Chapter 8
The Geography of Stigma: Experimental Methods to Identify the Penalty of Place

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Abstract The United States remains a spatially segregated nation by many measures including race, income, wealth, political views, education, and immigration status. Scholars have, for many years, grappled with questions stemming from spatial inequality and have come to recognize the neighborhood in which an individual lives as a socially organizing unit of space, predictive of many individual-level outcomes. The mechanisms that underlie the relationship between neighborhoods and outcomes for residents, however, remain relatively underexplored. In this chapter, we show how the use of audits and field experiments can help uncover one such mechanism—place-based stigma in social interactions. Specifically, we describe the methodology of a previous study (Besbris M, Faber JW, Rich P, Sharkey P, Effect of neighborhood stigma on economic transactions. Proc Nat Acad Sci 112:4994–4998, 2015) that revealed how signaling residence in a poor community of color negatively affected sellers' ability to attract buyers in a classified marketplace. We focus on the study's operationalization of neighborhoods and show how future research can use non-individual-level treatment characteristics such as units of space. Doing so helps us better understand the causal relationship between space and individual-level outcomes, as well as better parse the effects of individual-level variables versus non-individual-level variables, which are often conflated in non-experimental research. We close by suggesting the implementation of field experiments in testing for effects at other geographic scales, such as metropolitan area, state, region, country, or continent.

Keywords Spatial stigma · Experimental design · Socio-spatial inequality

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S. M. Gaddis (ed.), *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*, Methodos Series 14, https://doi.org/10.1007/978-3-319-71153-9_8

8.1 Introduction

Researchers studying the effects of residential environments have become increasingly aware of the limitations of both the methods generally used to study "neighborhood effects" as well as the basic question that motivates much of the literature. *Whether* neighborhoods matter for individual life chances, we argue, is an exceedingly narrow and underspecified question. Instead, research should focus on the ways in which neighborhoods matter, or the questions of when, where, why, for whom, and to what extent are individual or group outcomes affected by their local context (Sharkey and Faber 2014). At the same time, developments in the use of field experiments to estimate the impact of discriminatory behaviors and attitudes have focused primarily on stigma and discrimination at the level of individuals or groups (see Gaddis 2018). Experimental methods have rarely been used to understand the spatial dimensions of inequality, or the geography of stigma.

In this chapter, we show the potential for experimental audits and field experiments to test whether place-based discrimination contributes to spatial foundations of inequality (Galster and Sharkey 2017). Specifically, we draw on a previous study (Besbris et al. 2015) to illustrate how field experiments can operationalize ecological variables. We discuss best practices for signaling various aspects of place—and for designing effective signals in experimental research more broadly.

Our understanding of how neighborhoods affect inequality has largely been limited by methodological constraints (Sampson 2008). Despite advances in quasi-experimental techniques, observational studies are rarely able to provide causal evidence that isolates the effect of residential context on individual outcomes (Cheshire 2012; Ludwig et al. 2008; Mayer and Jencks 1989). Such studies face skepticism that differential outcomes across individuals who reside in different neighborhoods reflect unobserved confounders rather than an actual effect of neighborhood context. This methodological impasse calls for creative alternative approaches capable of producing unbiased tests of neighborhood effects. As we elucidate throughout this chapter, field experiments and audits use randomized conditions within "real world" environments to overcome the problem of selection bias while simultaneously focusing attention on discriminatory social behavior. Because field experiments and audits isolate specific variables and test for their impact on a given outcome (Baldassarri and Abascal 2017; Bertrand and Duflo 2016), they provide a methodological opportunity to move beyond older debates in the research literature on neighborhood effects. However, taking advantage of this opportunity requires a great deal of attention to constructing and testing signals of place which may not be as easily communicated as individual level characteristics like race or gender.

We focus on one particular mechanism through which place may affect individual outcomes: spatial stigma. Spatial stigma refers to the process by which individuals who reside in neighborhoods marked by poverty, crime, and/or racial isolation are thought to be less desirable interactional partners (Besbris 2015; Besbris et al. 2015; see also Goffman 1963; Link and Phelan 2001). We outline how spatial stigma might operate and review non-causal evidence of its existence. We then describe

how field experiments can measure the presence and magnitude of spatial stigma. We summarize the two existing field studies that have examined this phenomenon, focusing on how they operationalize place and the potential problems when in creating signals of place in audits and experiments more broadly. We then conclude by outlining the limitations of experimental methods, reflecting on what the existing experimental studies help us understand about neighborhood effects research more broadly, and proposing future lines of work for experimental and observational studies of place.

