UNIVERSITY OF CALIFORNIA, IRVINE

Won't You Be My Neighbor?

An Examination of Environmental Context, Resident Neighborhood Spatial Perceptions, and Implications for Aggregate Techniques

DISSERTATION

Submitted in partial satisfaction of the requirements

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DOCTOR OF PHILISOPHY

In Criminology, Law and Society

by

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DEDICATION

To

My partner in life, Erin

and

My family and friends

If we have chosen the position in life in which we can most of all work for mankind, no burdens can bow us down, because they are sacrifices for the benefit of all; then we shall experience no petty, limited, selfish joy, but our happiness will belong to millions, our deeds will live on quietly but perpetually at work, and over our ashes will be shed the hot tears of noble people.

(Marx, 1835)

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Acknowledgments

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PROFESSIONAL ASSOCIATIONS

American Society of Criminology

American Sociological Association

Abstract

‘Won’t You Be My Neighbor?

An Examination of Environmental Context, Resident Neighborhood Spatial Perceptions, and Implications for Aggregate Techniques

by

Benjamin James Forthun

Doctor of Philosophy in Criminology, Law and Society

University of California, Irvine, 2024

Professor John Hipp, Chair

Using data from the Los Angeles Family and Neighborhood Study, US Census, and RefUSA, this dissertation examines the role of demographics, businesses, block aesthetics, and social relationships on perceptions of neighborhood boundaries among Los Angeles residents. Chapter one begins by contextualizing neighborhood spatial perceptions through the lens of community attachment and activity patterns theory. The second chapter examines the role of these dimensions on individual perceptions of neighborhood spatial scale, finding significant associations for key elements within them each. The third chapter shifts to block level analyses to examine whether factors in each of these dimensions predict differences in perceptions of neighborhood bounds among neighbors. Results do in fact indicate that certain factors are associated with greater consensus in these perceptions (e.g. social services and population density), while others tend to be associated with greater differences (e.g. participation in local or civic group). Given the importance of these findings, the next chapter is focused on enhancing research by incorporating these boundary perceptions into aggregate analyses. By capturing neighborhoods as residents see them, we may more accurately capture ‘neighborhood’ effects.

Because of this, an aggregate measure informed by resident perceptions of neighborhood spatial scale is developed in chapter four. This unit is then tested against models aggregated to census block and .5 mile egohood boundaries. Results indicate that models incorporating neighborhood boundaries as residents define them tend to explain more variance in neighborhood cohesion than the other approaches. While there is little difference between approaches found in models focused on explaining the variance in standard deviations in neighborhood perceptions, these results seem to indicate that this is a useful approach that warrants further refinement. The final chapter outlines the overall project and connects findings back to prior research and theory. The project's limitations are also discussed leading to avenues for future research. Suggestions are also provided for the usefulness of this approach to other fields that may benefit from analyses that seem tied to resident perceptions of neighborhood boundaries.

Chapter 1: Introduction

When looking at societal structures through a wide macro lens, one feature seems to stand out as a phenomena that all nations tend to share. In fact, they reside at the very core of the concepts of society and place. While some of these features have been developed through natural processes, they have also been imposed and engrained in the very fabric of our existence. While its composition may ebb and flow, they persist through time while shaping mankind's understanding of the world. A feature with a high level of influence over our daily lives has become so deeply engrained into our systems and organization that we seldom question them as anything short of given. *Borders* become associated with our various daily activities, shape norms and values, and inform identities in important ways. Although some boundaries are clearly defined and easily visible, neighborhood boundaries are blurred by the activities and connections that residents experience.

While a wide range of boundaries (e.g. census blocks, tracts, or zip codes) allow for certain approximations of neighborhood to be captured, a growing body of evidence suggests that individuals typically do not identify with these units (Pebley & Sastry, 2011; Burdick-Will, 2018: Nejat, 2018). Rather, residents draw from key contextual features of the built and social landscape that shape perceptions of neighborhood bounds in different ways. Four key dimensions seem to be at work in shaping these views. Aspects of an area's underlying demographics (Coulton et al., 2013), businesses and employment opportunities (Kyle & Chick. 2007), block aesthetics (Lohmann & McMurran, 2009), and social relationships (Colburn et al., 2020) have all been shown to have some level of influence on the spatial bounds perceived by residents. While research does highlight these factors as key elements surrounding neighborhood attachment and activity patterns, these studies tend to be specifically focused on a single dimension rather than the overall structure as a whole. The majority of neighborhood boundary

research also tends to be qualitative in nature involving resident drawn maps. While these studies are insightful in highlighting the fuzzy boundary issue of perceived neighborhood, unfortunately this research is somewhat limited in number and in scope.

Although some aspects of these dimensions have been examined, the extent of influence these features exert has not yet been fully explored. While a growing body of literature highlights the role of social and built environmental factors on these perceptions (Coulton et al., 2012; Pebley & Sastry 2009; Charreire et al., 2016), there remains a need to incorporate features of the social and physical backcloth into a single framework of perceived place. Prior research then provide the pieces of a larger puzzle that must be assembled in order to further enhance an understanding of resident perceptions of neighborhood space. Additionally, research needs to explore how collective these views are and whether they remain stable over time. By enhancing an understanding of these relationships, research focused on neighborhoods may be advanced by utilizing resident neighborhood perceptions in the development of more meaningful aggregate units.

Theoretical Outline

In order to understand how residents form perceptions of their neighborhood boundaries (and explain variation in these perceptions), it is crucial to have a discussion on how people form meaning through their interactions within the backcloth of the social and physical environment. Social construction of meaning rooted in social interaction is not a new concept. Early theorists such as George Herbert Mead, Herbert Blumer, and many others from the Chicago School thought of social interactions through a social construction of reality based on symbols (both physical and social) that are recognized and shared by members of a society. Around the same time, scholars like Mary McDowell and Jane Addams worked to develop organizations to

solidify community relationships that worked toward alleviating social problems of the day. This provided a unique place for residents to "set foot under the same table" and share their experiences. This exposed many to the harsh reality of rapid industrialization (McDowell, 1920), and encouraged a sense of shared mobilization and purpose within various Chicago neighborhoods. Though the types and availability of these places has changed over time, this dissertation argues that local businesses, recreational spaces, and the organizations residents have available to them continue to be an important spaces for residents to form meaning and connections.

