are isolated (i.e., living in a household cluster with two or fewer renters) perceive more social and physical disorder than do renters who are not isolated (models 5 and 6). On the other hand, there is no difference between owners who are isolated in a household cluster compared to those who are not. Furthermore, there was no evidence that households who are relatively isolated based on income differed in their perceptions of crime and disorder than those who are not similarly isolated (results not shown).

Conclusion

A key takeaway point of this study is that if residents are aggregated into too large a geographic unit, the actual level of crime or disorder in the environment experienced by a resident can be conflated with their degree of systematic bias when assessing neighborhood crime or disorder. This occurs because the blocks *within* a neighborhood can vary in their levels of crime or disorder. Focusing on residents nested within household clusters provided clarity on why prior research has generally produced conflicting results regarding which types of residents perceive more crime or disorder. By utilizing a unique sample of households nested in household clusters, this study was able to tease out the degree of systematic bias on the part of respondents when perceiving crime and disorder, as households living a few doors from one another are arguably living in the same social environment when making such assessments. Contrasting these findings with those obtained when using the same survey instrument on a sample of households nested within census tracts—the dominant approach in much previous research—illustrated how using this larger aggregation appears to explain the inconsistency of prior results.

The general issue being raised here is the modifiable areal unit problem (MAUP). Studies have long pointed out that aggregating to too large a unit of analysis can cause a loss of information (Diggle, 1993; Lawson, 1993). Indeed, studies in Epidemiology wrestle with the choice of the proper level of aggregation for determining effects (Tatalovich, Wilson, Milam, Jerrett, and McConnell, 2006), and a general conclusion is that theory should guide this choice (Hipp, 2007a; Lawson, 2006). As highlighted here, an improper level of aggregation will result in conflating a person's degree of bias when reporting on their perceptions of the environment with the *actual* characteristics of the social environment they experience. This is why the estimates of bias differed whether using the tract or the household cluster as the clustering unit.

The general issue of the proper geographic unit when measuring neighborhoods is an ongoing challenge, and this study has not proposed an answer to this problem. Nonetheless, I emphasize that nesting requires placing residents into the *same* social environment when asserting that they live in the same neighborhood. If this is not the case, scholars should be aware that individual-level estimates will be biased.

Utilizing this sample of households nested within household clusters provided findings that conformed to theoretical expectations, in contrast to the results when using a sample of households nested within census tracts. For instance, whereas the results were mixed when using the sample of households nested within tracts, the sample of households nested within household clusters found evidence consistent with the hypothesis that the social background of minority residents causes them to have a higher threshold when observing crime and disorder. This study consistently found that African-Americans and Latinos perceive less crime and disorder in the neighborhood than do white residents living in the same household cluster. Taking into account these individual biases in responses will provide a more accurate assessment of the common perception of crime or disorder in these household clusters.

We also saw that longer term exposure to an environment is related to perceptions. In the sample of households nested in household clusters, those living longer in the neighborhood perceive more crime and social disorder than their neighbors who have lived in the area for a shorter period of time. It may be that these long-term residents gain knowledge that makes them more aware of neighborhood problems in general. This would imply that long-term residents provide more accurate assessments, whereas newer residents underestimate the amount of crime and disorder. Of course, it could be that long-term residents simply become more jaded and critical of the environment, leading to overestimates on their part, whereas newer residents provide more accurate estimates. This study is unable to distinguish between these two

possibilities. Nonetheless, these relative differences between more recent and long-term residents' perceptions should be accounted for when using residents' reports of their environment.

The story regarding SES was similarly nuanced. Whereas the sample using households nested within tracts incorrectly found little evidence that higher SES persons perceive more crime or disorder, the sample of households nested in household clusters found robust evidence that residents with higher levels of education perceive more crime or disorder in the area than do their lower-educated neighbors. Given that higher educated persons tend to live in neighborhoods with lower overall levels of crime and disorder (Chilton, 1964; Crutchfield, Glusker, and Bridges, 1999; Gyimah-Brempong, 2001), these findings suggest this bias works in the opposite direction.