8.2 Spatial Stigma

As previously theorized, negative spatial or neighborhood stigma is generated when a particular place has a reputation for crime, disorder, poverty, and/or racial isolation. Such a possible set of characteristics devalues the place in relation to affluent, white, and otherwise more advantaged places. The residents of these differentiated places may come to embody the negative characteristics of their neighborhoods and, as a result, may experience suspicion, mistrust, and undesirability in their interactions with others when their residential origin is revealed (Anderson 2011; Bauder 2002; Wacquant 2008). Similar to other forms of stereotype, the consequences of spatial stigma arise when negative perceptions of a place are attached to individuals, leading to systematic disapproval, discrimination, and/or exclusion (Fiske 1998; Link and Phelan 2001).

For people to act upon spatial stigma and experience its consequences, there must be recognizable variation across geographic areas. In the U.S., residential segregation by race and income produces patchworks of neighborhoods distinct not only in their demographic composition but also in their concentrations of advantage and disadvantage (Logan and Stults 2011; Massey and Denton 1993; Reardon and Bischoff 2011; Wilson 1987). Race and class composition of neighborhoods typically also correlates with other community-level attributes, such as the quality and density of local institutions (e.g. schools, churches, municipal services), commercial activity, job opportunities, environmental conditions, (dis)amenities, property values, and the quality of public life (Clark 1991; Ellen 2000; Harris 1999; Sampson 2012). A long tradition of scholarship on housing preferences has demonstrated that people perceive neighborhoods through the "prism of race" (Krysan and Bader 2007), using racial composition as a direct or indirect measure of neighborhood conditions (Charles 2003; Emerson et al. 2001; Harris 1999; Krysan and Farley 2002). The judgments individuals make about neighborhood quality affects choices about where they live and—importantly—who they live near, contributing to continued residential segregation (Krysan et al. 2014).

If people make place-specific judgements about where to live, they might also make judgements about the people who live in one neighborhood versus another. Assumptions about residents of unfamiliar neighborhoods may be impacted by the fact that segregated neighborhoods reinforce segregated social networks (Sampson

and Sharkey 2008), leading to fewer connections between residents from different communities. Social psychologists have shown that in cases of limited inter-group contact people more often apply generalized stereotypes that ultimately reinforce social distance (Pettigrew 1998; Sigelman and Welch 1993). Thus, segregated metropolitan areas where many people lack nuanced information about communities beyond their immediate surroundings (Bader and Krysan 2015) provide a context for social actors to impose narratives about neighborhoods and the people who live there (Anderson 1999, 2011; Jones and Jackson 2012; Small 2004; Wacquant 2008; Wilson 1987). Moreover, dominant conceptions of black neighborhoods in particular as ghettos may shape how individuals interact with residents from majority black neighborhoods (Anderson 2012, 2015). This dynamic puts residents from racially-isolated, high-poverty neighborhoods at a potential disadvantage when interacting with strangers from outside their community.

Spatial stigma may be more pronounced in areas where crime (and especially violent crime) is concentrated. The geography of crime and race often overlap in U.S. cities, such that white and minority Americans live in what Peterson and Krivo (2012) describe as "divergent social worlds." This may lead to exaggerated perceptions of criminality and danger regarding non-white or poor neighborhoods (Liska et al. 1982; Quillian and Pager 2001; Sampson 2012; Sharkey et al. 2016), which are categorically avoided by outsiders whose fears are stoked by media representations of rampant crime (Chiricos et al. 1997, 2000). These fears, in turn, could dissuade individuals from hiring, dating, educating, or transacting with residents of isolated minority communities, regardless of the resident's individual characteristics. Anderson (2012, 2015) argues that these risks are highest for black Americans who are presumed to live in ghettos.

The disinclination of individuals to interact with those from different neighborhoods may also emerge from a simpler dynamic: geographic proximity. As the scale of segregation grows to broader geographies, such as between cities and places rather than neighborhood blocks (Lichter et al. 2015), any distance penalty added to the perceived cost of an interaction will have a negative impact regardless of intention or any place-based stigma. Growing income segregation (Reardon and Bischoff 2011) also compounds the social distance between individuals of different economic strata with geographic distance.

Geographic boundaries similarly structure the perceived distance between places. Natural boundaries, such as lakes and rivers, as well as constructed boundaries, such as highways and railroad tracks, create physical obstacles that residents of one neighborhood may need to cross or circumvent in order to reach another neighborhood. Bureaucratic and other symbolic boundaries, such as municipal borders, may also increase the social (and financial) costs of interactions across places. In fact, scholars have used natural (Card and Rothstein 2007), constructed (Ananat 2011), and municipal (Cutler and Glaeser 1997) boundaries as instrumental variables for racial segregation because they tend to segment space and separate groups.