More recent theory surrounding community attachment continues to focus on how residents develop a sense of place based on interactions with the larger contextual environment (Gieryn, 2000). This larger contextual environment provides exposure to a wide variety of people and places that help one form a sense of community. Community contexts such as strong social bonds and positive resident perceptions create stronger attachment to the neighborhood (Ma, 2021). Residents in areas characterized by strong levels of community attachment are better able to organize their efforts toward positive community change and tend to exhibit more positive perceptions of community attributes. Giuliani (2003) notes that "There is perhaps no feeling of mutual affinity, community, fraternity among persons, whether formal or informal, institutionalised or not – nor feeling of diversity, aversion, hostility − that is not in some way related to matters of place, territory and attachment to places. For better or worse, this has far-reaching implications" (p. 137). This line of reasoning poses an interesting question that threads throughout the following chapters- how do residents perceive the extent of these neighborhoods and what contextual factors are associated with differences in these perceptions?

While early research theorized that urban environments might undermine these processes due to large heterogeneous populations and lifestyle factors (Wirth, 1938), recent work has suggested that urban design and various services (stores, recreation, schools, employment opportunities, and the general built environment) may help to organize communities in ways that can foster attachment to community (French et al., 2014; McKnight et al., 2017). Neighborhood grocery stores, parks, and recreational spaces provide residents with the opportunity to come together and share experiences, concerns, interact with neighbors, and form connections. This shows that meaning of place is not static to one's neighborhood- it also develops from places people frequently visit and share meaning with family and friends (Giuliani, 2003; Kyle & Chick, 2007). Given that the contextual backcloth has such important implications for levels of community attachment, it seems relevant to explore how these factors contribute to NSPs that actually represent the spaces residents perceive as their community. With scholarship highlighting contextual features residents draw from in forming these attachments, it seems logical to consider whether these same factors are associated with resident NSPs. This project extends this research by examining this assumption.

Although this general framework is similar throughout multiple fields, it does not typically specify issues of data aggregation and neighborhood boundaries. Coulton et al. (2012) have consistently highlighted how this undermines our understanding of how these processes operate and have encouraged scholars to advance on this theoretical framework by exploring factors that may lead to different neighborhood boundary perceptions among neighbors. Additionally, she cautions that "If researchers and practitioners craft neighborhood units of a size that differs from residents experience, this can result in measurement error, misspecification of models, and practical problems of looking for results or impact in the wrong places" (p. 140).

That is, an understanding of neighborhood boundary perceptions helps to provide additional context not only for statistical analyses and the growth of theory, but also for the policies and practices that are developed from them (Ohmer et al., 2019; Charreire et al, 2016). Although research seems to have largely ignored this caution, this dissertation attempts to advance theory by enhancing an understanding between environmental context and NSPs. Additionally, it utilizes this measure in a method of aggregation aimed at more accurately capturing neighborhood boundaries as residents themselves see them.

Environmental context has been crucial for the development of spatial criminological theory. While this discussion does not center on crime, theories of crime geometry and activity spaces can be informative by providing additional context for understanding how neighborhood boundary perceptions may form (Smith et al., 2019). Different activity patterns and exposure to people and spaces could result in vastly different views of neighborhood boundaries. Early geographic research theorized a relation between urban form, human activities, and group dynamics (Lynch and Rodwin, 1958; Carr and Lynch, 1968; Lynch, 1995). Lynch and Rodwin (1958) note that theory must be "concerned with how alternative physical arrangements facilitate or inhibit various individual and social objectives" (p.202). These scholars realized that individuals develop and learn from their interactions with the built environment. From this view, urban form functions as a medium that places people into spaces where they learn, develop, and form meaning. This project draws these ideas by examining the association between urban form, activity spaces, and NSPs.

This framework has been applied to theories surrounding the geographic distribution of crime. Activity spaces could play a large role in the formation of individual NSPs. In particular, Brantingham et al. (2017) have outlined several rules of human behavior that are worth

discussion. First, they stress the importance of the backcloth of the social and physical environment on all human activities- not just crime. Second, people form activity patterns within this backcloth based on the routine activities of their lives. These activity patterns are formed by where one lives, works, shops, goes to school, and the homes of friends and family. Third, as these patterns of activity are repeated they become regularized. While the focus of Brantingham et al. (2017) is on how this regularization forms crime templates that offenders can use to understand where and when to commit a crime, these activity patterns may also aid in the formation of perceptions of boundaries or "neighborhood templates".

In fact, these ideas have been applied to a broad range of outcomes such as diet and physical activities (Zenk et al., 2011: Smith et al., 2019), border effects based on natural, infrastructural, and administrative boundaries (Jin et al., 2021), and urban form (Sharmeen and Houston, 2020). At an individual level these patterns can have a great deal of stability as they become part of daily life. When thinking of a neighborhood, these activity patterns can differ between individuals in ways that create variation in these templates (or awareness spaces). When considering resident perceptions of neighborhood boundaries, one could argue that residents with different experiences and exposure to community contexts may vary in their views of neighborhood boundaries in significant ways. Further research is not only needed to explore the association of community contexts in resident NSPs, but also to examine and identify factors related to consensus in these perceptions among neighbors living on the same block.

Scholars have pushed to advance our understanding of neighborhood through the perceptions residents have about their community. These researchers have focused on understanding the meaning, dimensions, attachments, and boundaries that residents perceive (Ma, 2021; Colabianchi et al., 2017; Kyle & Chick, 2007). Many have come to the conclusion

that neighborhood perceptions are not a static shared characteristic, rather they develop through interaction with the social and physical world (Coulton et al., 2001; Sastry et al., 2002; Coulton, 2012; Burdick-Will, 2018) . Their findings are robust and should be troubling for many fields. When looking at neighborhood boundaries, residents are rarely in agreement with typical census measures. Beyond this, residents in close proximity to each other (i.e. on the same block) may vary widely in these perceptions (Pebley & Sastry, 2011; Coulton et al., 2013). Though this research highlights great progress in understanding the "what is a neighborhood" question, more research is needed to capture the full context of the physical and social factors leading towards residents' perceived size of neighborhood boundaries- that I refer to as "Neighborhood Spatial Perception" (NSP). NSPs represent the area that a resident identifies as their neighborhood, and can range in size from the block one lives on to the larger area surrounding the focal block on which they reside.