I point out that this study has not focused on the question of whether some residents employ specific heuristics regarding the neighborhood environment when forming these perceptions. For instance, some have argued that residents employ the race/ethnicity of the neighborhood as a heuristic for indicating the presence of crime and disorder (Quillian and Pager, 2001). This only introduces systematic bias between households if certain types of residents are affected by such a context.[11] For instance, Quillian and Pager (2001) suggested that white residents perceive more crime than others in tracts with greater proportions of minority residents. However, Sampson and Raudenbush (2004) found no such differential effect for perceptions of disorder in a sample of households nested within the smaller geographic unit of block groups. This question is outside the scope of the present study; nonetheless, I did assess the robustness of the results by estimating ancillary models for the household cluster sample that included interactions of the racial/ethnic measures with measures of the racial/ethnic composition of the tract: virtually no differences were detected in the pattern of results for the

coefficients of interest (results not shown). It is worth emphasizing that previous research focusing on this question relies on the homogeneity assumption regarding crime across the household clusters within a tract when attempting to disentangle such a contextual effect.[12] This study has shown that this homogeneity assumption is a strong one, and it is possible that it impacts such results.

This study also tested whether residents who are relatively isolated in a household cluster based on race/ethnicity, ownership status, or income differed in their perceptions of crime and disorder from those who are not similarly isolated. There were only modest effects for this hypothesis: there was no evidence that white or African American households who were racially/ethnically isolated in the household cluster differed in their perceptions from similar households who were not isolated. Likewise, owners isolated in household clusters largely populated by renters did not differ in their perceptions from other owners. The only effects were detected for Latinos and renters: it appears that Latinos who live in household clusters in which they are relatively isolated perceive higher levels of crime and physical disorder than do Latinos who are not similarly isolated. Likewise, it appears that renters surrounded by owners perceive more social and physical disorder than do renters who are near more renters. For Latinos, it may be that cultural differences affect their perceptions of crime and disorder when they are relatively isolated in household clusters. For renters, although they tend to do less neighboring in general, this effect may be particularly accentuated in neighborhoods when they are surrounded by homeowners. These are clearly speculations, though they point a direction for future research.

Another implication of the findings is that studies testing the relationship between official rates of crime in census tracts and residents' perceptions of crime likely underestimate the degree of this relationship due to measuring these at larger units of analysis. For instance, one study compared the perceptions of residents regarding the level of physical and social disorder with the

estimates from systematic social observation by the researchers and found correlations of about .55 with these constructs (Sampson and Raudenbush, 1999), whereas another study found that the correlation between resident perceptions of crime aggregated to the census tract over a 25-year period was about .70 with official crime rates in those tracts (Hipp, 2007c). Given the likely heterogeneity of disorder or crime across the blocks *within* a census tract, the approach of each of these studies likely *underestimates* this degree of correlation given that they used census tracts, or combinations of census tracts, as the geographic units of analysis. Future research using smaller units of analysis is needed to assess this possibility.

I acknowledge some limitations of this study. First, the study employed proxies of some of these key constructs of interest (such as using age to capture lifestyle) rather than using more direct measures of such constructs (such as a measure of how much time the household actually spends inside the housing unit as opposed to in the neighborhood). While these crude proxies were nevertheless significant when using this particular sample, future studies will want to obtain more direct measures of these constructs. Second, given that respondents were left to define the "neighborhood", I could not be certain that respondents were referring to the same geographic area in their assessments. Of course, even if certain types of residents systematically perceive a larger area to constitute their neighborhood, this would not necessarily bias crime reports in one direction. That is, if a certain type of resident systematically classified the neighborhood as larger than did their fellow residents, they would report higher levels of crime if they lived adjacent to areas with more crime and would report lower levels of crime if they lived adjacent to areas with lower crime rates. Nonetheless, it is worth exploring in future research if certain types of residents systematically adjust the size of their "neighborhood" based on the amount of crime in nearby locations.

The results of this study provided consistent evidence that certain types of residents are systematically biased towards perceiving greater levels of crime or disorder in the neighborhood. By comparing residents living very close to one another—as opposed to trying to compare residents who live up to two miles apart from one another as has been done in prior research aggregating households to census tracts—this study was able to obtain relatively unbiased estimates of this systematic bias. The findings of the present study are quite informative given that they were obtained on a national non-rural sample, compared to other research that is often constrained to studying a single city. Understanding which types of residents are systematically predisposed to perceiving more crime and disorder in the neighborhood is important for understanding which households are likely to change their behavior as a consequence.

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Endnotes

[1] Of course, residents can experience different social spaces based on where they travel for work or shopping. To the extent that this everyday activity takes them further away, it is unlikely that it would influence their assessment of crime or disorder in their own neighborhood.