In sum, various factors—physical, bureaucratic, symbolic—segregate neighborhoods that are differentiated by demography and exposure to crime. The spatial stigma hypothesis posits that people living in neighborhoods associated with

poverty, crime, and racial isolation may face negative stereotypes and discrimination from strangers when they are forced to reveal their residential location or origin. This may result in lost job opportunities, suspicion by law enforcement, or mistrust in market transactions. The converse may be true as well: residents of affluent and white communities benefit from positive stereotypes, which manifest as more favorable social interactions. Through all of these pathways, the stigma of place may be an important mechanism through which neighborhood segregation reinforces social inequality (Ellen and Turner 1997; Galster 2012; Harding et al. 2011; Jencks and Meyer 1990; Neckerman and Kirschenman 1991; Small and Feldman 2012; Sharkey and Faber 2014). Despite the strong theoretical support for this concept, few previous studies have estimated the effects of neighborhood stigma, in part because it is difficult to disentangle from other forms of disadvantage.

8.3 The Challenges of Measuring Spatial Stigma

Field experiments and audits are critical tools for evaluating the spatial stigma hypothesis. Within specific social settings between strangers—a job application, online dating message, or classified advertisement, for instance—researchers can randomly manipulate a place-based signal while holding all other characteristics constant. They verify whether spatial stigmatization occurs by measuring variation in the rate of favorable responses between place signals. In this sense, field experiments and audits provide researchers with a falsification test of the "null" hypothesis—i.e., that spatial stigma does not occur independently from other forms of discrimination. Field experiments and audits are less well suited to determine precise lower or upper bounds on the effects of spatial stigmatization. And while the use of randomization provides such studies with potentially high internal validity, their conclusions may be constrained to the specific forms of social interaction they test. Nonetheless, because audit studies measure observed actions in real-world situations, they have a distinct advantage over survey methods for measuring discrimination. Specifically, field experiments and audits avoid bias due to social desirability behavior of survey respondents, who may report behavior that they think the researcher (or they themselves) normatively prefer, rather than how they actually behave when they must make trade-offs and experience the consequences of their decisions (Pager and Quillian 2005). Despite this methodological strength, the use of field experiment and audit methods to evaluate the spatial stigma hypothesis presents unique challenges that require careful consideration in design and implementation.

One challenge of measuring spatial stigma in an experimental context is the choice about an appropriate mode of interaction the researchers will control. In an in-person interaction, it is far easier to signal an individual's race or gender than an individual's home address. As such, examining the existence of spatial stigma is extremely difficult via in-person audits. Field experiments that entail correspondence provide a much easier venue because personal letterhead as well as official documents

often contain an individual's address. For example, resumes for jobs, applications for credit cards, and judicial processing documents all usually have an individual's home address or other indicators of their residential location. Interactions in online marketplaces, dating services, and other web-based communities may even require a user to identify where they live or provide such information to others via GPS capabilities. Addresses, zip codes, and neighborhood names, however, are not necessarily strong or clear signals. Residents of a particular city may not know the names and locations of every street or which neighborhoods correspond to which zip codes. Even in correspondence-based field experiments, communicating place of residence is still more difficult than signaling race or gender, which can be done using racially- and gender-identifiable names (Gaddis 2015, 2017a, b).

A second challenge for measuring spatial stigma is the need to effectively capture the local schemas that people use to cognitively map their city. Non-experimental research provides strong support for the claim that residents catalogue and label different parts of the cities in which they live (Anderson 2011, 2012; Hunter 1974; Jones and Jackson 2012; Bader and Krysan 2015; Suttles 1972), yet these cognitive mappings do not necessarily correspond to administrative designations of place such as census tracts, zip codes, or political boundaries. Indeed, employers may have particular reactions to neighborhood names but not street addresses (Wilson 1996:116). So while an application that lists an address may not be screened initially, an applicant may be rejected when they mention their particular neighborhood of residence during a later interview.

The context of the interaction may also activate different ways of interpreting and cataloging space. For example, administrative designations such as school districts may play a role in how people divide space when they are looking to buy a home (Lareau 2014) but they may be less important when a business owner is looking for a storefront to rent. People may also use geographic and physical divides such as railroad tracks, highways, or major thoroughfares as distinct spatial boundaries. Social factors like a local place's average income or racial makeup certainly shape how people define spatial boundaries as well. Furthermore, collective understandings of neighborhood boundaries update over time due to demographic changes (e.g. gentrification), new or demolished housing stock, improvements to public transportation, a shifting geography of crime (or perceptions of crime), and a number of other factors (Ehrenhalt 2012; Hwang 2016). The challenge of effectively signaling place requires researchers to draw on other forms of data when considering how to communicate place; ethnographic and interview data on how individuals map their surroundings should be particularly helpful.