Taylor's (2015) theorizing on community criminology also helps to expand on the relationship between social and environmental contexts and individual outcomes. Though his focus is largely on creating a framework to understand how these factors relate to the occurrence of crime, his attention to meso and macro level processes can be applied towards an enhanced understanding of factors that help individuals formulate NSPs. Features of a street block, such as views on neighborhood cohesion, feelings of safety, and observed conditions operate within larger macro environmental contexts that help shape and form these experiences. Larger macro environments can be thought of in terms of the availability and number of business establishments and the employment opportunities that come with them, the presence of amenities and schools, and various participatory groups that may extend resident connections to larger networks within a city. At the same time, individual characteristics shape levels of exposure to

these larger than individual contexts. Finally, it is important to note that these elements can change as well. Businesses, organizations, residents, and their connections may move or change in ways that can alter NSPs. While some of these elements have been explored in prior research, no comprehensive study containing aspects surrounding these various dimensions was found in review of the literature. This project attempts to bridge these ideas into one comprehensive model of place that accounts for demographic, business and employment, aesthetic, and social features in explaining outcomes of NSPs, changing NSPs, and consensus in NSPS among neighbors.

As previously noted, these ideas have important implications for data aggregation techniques across multiple fields. Neighborhood effects scholars have attempted to capture the environmental and social effects of an area on measures of health, wellbeing, and crime. With widespread data easily available from the U.S. Census, scholars typically aggregate data into units of analysis based on census tracts or block groups. These geographic areas are typically comprised of a polygon based on underlying population density and other factors**.** How suitable these boundaries are poses a very profound question. Research has been fairly robust in showing that the size of a chosen aggregate unit (as well as the ways they can be combined) can have an influence on the associations found in statistical models. Openshaw (1984) highlights multiple ways to compute contiguous regions, resulting in the areal unit problem. Hipp (2007) highlights how the relationship between crime and disorder may change depending on the aggregate unit used. Taylor (2015) highlights the importance of spatial scale and multiple units of analyses. Scholars in this line of research have been critical of these boundaries and have shown the importance of carefully selecting these units based on the underlying theory of a given study. If the goal is to understand resident perceptions (in particular perceptions they have about their

neighborhoods), it again seems important to accurately capture the areas residents see as their neighborhoods.

Advancing aggregate techniques to account for features that contain people to a given area has been important to the development of criminological theory. Early work by Grannis (1998, 2005) proposed T-streets, a method considering neighborhood boundaries in terms of neighborhood transit organization. This method attempted to capture how the built environment (in terms of road networks) formed physical boundaries that were theorized to bound residents in an area. Hipp & Boessen (2013) proposed aggregating to a series of overlapping egohood boundaries. This technique was developed to account for the movement of people. Residents do not exist in a static area but tend to move around based on their activity patterns. Recently, this work has progressed to street level egohoods that account for road networks (Kim & Hipp, 2020). Others have used the technique of wombling to define boundaries based on underlying population distributions (see Legewie et al., 2018). While these studies have advanced our understanding of aggregation techniques beyond typical census boundaries, they were unable to incorporate meaningful measures of resident perceptions into these aggregate units of analyses. A measure of NSPs provides the opportunity to continue expanding research surrounding aggregate techniques in a contextually meaningful way. Given the importance of aggregate analysis to neighborhood effects research, the next logical step is to establish and test a method of aggregation that accounts for these perceptions. These contextually meaningful boundaries should more accurately capture neighborhoods as residents perceive them, which would lead to greater accuracy in the measurement of people with place.

The issues discussed thus far lead to three key research questions that form the basis for the following chapters:

1) What features of the contextual backcloth are significantly associated with resident neighborhood spatial perceptions, and how does the movement of people and changes in the social and physical environment over time contribute to changes in individual perceptions of neighborhood? Are the findings of qualitative or more narrowly scoped research validated when empirically examining this backcloth in a more complete way (i.e. all four dimensions rather than a single one)?
2) What social and environmental contextual factors predict differences in perceived neighborhood boundaries for people that live on the same block and what factors are associated with similar perceptions?
3) Would the use of a measure of neighborhood boundary perceptions to inform aggregation techniques increase the explanatory power of models focused on neighborhood effects over block or other static aggregate methods?

Outline of the Project

This dissertation project combines elements of community attachment and activity patterns theory to hypothesize and test key factors theoretically associated with resident perceptions of neighborhood boundaries (NSPs), and to identify the various contextual features that may be associated with differences in these perceptions among residents. Through an understanding of the development and context of neighborhood spatial perceptions, a new method for data aggregation is proposed and tested that accounts for perceived boundaries. Measuring neighborhoods as residents see them has the ability to enhance research focused on resident beliefs and attitudes about neighbors.

Chapter 2 begins by outlining and testing a theoretical framework focused on capturing key features of the social and physical environment that influence resident perceptions of the

spatial boundaries of their neighborhood. Additionally, models are created to examine the stability of neighborhood boundary perceptions at the individual level over time with a focus on contextual changes in the social and physical landscape. While the first series of analyses is primarily focused on examining the correlates of neighborhood spatial perceptions, chapter three of the paper shifts the focus towards identifying factors leading to differences in these perceptions among neighbors.

Chapter 3 begins by identifying problems that can arise when aggregating data to typical census measures and the ways that scholars have started to address these issues. This problem is then further complicated by research suggesting that residents can view their neighborhoods in different spatial terms. In order to understand these differences, block level standard deviations in neighborhood spatial perceptions are modeled in order to examine and identify features of the environmental backcloth associated with consensus or disagreement among neighborhood residents.