[2] Sampson and Raudenbush in fact estimated a multilevel model with group-mean centering of the individual-level variables. Although a true fixed effects model would also group-mean center the outcome measure, their approach is a relatively close approximation.

[3] In the American Housing Survey, sample units were selected from the 1980 Census Sample Housing Unit Record File. A Housing Unit Coverage Study was performed to locate units missed by the 1980 census, and an additional sample was selected from the units located by this study (such as non-residential to residential units, new mobile home parks, etc). Building permits are also sampled to represent newly constructed housing since the 1980 census (For a more complete description of the AHS sampling design, see Hadden and Leger, 1995).

[4] For the perception of crime model, I also estimated ordered logit models: the results were very similar to the models presented here, so are not included. I also tested whether the last category of the perceived crime measure—crime is so bothersome that you wish to move—behaves differently. In one approach, a variable was created in which this category was collapsed into the category of "crime is bothersome." The results for this model were very similar to those presented here, suggesting there is no additional bias introduced by this question wording. As a second approach, multinomial logistic models were estimated to assess whether any of the categories of the crime variable behaved differently in relation to the covariates: no such differences were detected.

[5] The Proc MI procedure in SAS was used to perform the imputations. Given that households could change over waves of data, the imputation strategy only included information from the

current wave when imputing values. The imputation model included all variables contained in the model, as well as several other important characteristics about the neighborhood as assessed by the respondent (the presence of undesirable odors, abandoned buildings, junk, undesirable noise, street noise, poorly maintained streets, commercial or industrial activities, poorly maintained street lights, recreation, shopping, quality of police, poor services, adequate public transportation, satisfaction with house, satisfaction with neighborhood, satisfaction with schools, value of unit, square footage of unit). I constrained all imputed values to fall within the range of values in the original measure, and did not round values to integers given Monte Carlo simulation evidence that such an approach has poor properties (Allison, 2005).

[6] In these multilevel models, the intra-class correlation is estimated as the amount of variance at level two divided by the total variance (the sum of level one and level two variance) in the unconditional model (the SMSA indicator variables are included in the unconditional model for the metropolitan sample).

[7] These values are based on the degree of variability in the outcome measure within household clusters, given that these fixed effects models are only explaining within-household cluster variability. For instance, given that the average standard deviation of crime within the household clusters of the sample is .731, the effect of African-Americans perceiving crime is calculated as -.170*.731 = -.233.

[8] Assessing the degree of isolation is more difficult with a continuous measure such as household income. As an approximation, I computed the income standard deviation and range within clusters in the full sample and then computed the income standard deviation and range within clusters when excluding the single highest and lowest income household. There appears to still be a considerable amount of variability within clusters when excluding these highest and lowest income households: although the average range within clusters is 7.08 logged income in the full

sample, this range is still 4.51 when excluding these extreme values. Likewise, whereas the standard deviation of logged income within clusters is 2.16 in the overall sample, this remains 1.52 when excluding the extreme values.

[9] I also created a second measure of isolation defined as the household being the only one of their race/ethnicity (or ownership status) in the cluster. The substantive results for these ancillary models were very similar to those presented here, though with slightly weaker statistical significance due to the smaller number of such cases. A second measure of isolation by income was created in which households were defined as isolated if they had household income 20 times greater than the cluster mean (thus, > |ln(3)| difference from the cluster mean). These results paralleled those with the > |ln(2)| cutoff.

[10] This was assessed by estimating an additional model with isolated Latinos as the reference category, and no differentiation made in the isolation status of whites or African Americans (given the nonsignificant differences found in the Table 3 models). The effect for white residents remained significantly positive for perceived crime, social disorder, and physical disorder.

[11] If in fact the racial/ethnic composition causes all residents in the neighborhood to equally incorrectly perceive more crime, there would be no evidence of systematic bias between different types of residents. Of course, determining that all of the residents in a neighborhood are incorrectly perceiving more crime than actually exists is a thorny problem given that it would require taking into account the "true" level of crime, for which no measure exists. Given the evidence from studies that the racial/ethnic composition affects the level of official crime rates (Hipp, 2007b; Hipp, Tita, and Greenbaum, 2009; Roncek, 1981; Sampson and Groves, 1989; Warner and Rountree, 1997) suggests at least the possibility that the racial/ethnic composition

may be affecting the actual level of crime and not leading to mistaken reports on the part of residents.