A third and related complication to estimating the effects of spatial stigma is the fact that social phenomena operate at a diverse set of intersecting and overlapping geographies. For example, a police officer may carry geographically-narrow stereotypes of individuals based on the specific blocks on which they reside, which have developed over the course of time spent on a beat. Or an employer may prefer job candidates from one high school catchment area over another—a less granular analysis of space. The relevant spatial unit, therefore, may depend on the phenomena under study (Sharkey and Faber 2014) and assumptions about the local knowledge

of respondents. As a result, experimental studies must have sound reasoning for their selection of local designation. Small pilot studies can often indicate if the target population is recognizing a particular neighborhood signal.

8.4 Experimental Design: Examples from Two Studies

The various challenges in experimental evaluation of spatial stigma require careful considerations of design. The type of behavior analyzed and the local scale of spatial meaning in any given project should inform how analysts make specific methodological decisions. To illustrate important design decisions by example, we discuss how spatial stigma was operationalized in two studies. To our knowledge, these are the only two studies that have ever used field experiments to directly test for the existence of spatial stigma.

The first study tested for spatial stigma by responding to help-wanted advertisements in Chicago and Boston and varying the address on the resume to signal either advantaged or disadvantaged neighborhood of residence (Bertrand and Mullainathan 2004). Across all job applicants, the authors found that living in a whiter, more educated, or higher-income neighborhood increased the likelihood of receiving a call back. Interestingly, they found the same effect across resumes using both identifiably white and black names. In other words, they provide evidence that spatial stigma exists and that it acts similarly for whites and blacks. While the main focus of the study was to identify racial discrimination in the labor market, the addition of a neighborhood signal highlights the ability of field experiments to test for non-demographic sources of discrimination such as spatial stigma.

Betrand and Mullainathan (2004) operationalize neighborhood using contact info on applicant resumes. The researchers randomly assigned fake addresses with real zip codes to every resume, drawing from every possible zip code within Chicago or Boston (p. 996). The authors utilize probit regression models to measure the relative change in likelihood of call-back as the characteristics of zip codes (racial composition, education, and income) changes. One worry, of course, is that employers will not recognize the signal, as zip codes are not necessarily part of individual employers' everyday cognitive schemas of the city (see Wilson 1996). However, the researchers were able to show that the zip code signal was received by employers since it produced differential outcomes. Had the response rate not significantly varied across zip codes, the researchers could have concluded that their operationalization of neighborhood quality was a poor one or that place of residence was not a factor that employers cared about. Yet they did find a difference in response rate, and because field experiments allow for causal claims, they can be certain that the zip code of where an applicant lived mattered for their chances of a call back.

The second study, which we authored and therefore highlight in greater depth here, examined whether advertisements for second-hand iPhones posted from advantaged (i.e. affluent and predominantly white) or disadvantaged (i.e. impoverished and black or Latino) neighborhoods in markets across the U.S. received the

same number of responses from buyers (Besbris et al. 2015). We used an existing online market for second-hand goods, enabling us to gather large amounts of data quickly. We chose 12 markets in large urban areas to reflect the geographic and racial diversity of cities in the U.S. The study found that advertisements signaling disadvantaged neighborhoods received 16 percent fewer responses than those signaling advantaged neighborhoods, providing a strong verification of spatial stigmatization in action.

How were neighborhoods across 12 cities chosen? We began by drawing upon multiple sources of information to name and select advantaged and disadvantaged neighborhoods (see p. 4995). First, census tract-level data on poverty and racial composition were aggregated to boundaries specified by the world's most visited real estate website, Zillow.com. We chose to use a real estate website because it provided more plausible real-world neighborhood boundaries than census tract boundaries, which are often the preferred source in neighborhood effects research (see Sharkey and Faber 2014). While all neighborhood names and boundaries are, in a sense, artificial impositions, we assumed that a popular real estate website's designations were more reflective of individual residents' general understandings than the Census Bureau's and more widely understood than zip codes. Furthermore, Zillow.com provided a systematic tool for naming neighborhoods across all cities in the sample. Second, to confirm our assumptions and verify the names we gathered from Zillow.com, we searched LexisNexis for recent news (including in print and online) that used the neighborhood names we found on Zillow. These searches provided evidence that local media used these neighborhood names, adding strength to our assumption that they might reflect the parlance of local residents. Furthermore, we cross-referenced neighborhood names with the terms "poverty," "homicide," "crime," and "theft" to identify whether local news sources portrayed these neighborhoods as disadvantaged. Finally, we confirmed that the neighborhood names we selected from Zillow would not be unusual or unrecognized by searching for them in the local listings of the online market itself. This strategy of triangulation—using multiple sources including census data, data from Zillow.com, data from local news sources, and data from the market under investigation itself—allowed for a confident assumption that the names we chose were not only recognizable to participants but also identifiable as advantaged or disadvantaged places. Table 8.1 provides a list of neighborhoods and cities from the study.