While the previous chapters focus exclusively on understanding contexts that drive boundary perceptions, it should be noted that they do not attempt to address the utility of different sized NSPs for specific neighborhood outcomes (i.e. this dissertation is not focused on NSPs as an independent variable). In other words, it is not argued whether smaller or larger boundaries result in overall "better" neighborhood outcomes. Instead, this project is focused on enhancing an understanding of NSPs as an important phenomena of communities that has the ability to further inform research from multiple fields of study surrounding neighborhood effects, crime, health, and well-being. In particular, scholars focused on survey data surrounding perceptions of neighbors should find NSPs to be of particular importance. By incorporating a measure of NSP into aggregate units, analyses surrounding survey data focused on resident

perceptions of attitudes and beliefs held by neighbors can gain further precision as they more accurately capture the people or places identified as a part of one's neighborhood.

A measure of average NSP reported by respondents may aid creating aggregate units that more accurately capture the area that residents identify as their neighborhoods. Chapter 4 of this dissertation proposes a new aggregate measure of neighborhood based on respondent reported NSPs. In particular, this chapter tests this unit against block and egohood level aggregations. The first series of analyses extends on chapter 3 by examining block level standard deviations in NSP across these aggregate units. Analyses then shift focus to block level cohesion (or block level variation in it) given the contexts within these varying boundaries, and whether the use of these NSP informed aggregate units enhances the explanatory power of these models over other standard or static aggregate approaches.

The final chapter reviews these results in connection to previous research and the implications of this research to a theory of place. Study limitations are then addressed, while also highlighting useful suggestions for future data collection projects. Finally, the paper addresses the contributions this research may offer other fields to aid in refining and reforming neighborhood effects research in perceptually meaningful ways.

Chapter 2: Contextualizing Neighborhood Perceptions

Determinants of Neighborhood Spatial Perceptions

A theoretical framework grounded in community attachment and activity patterns surrounding the built environment has significant implications for how we understand and test a variety of neighborhood effects. A discussion of literature from multiple fields is key to help explore these ideas. This combined research provides indications of specific neighborhood contextual factors that may vary in ways that are associated with different neighborhood boundary perceptions (NSPs), how these perceptions could vary in time, and how these perceptions are important to the advancement of aggregate techniques and theory. The current chapter is focused on identifying key findings from a variety of fields in a way that provides an enhanced framework of NSPs that motivates the research topics for the following chapters. As previously noted, NSPs represent the areas that residents perceive to be their neighborhood. They can include the block or street a respondent lives on, neighboring blocks, or a larger area. This project theorizes that the reported size of these boundaries (NSPs) is predicated on underlying contextual features that have been show in prior research to influence patterns of community attachment (factors that one associates with neighborhood), activity spaces (frequented places that tie people together), and interactions (social connections within a given area).

Research focused on neighborhood perceptions and definitions finds several key factors that residents draw from when considering their neighborhood. Notably, residents tend to see their neighborhood in both social and physical dimensions. Using survey data from Seattle, Guest & Lee (1984) examined the features people focused on when defining their neighborhood. Respondents were asked about the meaning of the word neighborhood. Open ended responses were coded through content analysis. About 75% of the sample described their neighborhood in

physical geographic terms, and about 60% focused on nearby people and social connections. Social cohesion (40%) and institutions (10%) were also mentioned as important factors by respondents. Lee & Campbell (1997) find similar results in a sample of Tennessee residents. About 87% of respondents considered their neighborhood in spatial/physical terms, while about 41% noted social connections. As people go about their lives, they navigate through physical features of the environment that organize social interactions. These interactions help individuals find meaning and form the basis for an understanding of community (Ohmer et al., 2019).

Built Environment

Physical features of the environment can serve as hard boundaries that inform neighborhood perceptions. An excellent example of this is the ability for highways to physically constrain people in ways that lead to smaller spatial perceptions of neighborhood boundaries. Research does in fact show that physical constraints tend to be associated with smaller reported NSP. In their quasi-experimental study, Lohmann and McMurran (2009) examine how the construction of a new freeway in Los Angeles influenced perceptions of those in the community. Before and after construction, they collected resident drawn maps from a random sample of those living near and far from the planned freeway. In the post test, those living near the freeway tended to report a reduction in their NSPs compared to those located away from it. Though the methods in this study are not ideal given that two random samples were used (rather than surveying the same people), it does provide evidence of the importance of hard physical boundaries on NSPs. Given that highway construction results in a significant reduction in NSPs, features like these seem to influence the way residents interact with the backcloth of their neighborhood. Residents contained by physical boundaries may feel encased by these built

features in a way that reduces the reported size of neighborhood spatial boundaries among neighbors.

Land use in the surrounding area provides various contexts for these perceptions to form. A block with parks, grocery stores, social services, and economic opportunity nearby could have varying influence on residents of a neighborhood. For some residents, manufacturing businesses within or nearby one's block might represent a hard boundary to the residential neighborhood which could be associated with smaller NSPs. Alternatively, these businesses could be associated with larger NSPs by offering opportunities to connect to others from outside the main focal neighborhood in ways that might expand one's connections beyond the immediate area. Residents without access to a range of nearby businesses would have to rely on a broader range of options outside of their community- further driving their exposure and interactions in ways leading to larger NSPs (Golledge & Stimson, 1999).

The number and types of businesses in an area can help provide residents with places to interact, procure resources, and form meaning and may serve as community anchors that inform NSPs. A broad range of amenities in a given area provides residents the opportunity to share experiences in ways that could promote similar views of neighborhood boundaries. One way to capture these features would be through quantifying their availability within a given buffer unit (i.e. a distal measure surrounding a given area). Alternatively, businesses can be aggregated to block and area levels to parse the effects of immediate access verse nearby establishments outside of the focal block. Recreational spaces, schools, grocery stores, and religious institutions may serve as anchors that inform perceptions of community as well as tie a community together in ways that help residents define their NSPs (Lee, 2020; Clopton and Finch, 2011; Sherman and Doussard, 2019: Colburn et al, 2020).

Distance to these anchor areas- the places people visit for groceries, school, social services, and worship- inform their awareness of the social (e.g. people) and physical (e.g. built) environment in ways that could be important to resident NSPs. If there is a lack of amenities in an area, some may have to travel longer distances to these locations. Those that travel longer distances may lead more spatially diverse lives, and may be more likely to report larger NSPs. While research by Sastry, Pebley, and Zonta, (2002) shows how several different individual level factors are associated with distance traveled to key locations, they were not focused on the association between these distances and NSP. At the individual level, areas characterized by more of these frequented locations may be associated with smaller NSPs. Additionally, the distribution in the types and number of these locations to a given area may be associated with consensus in NSP.