[12] This approach rests on two other assumptions: 1) that the official rate of crime is a flawless measure of the true level of crime (an almost certainly implausible assumption), and 2) that reporting crime events to the police does not systematically vary over tracts based on the racial/ethnic composition. These assumptions, along with the homogeneity assumption, are arguably quite strong.

Tables and Figures

Table 1. Summary statistics for variables used in analyses. American Housing Survey special neighborhood sub-sample, 1985, 1989, 1993

	National sample		Metropolitan samples	
	Mean	Std. Dev	Mean	Std. Dev
Perceived crime	0.59	0.95	0.56	0.97
Perceived social disorder	0.00	1.00	0.00	1.00
Perceived physical disorder	0.00	1.00	0.00	1.00
Female	0.56	0.47	0.40	0.49
Age	49.07	17.45	44.33	17.46
African-American	0.14	0.34	0.09	0.28
Latino	0.09	0.28	0.05	0.22
Other race	0.01	0.08	0.01	0.07
Years of education	12.83	3.10	13.21	2.94
Real household income (1984 $1,000's)	21.33	15.47	31.12	16.40
Length of residence	6.51	3.22	5.11	2.96
First year in residence	0.16	0.36	0.12	0.32
Married	0.51	0.50	0.40	0.49
Divorced	0.19	0.39	0.13	0.33
Widowed	0.14	0.35	0.06	0.25
Have children aged 0 to 5	0.20	0.40	0.12	0.33
Have children aged 6 to 12	0.21	0.41	0.13	0.34
Have children aged 13 to 18	0.19	0.39	0.11	0.31
Owner	0.57	0.48	0.47	0.50
Households	27,000		79,779 (1)	
Household clusters	2,378			
Tracts			9,985 (1)	

(1): Average per wave

Table 2. Determinants of perceived neighborhood crime, social disorder, and physical disorder. Fixed effects models for household clusters. American Housing Survey special neighborhood sub-sample, 1985, 1989, 1993

	(1) Crime	(2) Social disorder	(3) Physical disorder
African-American	-0.170 **	-0.092 **	-0.121 **
	-(4.63)	-(2.97)	-(4.01)
Latino	-0.185 **	-0.095 **	-0.164 **
	-(6.56)	-(3.22)	-(5.91)
Other race	0.015	0.010	-0.110
	(0.19)	(0.08)	-(1.36)
Education	0.015 **	0.015 **	0.016 **
	(6.30)	(5.87)	(5.74)
Household income (logged)	0.007 *	-0.002	-0.001
	(2.57)	-(0.62)	-(0.25)
Owner	-0.048 *	0.032	0.036 †
	-(2.46)	(1.51)	(1.78)
Length of residence (logged)	0.055 **	0.046 **	0.040 **
	(6.75)	(5.19)	(5.11)
First year in residence	-0.100 **	-0.004	-0.030
	-(4.53)	-(0.15)	-(1.36)
Married	-0.005	0.038 *	0.038 †
	-(0.30)	(2.10)	(1.85)
Divorced	0.020	0.041 *	-0.009
	(0.99)	(1.98)	-(0.41)
Widowed	-0.077 **	0.019	-0.062 **
	-(3.66)	(0.79)	-(2.58)
Presence of children 0-5 years old	0.058 **	0.099 **	0.102 **
	(3.35)	(5.56)	(5.49)
Presence of children 6-12 years old	0.035 †	0.064 **	0.041 *
	(1.80)	(3.52)	(2.09)
Presence of children 13-18 years old	0.055 **	0.069 **	0.051 **
	(3.46)	(4.12)	(2.98)
Female	0.043 **	0.037 **	0.033 *
	(3.41)	(2.68)	(2.31)
Age (X 100)	-0.386 **	-0.194 **	-0.160 **
	-(7.24)	-(3.47)	-(2.97)
Indicator for 1985	-0.121 **	0.019	-0.121 **
	-(8.48)	(1.16)	-(6.85)
Indicator for 1989	-0.053 **	0.005	-0.049 **
	-(3.61)	(0.32)	-(3.14)
Intercept	0.351 **	-0.372 **	-0.274 **
	(8.71)	-(8.61)	-(5.74)
R-square	0.025	0.010	0.015