After selecting neighborhoods associated with advantage and disadvantage for each city in the study, we designed an experiment to isolate the phenomenon of spatial stigmatization in the online marketplace. Specifically, we posted advertisements that randomly signaled a seller's residence using short sentences. To avoid repetitive advertisements, which could produce a negative time effect by conditioning buyers to recognize our posts and ignore them, we generated several versions of advertisement title, text language, and price that were assigned randomly. Table 8.2 provides examples of actual posts. Importantly, the signal of neighborhood origin was added to the end of the text, but was also accompanied by information about desired meeting location. We randomly varied two types of meeting location—willing to meet in buyer's neighborhood, or willing to meet at a central place—to

Table 8.1 Neighborhoods selected for the field experiment in Besbris et al. 2015

City	Neighborhood	Classification	Poverty rate	Selected racial composition
Atlanta	Midtown	Advantaged	9.1%	70.2% white
	Oakland City	Disadvantaged black	35.4%	87.5% black
Baltimore	Canton	Advantaged	11.8%	75.4% white
	West Baltimore	Disadvantaged black	37.9%	83.7% black
Boston	Back Bay	Advantaged	9.7%	86.0% white
	Dorchester	Disadvantaged black	18.8%	45.8% black
Chicago	Lincoln Park	Advantaged	11.6%	82.5% white
	North Lawndale	Disadvantaged black	41.8%	91.7% black
Los Angeles	Century City	Advantaged	9.7%	76.8% white
	Crenshaw	Disadvantaged black	25.3%	68.9% black
NY Brooklyn	Cobble Hill	Advantaged	4.3%	71.2% white
	Bedford-Stuyvesant	Disadvantaged black	29.6%	77.3% black
NY Manhattan	Upper East Side	Advantaged	6.0%	81.2% white
	East Harlem	Disadvantaged Latino	35.5%	56.6% Latino
Philadelphia	Fox Chase	Advantaged	8.9%	78.9% white
	Nicetown	Disadvantaged black	32.2%	93.8% black
	Juniata	Disadvantaged Latino	39.3%	52.1% Latino
Phoenix	Ahwatukee Foothills	Advantaged	6.1%	73.3% white
	Central City	Disadvantaged Latino	44.2%	64.4% Latino
San Antonio	North Central	Advantaged	3.8%	74.0% white
	Southwest San Antonio	Disadvantaged Latino	38.8%	92.2% Latino
Seattle	Madrona	Advantaged	4.4%	74.8% white
	Leschi	Disadvantaged black	18.1%	36.2% black
	International District	Disadvantaged Asian	43.1%	49.0% Asian
Washington DC	Dupont Circle	Advantaged	11.1%	73.6% white
	Anacostia	Disadvantaged black	31.6%	97.1% black

Neighborhood boundaries derived from Zillow.com. Tract-level data aggregated to neighborhood using 2007–2011 American Community Survey data

Table 8.2 Examples of advertisements varying reference to seller neighborhood from Besbris et al. 2015

Advantaged neighborhood	Disadvantaged neighborhood
City: Atlanta	*City:* Atlanta
Price: $265	*Price:* $265
Heading: 16GB IPHONE 5 - ATT - BLACK - LIKE NEW!	*Heading:* 16GB IPHONE 5 - ATT - BLACK - LIKE NEW!
Advertisement text: 4 month old black iPhone 5 for sale. Includes original box, headphones, and charger. Perfect condition, no scratches. I live in Midtown and can meet downtown.	*Advertisement text:* 4 month old black iPhone 5 for sale. Includes original box, headphones, and charger. Perfect condition, no scratches. I live in Oakland City and can meet downtown.
City: Boston	*City:* Boston
Price: $405	*Price:* $405
Heading: AT&T Black iPhone 5 (16G)	*Heading:* AT&T Black iPhone 5 (16G)
Advertisement text: Like new iPhone 5 for sale - just a few months old. Comes with box and all items that were in the box. No scrapes or dents. I'm in Back Bay. Meet in your neighborhood.	*Advertisement text:* Like new iPhone 5 for sale - just a few months old. Comes with box and all items that were in the box. No scrapes or dents. I'm in Dorchester. Meet in your neighborhood.
City: Chicago	*City:* Chicago
Price: $320	*Price:* $320
Heading: iPhone black 5 16G (AT&T)	*Heading:* iPhone black 5 16G (AT&T)
Advertisement text: If you want a good deal on a basically new (no scratches, dents, etc.) iphone 5, this is it. You'll get all the things that were in the original box. Meet in the loop. I live in North Lawndale.	*Advertisement text:* If you want a good deal on a basically new (no scratches, dents, etc.) iphone 5, this is it. You'll get all the things that were in the original box. Meet in the Loop. I live in Lincoln Park.