Population density may also have important implications for how residents view their neighborhood in spatial terms (NSPs). Dense housing may be associated with more similar spatial perceptions. As people become situated closer and closer to their neighbors, they may see their boundaries in more similar terms. High population density can place many residents in close proximity to each other. In some areas large housing units may take up a whole census block. Residents may identify with specific housing units which would result in smaller reported NSPs. Lower levels of population density could reflect more spatially diverse activity spaces which would be associated with larger NSPs. Pebley & Sastry (2009) note that it is important to consider housing density "because it eliminates the possibility that different neighborhood size perceptions simply reflect actual differences in neighborhoods" (p. 14). However, there is little evidence suggesting that these perceptions are completely absent of actual differences in neighborhoods. This dissertation argues that various patterns become formed through a built

environment that organize people in specific ways that are crucial to our understanding of neighborhood, boundaries, and perceptions, and that differences in neighborhood organization on a variety of levels does in fact influence neighborhood spatial perceptions in important ways to our research. Only by exploring and understanding the influence of the organization of neighborhoods can we inform and expand our contextual knowledge of communities and NSPs.

Social Fabric

As people go about their lives, they navigate through physical features of the environment that organize social interactions. These interactions help individuals find meaning and form the basis for their understanding of community (Stülpnagel et al., 2019; Ohmer et al., 2019). The social fabric of the environment may influence NSP in several ways. Using data from the Making Connections survey, Coulton et al. (2012) find that those with higher rates of community participation tend to view their neighborhoods as larger spaces. Participation in civic or community organizations may expose people to a broader view of their community or reinforce certain boundaries that they perceive. If one resident of a block participates in many of these activities, they may see their neighborhood in very different terms than those on the block who do not participate. While higher rates of participation in these groups at the individual level suggest enhanced community connections that are likely associated with larger reported NSPs, block level rates of participation could be associated with consensus in these views.

Collective efficacy has been shown to be an important measure of community perception that can inform an understanding of neighborhood attachment and definitions. This construct captures perceptions residents have surrounding resident cohesion and their ability to enact informal social control. Research has highlighted collective efficacy as an important construct in explaining the relationship between neighborhood structure and crime (Armstrong, 2015; Cohen

et al, 2008; Sampson & Raudenbush, 1997). While collective efficacy has been shown to play an important role in ameliorating the relationship between adverse community conditions and crime, it also has important implications for resident NSP. Coulton et al. (2012) find that neighborhoods characterized by higher levels of collective efficacy are associated with larger NSP. Higher levels of collective efficacy represent perceptions of stronger community bonds, knowledge, and attachment which may reduce differences in NSPs through shared visions of the larger neighborhood structure.

While research has focused on variation in average levels of collective efficacy across neighborhoods, other work has explored within neighborhood differences to responses for this measure. In their sample of London neighborhoods, Brunton-Smith et al. (2018) find significant differences in reported levels of neighborhood collective efficacy among residents. Roughly 13% of London neighborhoods had significantly lower levels of consensus on collective efficacy, and these neighborhoods were characterized by higher levels of victimization, fear, and risk avoidance. Neighborhood ethnic composition has also been shown to influence consensus of collective efficacy (Browning et al., 2016; Brunton-Smith et al., 2018). Hipp et. al. (2018) examined the relationship between a measure of social distance and various components of collective efficacy (cohesion, expectations of informal social control, and neighboring). Their results show that greater levels of general social distance are associated with more disagreement between neighbors. Given these differences, individual perceptions of the components of collective efficacy should be examined in relation to NSP. While the built environment can provide spaces for community members to interact and form meaning, perceptions of the social connections within a neighborhood can differ between individuals in ways that inform perceived boundaries. Individuals that perceive stronger patterns of cohesion and intervention may see their

neighborhood as large spaces while those that do not see their neighborhoods bounded to a smaller spatial range.

Though collective efficacy captures perceptions of neighbors' cohesion and willingness to intervene, research surrounding this construct tends to take for granted the people and spaces that people consider when thinking about their neighborhood and their neighbors. This shortcoming is further complicated when residents can form different NSPs. While an interviewer may try to mitigate this issue by priming residents to focus on a specific spatial unit, an argument can be made that respondents still base these perceptions through experience and knowledge rooted in NSPs and the physical/social features contained within them. This may be problematic for block and tract level analyses that implicitly hold "neighborhoods" at a consistent aggregate unit, and reinforces the need for research that accounts for these perceptions in aggregate research.

Although collective efficacy captures community bonds and knowledge, fear of walking in one's neighborhood may undermine these perceptions in ways that inform NSP. Scarborough et al. (2010) highlight the association between fear and social relationships. This study of Kansas City neighborhoods found that social cohesion has a negative effect on fear, while physical and social disorder are associated with increased levels. Research highlights that there is an important association between fear and the social and physical features of the environment (Kilewer, 2013). Though Taylor's (2002) study is focused on fear as the outcome, he notes that fear should be considered through the constructs of "attachment to place; sense of community; residential satisfaction, and social dynamics" (p. 786). Fear of walking in one's neighborhood may be associated with smaller NSPs because it limits activity spaces and interactions within a block.

Individual level variation in perceptions of neighborhood safety could be associated with different levels of neighborhood exposure and experiences, leading to less consensus in NSP.

Social and physical disorder may also influence NSP through the way it is experienced by residents. Research by Hipp (2010) finds bias in perceived disorder among certain members of the population. Given these different levels of bias, some may be more influenced by their perception of disorder. This suggests that at the block level, people engaging in deviant behavior (or the remnants they leave) may have differing influence on individual NSP leading to greater levels of variation. While Coulton et al. (2012) find physical disorder is not significantly associated with individual NSP, high levels of block level disorder may have a differential influence on these perceptions. Although disorder may influence one resident of a block, others may not experience these effects. It is possible that newer residents have not been exposed to homelessness, drug use, prostitution, vandalism, or other factors that characterize disorder in a given area. This has important implications for how residents perceive the activity spaces from which they develop NSPs. Examining the relation between levels of disorder and differences in the perceptions provides the opportunity to advance an understanding of how meaningful measures of disorder are to consensus about neighborhood bounds (NSPs).