*** p < .01(two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). T-values in parentheses. N = 27,000 household time points in 2,378 household cluster time points. Fixed effects models include indicators for household clusters.*

Table 3. Determinants of perceived neighborhood crime, social disorder, and physical disorder. Fixed effects models for household clusters, taking into account the isolation by race/ethnicity or ownership status. American Housing Survey special neighborhood sub-sample, 1985, 1989, 1993

	(1) Crime	(2) Social disorder	(3) Physical disorder
Isolated white household	0.075	0.143 †	0.245 *
	(1.53)	(1.68)	(2.41)
Non-isolated white household	0.128 **	0.147 **	0.243 **
	(8.49)	(4.59)	(7.32)
Isolated black household	0.055 †	0.058	0.130 **
	(1.90)	(1.05)	(2.70)
Non-isolated black household	0.007	0.032	0.088 †
	(0.26)	(0.61)	(1.81)
Isolated Latino household	0.047 *	0.083	0.136 **
	(2.04)	(1.53)	(2.90)
Non-isolated Latino household	---	---	---
Other race household	0.106 *	0.118	0.071
	(2.55)	(1.06)	(0.92)

	(4) Crime	(5) Social disorder	(6) Physical disorder
Isolated owner household	-0.014	0.165 *	0.146 †
	-(0.35)	(2.15)	(1.85)
Non-isolated owner household	-0.026 *	0.042 †	0.047 *
	-(2.43)	(1.78)	(1.99)
Isolated renter household	0.008	0.117 **	0.101 *
	(0.42)	(2.88)	(2.54)
Non-isolated renter household	---	---	---

*** p < .01(two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). T-values in parentheses. N = 27,000 household time points in 2,378 household cluster time points. Fixed effects models include indicators for household clusters. All models include all measures from models in Table 2.*

Appendix

Table A1. Factor loadings from principal components analysis of physical disorder

	National sample		Metropolitan samples	
	Factor loading	Uniqueness	Factor loading	Uniqueness
Litter/housing deterioration	0.46	0.79	0.43	0.82
Street noise	0.75	0.44	0.76	0.43
Poor city services	0.25	0.94	0.22	0.95
Noise in general	0.73	0.47	0.74	0.46

N = 27,000 household time points in 2,378 household cluster time points for the national sample; an average of 79,779 households in 9,985 tracts across the four waves of the metropolitan sample.

Table A2. Outcome of perceived crime, social disorder, and physical disorder. Fixed effects models conditioning on census tract. Sample of 25 metropolitan areas. Average of results over four time points.

	(1)	(2)	(3)
	Crime	**Social disorder**	**Physical disorder**
African-American	0.091 **	-0.021 *	-0.007
	(.005)	(.009)	(.009)
Latino	-0.058 **	-0.045 **	-0.036 **
	(.007)	(.014)	(.014)
Education	0.002 *	0.007 **	0.007 **
	(.001)	(.001)	(.001)
Household income	0.001	0.000	-0.003
	(.002)	(.003)	(.003)
Owner	-0.073 **	-0.023 *	-0.086 **
	(.006)	(.010)	(.010)
Length of residence (logged)	0.041 **	0.042 **	0.048 **
	(.003)	(.005)	(.005)
First year in residence	-0.125 **	0.015 *	0.016 *
	(.005)	(.007)	(.006)
Married	-0.009	-0.032 *	-0.024 *
	(.006)	(.013)	(.012)
Divorced	0.039 **	0.019	0.024 *
	(.007)	(.014)	(.012)
Widowed	0.002	-0.055 **	-0.070 **
	(.009)	(.018)	(.018)
Number of children 0-5 years old	0.001	0.093 **	0.094 **
	(.006)	(.010)	(.011)
Number of children 6-12 years old		0.080 **	0.049 **
		(0.011)	(0.011)
Number of children 13-18 years old		0.065 **	0.056 **
		(0.010)	(0.010)
Female	0.003	0.028 **	0.022 **
	(.005)	(.008)	(.008)
Age (X 100)	-0.375 **	-0.219 **	-0.248 **
	(.018)	(.031)	(.030)
Number of households per year	79,779	79,779	79,779
Number of tracts per year	9,985	9,985	9,985

*** p < .01(two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). Standard errors in parentheses. All models include other race (results not shown), with white as the reference category for race. Fixed effects models include indicators for tract and SMSA. Models were estimated separately for years, and the results were averaged.*