Advertisements included randomly selected versions of heading, price, and advertisement text, and suggested meeting location (central location or in buyer's neighborhood). Advantaged and disadvantaged neighborhoods of the seller were assigned randomly according to Table 8.1, and the central location was specific to each city (for example: "the Loop" in Chicago). Prices were determined based on the median advertised price in each live market, updated each month of the field experiment. For additional information, see the Supporting Information of Besbris et al. 2015 (http://www.pnas.org/content/112/16/4994.full.pdf?with-ds=yes)

address the concern that response rates captured proximity and convenience concerns (or higher concentrations of buyers in some areas than others)—although, as we discuss above, geographic distance may be an important factor in shaping social distance and the perceived cost of cross-neighborhood interaction.

We did consider that our reference to specific places could be viewed as artificial. This could potentially suppress the number of responses, although any such effect would need to be correlated with the neighborhood preferences of respondents in order to bias our results. Specifically, without such a confounding relationship, it would not affect the difference in the average number of responses between advantaged and disadvantaged neighborhoods because both used identical versions of syntax in the advertisements. Nonetheless, to ensure that our posts would not be systematically ignored by real buyers, we ran a pilot to test our method and sampled

advertisements posted by others (i.e. actual sellers) from each of the 12 local markets. Nearly 60 percent of the advertisements we sampled indicated location. As such, we were confident that the method we used to signal neighborhoods was typical of other actors in that online community and not artificial. Again, brief pilots can provide researchers with some indication of how place and other characteristics are normally signaled in a particular context and if the signals to be used in the experiment are being received by the target group.

Field experiments and audits in online (and brick and mortar) marketplaces face a challenge unique to the setting: conditions of supply and demand may change rapidly due to external forces. For example, the release of a new version of a particular technology can dramatically reduce the desirability of the previous version. Indeed, we observed that the secondary market for the iPhone 5 declined over the course of our study both as measured by the number of other advertisements in each local market as well as the prices listed by those sellers. We addressed this time trend by including controls for market conditions and by adjusting the advertised price each month according to the median price of all other advertisements. In addition, we included statistical controls for time when evaluating the results. Nonetheless, it is possible that the nature of bias can change over time, as buyers and sellers adjust their behaviors in a dynamic marketplace. It would be difficult to detect if, for example, the magnitude of neighborhood stigma declined over time as buyers face dwindling supply of a particular good. As such, researchers may have to continually assess which aspects of a field experiment can be altered during data collection without changing the intended signal or compromising marketplace behavior.

To conclude, in both Bertrand and Mullainathan (2004) and Besbris et al. (2015), field experiments tested and found evidence for the existence of spatial stigma. Because this particular research design can isolate place of residence from other factors that correlate with it (e.g., education, race, income, proximity, or some other unobserved covariate), both studies provide valid causal evidence of a social mechanism through which neighborhoods matter in two economically consequential activities: the search for jobs and the sale of goods in a classified marketplace.

8.5 Limitations

Although online audits and field experiments have a number of beneficial qualities, there are limitations to these approaches. Most importantly, perhaps, is the broad challenge of capturing the complexity of the social world and, in particular, the ways in which multiple aspects of society often work in concert to shape outcomes. For example, although Besbris et al. (2015) identified a negative effect of mentioning a poor, black neighborhood in an online marketplace for used smartphones, the specific cause of this effect is unclear. Potential buyers in that market may be assuming that the seller from a poor, black neighborhood is a poor, black person, or simply a black person, or simply poor. The signal may also be priming concerns about

criminality, but this cannot be directly tested in the study. In such a spatially stratified society, specific individual and ecological characteristics are often bound together, which makes it difficult to interpret how the behavior of respondents in online audits and field experiments maps on to theories of disadvantage and bias. Therefore, researchers must be extremely careful in the kinds of claims they make based on experimental field studies that measure different outcomes across non-demographic characteristics. Increasingly, experimental research signals multiple variables (e.g. both race *and* gender) for an intersectional understanding of how various aspects of social life may work in concert to stigmatize individuals (for review, see Baldessarri and Abascal 2017). Research on spatial stigma should follow and use signals of place in combination with different demographic or non-demographic variables to better evaluate if place itself contributes to various outcomes or if it is simply acting as a proxy for other potential variables (see below).