Research has also found that children influence NSP, often leading to perceptions of neighborhood that encompass schools. Research by Burdick-Will (2018) examined the Making Connections survey, and found that schools played a significant role in the size of resident-drawn neighborhood boundaries. Their results show that those with a school in their neighborhood tend to report living in a more cohesive neighborhood, and also tend to shift their perceptions towards the schools local children attend. This has important implications for understanding anchors that can inform individual and block level NSP. Some schools may also provide various opportunities

for neighbors to come together and meet others in the immediate area, possibly contributing to expanding views of neighborhood boundaries.

Education has been shown to have one of the strongest associations with NSP. Those with higher levels of education tend to have larger spatial boundary perceptions. By analyzing resident drawn maps, Coulton et al. (2012) find that those with a high school degree reported neighborhood boundaries about 8% larger than those without a degree. In their analysis of LAFANS data, Sastry, Pebley, & Zonta (2002) find that the education effect increases for each degree earned. Those reporting a graduate degree generally reported the largest NSPs. Residents with a degree tend to have more money, access to independent transportation, and work further from home. These factors suggest a more spatially diverse activity pattern that exposes them to a larger area than those without a degree. Given the strength of these findings, the number of school years completed should be associated with larger NSPs. Those with higher levels of education should see their neighborhoods in larger spatial terms. Variation in education may contribute to less consensus in NSPs by exposing people to a different contexts surrounding ones community.

A changing social and physical landscape

Perhaps further complicating our understanding of these processes is the fact that the backcloth of the environment is not a static feature of neighborhoods or community. In fact, scholars have addressed the changing nature of community in relation to a broad range of issues. While the previous literature has primarily focused on social and structural factors related to NSP, attention must also be paid to how these features can change in important ways to residents.

The built environment, activity patterns, and social interactions can change over time. While there may be some level of individual stability in patterns of activity and social relations, contextual factors might change in ways that shift resident perceptions of community. Schools can be closed, demolition can take place, new development can occur, and neighbors could move or pass away. A new business may open and serve as an anchor for the community, jobs can change, and an education can be advanced. Exposure to these contexts can shift and change over time in ways that can alter community perceptions. People may move to a new neighborhood, a nearby block, or even a different city. Given that neighborhood perceptions emerge through one's interaction with the social and physical environment, these perceptions may be fluid over time. This raises an interesting question- How do changes in the social and physical environment and the movement of people contribute to changes in resident NSP? While the first series of analyses in chapter two are focused on explaining correlates of NSP, this second collection of models explored in this chapter are centered on understanding the stability of NSP at the individual level over time.

Theorizing change

Some features of the built environment may not experience much change over time. While there may be general renovations to infrastructure (road work, filling potholes, building remodeling), major changes in developed areas may not occur frequently enough to capture changes in the built world. At the same time, when these changes occur, they tend to have a significant influence on perceptions of community boundaries. Hard boundaries like rivers, freeways, and industrial areas contain people in physical space that can shape neighborhood perceptions in ways that decrease NSP. The development of freeways or industrial areas can contain people in spaces that shift these perspectives (Lohmann and McMurran, 2009). The role

of change in these environmental contexts to resident perceived neighborhood boundaries has not been fully explored. While some characteristics of the built environment may remain fairly stable over time, the form and function of them can change in ways that can be informative to understanding resident perceptions of community.

The distribution and use of various institutions and businesses can connect and expose residents to different people and places (Sastry et al., 2002; Coulton et al. 2013: & Burdick-Will, 2018). Residents tend to stretch their perceptions of neighborhood boundaries towards the schools or services local children take part in. While this is generally associated with larger NSP for residents due to increased exposure to larger community contexts (compared to those without children), over time these schools and services change in ways that could influence neighborhood perceptions. A child could attend a preschool a half mile or more away from their home and advance to a grade school on a nearby block. In this case NSP could decrease as the preschool is no longer frequented by the parent. Multiple children of different ages could be attending different schools further stretching a parent's NSP. Lastly, little is known about how long these effects persist. Difference models can further our understanding of the relationship between NSP and schools by examining these changes over time. Perceptions may change significantly as schools are opened or closed within or nearby a community.

Some resources provided by local businesses can be moved to new areas. These resources are associated with NSP (Colabianchi et al., 2014) and changes in their availability could alter neighborhood perceptions. For example, schools, parks, libraries, and stores can serve as community anchors that inform NSP and foster community attachment. Businesses could close or open leading to differences in activity patterns based on employment opportunity or the disbursement of goods and services. While changes in the immediate area may have the strongest

association with NSP, it also seems important to account for changes that are further away from the focal area that a resident is surrounded by. To further explore the role of changes in area businesses in NSP, change measures in business availability can be calculated at the egohood level to empirically examine changes within the larger area.

Participation in local or civic groups has been tied to larger NSP. Participation in these groups may provide stronger community bonds leading towards more knowledge of community contexts. As people build connections through neighborhood block meetings, political organizations, or other local organizations, they may develop a more advanced contextual understanding of their environment, social relations, and needs of the community. Increased levels of participation in these activities should result in larger perceptions of neighborhood boundaries. Higher levels of education are associated with larger NSP. Those with higher levels of education generally have more resources (transportation, leisure, participation in local or city groups, etc.) and greater exposure to the greater contextual area they live in. Increases in education should be associated with increased NSP.

Social connections and bonds can shift over time in ways that inform NSP. Longitudinal research focused on neighborhood collective efficacy show some change over time (Hipp and Wickes, 2017). Differences have also been found at the individual level (Hardyns et al., 2018). Chouhy and Unnever (2020) describe individual level collective efficacy as "a cognitive landscape- a way of seeing the world- that has the potential to affect individual behavior that is distinct from macro-level collective efficacy" (p. 2). Changes in this landscape may reflect differences in how people see, experience, connect with, or understand their neighborhood and may have important implications for understanding changes in NSP. An increase in individual

level perceptions of the components of collective efficacy should be associated with larger spatial boundary perceptions.