Most social interactions are multi-stage, and field experiments typically only address one step—often an initial one—in the process. A decision to hire an employee, for example, may involve the review of a resume, followed by a phone call, and concluded by an in-person interview and a check of references. Typically, due to resource constraints and the protection of human research subjects, online audits are limited to the study of one stage in an interaction and, perhaps, the least consequential stage. Resume-based field experiments (Bertrand and Mullainathan 2004; Gaddis 2015; Pedulla 2016) are useful in understanding discrimination early on in the hiring process, but are incapable of fully capturing how biases contribute to employment disparities. Internet-based field experiments in the housing market (Ahmed and Hammarstedt 2008; Hanson and Hawley 2011; Hogan and Berry 2011) suffer from a similar limitation in that a listing agent or landlord may agree to show a house to a minority homeseeker with no intention of actually renting to her. Furthermore, experimentally testing the presence of bias at later stages of either of these processes (e.g. as part of a background or credit check) would be impossible.

This limitation is especially important to note in the context of investigating neighborhood stigma. Not only are field experiments limited in their ability to capture the cumulative effect of place of residence in a given interaction (i.e. neighborhood of residence may not matter in the initial job application but does become a relevant signal at a later screening stage), but there is increasing evidence that neighborhood effects compound over time (Chetty et al. 2016; Sharkey and Elwert 2011; Wodtke et al. 2011). As a result, the *cumulative* effect of spatial stigma is unknowable, even when using more precise measures like field experiments.

A related limitation in experimental studies of social stigma stems from the fact that multiple mechanisms may simultaneously affect perceptions in social interactions. Ideally, one could test stigmatization across neighborhoods that vary by one specific trait—such as crime—but have the same poverty levels and racial makeup. However, because crime, poverty, and racial/ethnic groups are so highly segregated in many American cities, and because there is such a strong class gradient across racial/ethnic groups, it is nearly impossible to compare neighborhoods that are only different on one axis. For example, geographically concentrated white poverty does not exist in many American cities. Furthermore, the poorest, predominantly white

area within a city is often not nearly as poor or racially homogenous as communities of color in that same city. This is why, in our previous work, "disadvantaged neighborhoods" are all non-white (Besbris et al. 2015).

An online experiment may also alter the community in which it takes place. For example, flooding a small market with fake advertisements may reduce trust in the market among those who are using it for its intended purpose. Similarly, posing as a potential employee or romantic partner may exact substantial costs—time, emotional and psychological commitment, etc.—on those who are evaluating potential matches. Spillover effects of online studies must be considered as a potential violation of the Stable Unit Treatment Value Assumption (SUTVA) (Morgan and Winship 2007) and efforts must be taken to avoid harming the integrity of the community and its members. In Besbris et al. (2015), for instance, we limited the frequency of advertisements to twice per week, and utilized a generalized randomization technique—rather than a matched-pair audit study—that constrained the number of observations collected and the amount of statistical power available to address nuanced research questions, such as heterogeneity in spatial stigmatization across different cities.

Another limitation stems from the fact that it is often difficult, if not impossible, to gather data on the respondent population in online studies. Many online interactions are characterized by anonymity and in studies in which non-response can be just as informative as response (e.g. Besbris et al. 2015), there is no way to know which users did not initiate communication. Furthermore, conducting post-audit surveys of respondents likely increases the risk of contaminating the market in ways discussed above. Yet without data on participants, it is impossible to verify whether inferences drawn from online audits and field experiments reflect broader population dynamics or, instead, behavior specific to the members of the online community studied since market participants may not be representative of the populations of neighborhoods, cities, or any larger geography. While not a threat to internal validity of such studies, this external validity concern is substantial. More broadly, the lack of post-hoc data in many field experiments and audits limits they types of conclusions that can be drawn—especially if the findings are null. If we had found no difference in response rate between ads from advantaged or disadvantaged neighborhoods, we would not know if the results were due to a poor operationalization of our treatment or if the variable itself did not matter for how buyers made their choices. This risk can be mitigated with the type of triangulation we performed when selecting our neighborhoods as well as with pilot phases of experiments and post-hoc data collection (e.g., interviews with participants).

Even separating geographic proximity from other potential mechanisms of stigma is difficult, as poor black and Latino areas are typically not near affluent white communities. We previously tried to address this potential issue by signaling willingness to travel to respondents' neighborhoods or a central location and by choosing neighborhoods that were relatively close to one another, a downtown area, or transit hub. However, the extent to which individuals are disinclined to interact with others who do not live nearby is itself a cause and consequence of segregation, so it is theoretically unclear whether distance is a confounding variable or a causal pathway.

8.6 Three Areas for Future Research

Audit studies and field experiments are uniquely positioned to advance understanding of how different dimensions of advantage and disadvantage, at the level of individuals and places, can influence social and economic interactions and outcomes. More specifically, we believe that field experiments focusing on the impact of places have substantial potential to generate new insights into the spatial dimensions of inequality and the mechanisms underlying neighborhood effects. Building on the research described in this chapter, we have identified three areas of research that are crucial for moving toward a more complete understanding of spatial stigma.

First, field experiments carried out in different geographic settings and focusing on different forms of interactions are essential to understanding where and when spatial stigma may become salient. In our own study, we examined the effect of neighborhood disadvantage in online markets for interpersonal exchanges of smartphones, but the particular conditions of the market for this item almost certainly influence the potential impact of spatial stigma. Does place of residence matter for exchanges that do not involve personal, face-to-face interaction? If place of residence matters for interpersonal economic exchanges and job applications, does it matter for college admissions or promotion within a given firm?

The close connection between place of residence and race suggests that spatial stigma may exist in situations where race has been shown to affect outcomes, such as romantic partnerships (Robnett and Feliciano 2011; Torche and Rich 2017) or assessments by market intermediaries like real estate agents (Besbris 2016; Besbris and Faber 2017; Yinger 1995) or mortgage lenders (Faber 2013). Testing for the impact of spatial stigma in these and other sites of stratification is necessary to develop a broader theory of how residential context can advantage or disadvantage individual residents and understand when, where, and for whom place of residence acts as a filtering and sorting heuristic. Using field experiments to test for spatial stigma across situations and interactions therefore fills both theoretical and empirical gaps.

Second, and related to the previous point, study designs can be developed to assess the interactions between individual (or group) disadvantage and spatial disadvantage, and to attempt to disentangle the relative influence of each. While a number of studies have explored intersectionality in specific arenas, for example, by testing for both race effects and sexuality effects in the market for jobs (Pedulla 2014) or both parental status and sexuality in the market for housing (Lauster and Easterbrook 2011), minimal research has considered the interaction of individual disadvantage and spatial disadvantage.[1] As noted previously, signaling place of residence along with other variables can help isolate the effects of the place itself. This is especially needed in the study of spatial stigma because place of residence is

[1] Although Bertrand and Mullainathan (2004) found spatial stigma operating similarly across black and white job applicants, it is possible that spatial stigma may produce different results across races in other areas of social life like mate selection.

so tightly linked to socio-economic status, race, education, and a host of other characteristics that may also affect decisions across situations.

Three of the authors are conducting an additional study designed to disentangle the impact of spatial disadvantage from individual race and ethnicity by responding to advertisements for smartphones while signaling both race/ethnicity and residential location. This design will help determine whether the impact of neighborhood disadvantage is partially or fully explained by assumptions made about the race/ethnicity of the individual taking part in the transaction.

Examining multiple dimensions of stigma in the same study also allows for tests of interaction effects. The implicit and explicit associations that individuals make regarding delinquency, intelligence, sexual proclivity, and other behavioral traits are rarely race- or gender-neutral, so certain race and gender combinations may accentuate neighborhood stigma, while others may moderate it. For example, does the negative effect of the stigma associated with a poor, black, and high-crime neighborhood operate for white women? Conversely, do black men garner the same interactional benefit from residing in an affluent white community? These and related questions will shed light on the nature of racial and gender inequality in the context of a highly segregated society.

Third, the effect of spatial stigma must be examined at multiple levels of analysis. Although our examples in this chapter focused on relatively small geographies (i.e. neighborhoods), stigma may operate at other spatial units in ways that create advantage or disadvantage. Country of origin, while often conflated with race, religion, and language, may also communicate cultural affinity, wealth, or political leaning in particular interactions. Given current public debates in the United States regarding immigration from Latin America and the Middle East, nationality bias may be particularly strong. Americans may also carry stereotypes about individuals from different regions within the country, which manifest as interactional bias—particularly in combination with race. And within metropolitan areas, people living in urban areas may be perceived differently than people living in suburbs. Affiliation with even smaller locations within individual cities, such as specific public housing projects, or, conversely, luxury residential developments, may also influence interactions with the police, teachers, employers, or potential romantic partners.

Understanding the various, context-dependent roles of these layered geographies, as well as the ways in which they interact with race, gender, age, and other characteristics is a challenging task. In addition to audits and field experiments, the theory and suggestions outlined in this chapter can be extended to other methodological approaches. Qualitative work is particularly well positioned to investigate the role (or roles) played by spatial stigma at the interactional level. In combination with experimental approaches, ethnography and interviews can help elaborate interactional mechanisms—such as spatial stigma—shaping the geography of inequality.