Perceptions of neighborhood safety could also be associated with one's NSP. While some may feel that safety issues prevent their exposure to the neighborhood (resulting in smaller perceptions of NSP and lower levels of community attachment) others may extend their NSP beyond block boundaries due to the connections they have within the surrounding area. This is difficult to tease apart but warrants further examination. Decreased perceptions of safety should then result in some levels of variation in NSP- most likely in the form of smaller resident boundary perceptions. A model focused on change seems best suited to explore the relation between safety, disorder, social connections, and built environment to how one perceives their neighborhood.

The following analyses attempt to answer the first set of research questions posed in the introduction of this dissertation; what features of the contextual backcloth are significantly associated with resident neighborhood spatial perceptions, and how does the movement of people and changes in the social and physical environment over time contribute to changes in individual perceptions of neighborhood? Are the findings of qualitative or more narrowly scoped research validated when empirically examining this backcloth in a more complete way (i.e. all four dimensions rather than a single one)?

Data

Data sources and variables are fairly similar for each chapter of this project, though there are some key and meaningful differences in the analyses. The focus of this first chapter is to contextualize and model the various features of the social and physical environment raised

throughout the previously cited literature in order to understand their role in individual NSPs. While a broad range of research exists surrounding these features, it tends to be more qualitative in nature with a specific focus on certain neighborhood aspects. The following data and analyses attempts to capture and model these elements together in a cohesive way to enhance an understanding of community context and resident NSP.

The first set of analyses focus on cross sectional contextual data and their association with resident perceptions. The second series of analyses is focused on longitudinal analyses meant to address changing contexts surrounding these perceptions, though it should be noted that there are some data constraints that limit the extent of this modeling.

The Los Angeles Family and Neighborhood Survey (LAFANS) is a unique data set to explore neighborhood boundary perceptions. First, the version of restricted data (V2.5) used for analyses allow the incorporation of other block level data sources. Data sets like the Project on Human Development in Chicago Neighborhoods have larger aggregate units less suitable for the goals of this research. Second, the survey captures important aspects of respondent social bonds, activity spaces, and community involvement. Community attachment scholars and activity patterns theory would suggest that this is key information in understanding how residents form meaning in their daily lives, and may have important implications for how residents perceive their neighborhood. Differences in these patterns could lead to very different perceptions of neighborhood for respondents in the study.

Third, residents were interviewed at two time points which allow for analyses focused on changes in social/environmental contexts over time. Wave 1 was collected from 2000-2002 and wave 2 was collected from 2006-2008 (see Peterson, n.d., a & Peterson et al., 2011). While theory suggests that social and physical environmental features and frequented places will

influence neighborhood perceptions, analyses focused on changes in this environment will fill a large gap in the literature and has potential to advance an understanding of how changing context can shape the contours of neighborhood. While some built features may remain stable in developed areas over time, other features may change more rapidly. Businesses may be more likely to experience rapid change, demolitions and development can occur, and changes to a given area may help redefine NSPs in important ways. Block level data allow for an exploration of these changes and the role they play in reformulating residents' spatial boundary perceptions.

Finally, LAFANS data can be used to craft aggregate units based on resident perceptions of neighborhood size. This has important implications to research focused on perceptive measures of a community and its residents. By defining neighborhood boundaries based on resident perceptions, we can create more accurate units of aggregation that account for average NSPs among residents living on the same block (the core of my third chapter). Data can then be aggregated to meaningful boundaries that can be compared to other aggregate units. Survey data that captures these perceptions is crucial towards empirically examining their utility in exploring outcomes focused on neighborhood sentiment. It allows scholars to account for who one generally considers to be a neighbor. By informing aggregate techniques using a measure of NSP, models can be advanced by accounting for the elements and people contained within them. By capturing neighborhoods as residents see them, the explanatory power of neighborhood effects models should be increased. For these reasons, this project uses data from the Los Angeles Family and Neighborhood Survey in order to explore a variety of factors theorized to influence individual level NSP (and changes over time), block level variance in these perceptions, and the utility of resident perceived neighborhood size to inform levels of aggregation.

LA FANS was designed to examine neighborhood effects on the mental and physical health of adults and their children, and to explore this influence on adolescent development and well-being (Pebley & Sastry, 2011). The survey was designed based on a stratified sample of 65 census tracts in Los Angeles County. Within each tract, households were randomly selected from 422 census blocks. This resulted in a sample of 6,747 respondents from 3,085 households. This includes 3,557 randomly selected adults. While data restrictions limit the details that can be shared on how the final sample was derived, there were a total of 350 blocks (3,426 respondents) included in the final sample used for analyses. This represents the majority of blocks that could possibly be combined to the adult module, with the limited loss of identifiers due to other factors.

Along with the adult survey, this study will also incorporate measures from the Social Observational (SO) module (see Peterson, n.d., b) These are provided by LA FANS, and can be merged to the adult survey via unique block identifiers. Social observational data contains information on neighborhood disorder collected on the 422 Census blocks by trained observers, with multiple observations of each block face. Observers noted the presence of physical (litter, abandoned cars, etc.) and social (prostitutes, drug dealers, etc.) disorder.

Dependent Variables

The dependent variable for analyses (NSP) is based on perceived neighborhood size. In the LAFANS adult questionnaire, respondents were asked; when talking about neighborhood is it, (1) the block or street you live on? (2) Several blocks or streets in each direction? (3) Area within a 15-minute walk? (4) Area larger than a 15-minute walk? While some might question the different aspects of space/time in this question, ordered outcomes often have some uncertainty surrounding the difference between categories. While this may result in some overall error, it does provide a fairly clear measure capturing the spatial boundary perceptions residents have of

their neighborhood. It should be noted that emancipated minors or those selected only as primary caregivers only did not complete the adult module of the LAFANS questionnaire, which results in a 2,597 responses on this outcome. LAFANS contained various modules for multiple people within a household. These included a child module and assessment (assigned to children), a household module (to a household respondent), a parent module (to parents), a primary caregiver module (to the primary care giver), and the adult module (assigned to randomly selected adults and primary care givers/randomly selected adults). If there were siblings in the household, an additional sibling module was assigned to them.

Independent Variables

The LAFANS questionnaire also captures several important social indicators for analysis. Neighborhood collective efficacy captures perceptions of resident social cohesion and informal social control that can be actualized as a form of social capital to ameliorate the effects of adverse neighborhood conditions. Higher perceived levels of cohesion or informal control at the individual level may suggest stronger community bonds and contextual understanding of one's area. Perceptions of cohesion and informal social control are drawn from the adult survey module, and measured by the following items; (1) would you consider this to be a close-knit neighborhood, (2) are there adults in the neighborhood that kids can look up to, (3) are people in the neighborhood willing to help their neighbors, (4) your neighbors generally don't get along (reverse coded), (5) people don't share the same values (reverse coded), (6) people in neighborhood can be trusted, (7) parents in neighborhood know kids friends, (8) adults in neighborhood know local kids, (9) parents in neighborhood know each other, (10) neighbors would do something if kids hang out and cause trouble, (11) there are adults in neighborhood that watch out that kids are safe, (12) neighbors would do something if they see kids doing

graffiti, (13) would scold a kid if showing disrespect. Response options for these items range from 1= very likely to 5= very unlikely. Refusals (-9) and unsure (3) were recoded to missing, and the response was reverse coded to reflect positive views of neighbors and their perceptions of willingness to intervene with informal social control.. The first 9 items represent elements of social cohesion, while items 10-13 represent informal social control. Values for social cohesion and informal control at the individual level were generated by summing each item underlying the construct. It is expected that higher levels of informal social control and cohesion will be associated with larger NSPs as respondents that perceive more cohesion and informal social control may have stronger connections within and understanding of the larger area.

LAFANS also asked residents if they participate in various community organizations. This includes: (1) neighborhood or block meeting, (2) business or civic group, (3) nationality or ethnic pride club, (4) local or state political organization, (5) volunteered for a local organization, (6) veterans groups, (7) labor unions, (8) art discussion group, or (9) fraternity or sorority. This dichotomous data is combined into a summated value to gauge overall individual participation in these various groups. While prior research has found that participation in these groups is associated with larger NSP through their ability to connect residents in an area, these studies usually omit key social data (like cohesion) that may operate in a similar fashion. It has also been largely qualitative in nature and warrants further empirical validation using a more complete framework to see if this remains an important relationship given other contextual factors.

Other key independent variables drawn from the adult survey include education, age, race/ethnicity, gender, neighborhood safety, and whether the respondent owns a car. LAFANS asks respondents “how safe is it to walk alone” in their neighborhoods, with responses ranging from (1) completely safe, (2) fairly safe, (3) somewhat dangerous, and (4) completely dangerous.

These were reverse coded to capture feelings of safety. Respondents who feel safe walking alone in their neighborhoods should have larger NSPs because they may be more likely to walk around the local area, get to know residents, and expand their connections to surrounding areas. Respondent education was collected by asking how many years of education a respondent currently has had. This ranges from (1) grade 1 to (19) those with advanced education and graduate degrees. Age of respondent is also included, ranging from (15) to (99) in 5 year increments. Car ownership and whether the respondent is female are measured as dichotomous variables.

Data on social and physical disorder are included in the Social Observational dataset linked to LAFANS. This was derived from interviewer observations of face blocks contained within the sample. Trained observers noted the presence (coded as 0 or 1) of (1) abandoned cars, (2) trash or junk, (3) broken glass, (4) drug paraphernalia, (5) empty beer or liquor bottles, (6) cigarette butts or packs, (7) graffiti, (8) painted over graffiti, (9) burned or abandoned homes, and (10) damaged or exterior walls. They also recorded whether they were told that (11) there was gang activity, (12) prostitutes, (13) homeless people, (14) drug dealers, (15) or drunks on the block, and if they directly observed (17) adults loitering or hanging out, (18) prostitutes, (19) homeless people, (20) drug dealers, (21) people drinking, (22) intoxicated people, or (23) heard loud music on the block. Each observation of a given face block was averaged for each observer. These measures were then aggregated as block level averages. Higher average levels of disorder might limit someone's exposure to the neighborhood leading towards smaller perceptions of spatial boundaries. Loud music, people drinking, and hanging out on the street *could* represent strong community bonds. Respondents who engage in this behavior may be more likely to identify with the street or block they live on.

This dataset also provides information on the amount of traffic lanes (ranging from 0 to 9), flow of traffic (ranging from 1 very light to 5 very heavy), availability of public transportation (dichotomous), the presence and amount of trees on a block (ranging from1 none 4 many), and a general rating of overall building conditions (ranging from 1very poor to 5 excellent). Each of these features were separately averaged and aggregated to the block level from face block observations conducted by multiple interviewers. Traffic lanes and flow can become hard boundaries to residents which may be associated with smaller NSPs. Public transportation could connect people to a larger area suggesting higher NSPs, and the presence of trees and better building conditions represent aesthetics of an area that can separate a block from other areas resulting in smaller NSPs. Using census shape data and ArcGIS processes, each block was also categorized by its distance from major highways and roads. This produced data on whether the block was very close (.1 mile) to very far (1 mile) from a major roadway. Respondents located closer to major roads may be contained to an area by them which would result in smaller NSPs.

Data were also drawn from the 2000 US Census. This includes the percent black, Hispanic, Asian, and other. For the purpose of these models, the percentage white is used as the reference category. Additionally, population density (logged), the Herfindahl index for ethnic heterogeneity, and percent home ownership are also included from census data. These measures allow models to control for underlying block population characteristics in which a respondent resides.

Finally, data from RefUSA are used to capture a variety of business that are theorized to influence individual NSP. This provides information on the number of schools, churches or other religious institutions, grocery stores, general merchandise stores, recreational areas, social

service organizations, manufacturing jobs, and retail jobs. These businesses were captured in 3 ways. First, the amount of businesses (or employees) are joined to each block giving a total count of each type for each block in LA County. Second, each business surrounding a block (but not including the block itself) within a .5 mile radius are weighted using an inverse distance decay and aggregated to the .5 mile buffer. This provides greater weight to businesses closer to the focal block. Finally, business data is aggregated to .5 mile egohoods to provide an overall picture of local businesses in the general area in which one resides.

Analyses

Data were analyzed using Stata 18 software. Stata provides Structural Equation Modeling (SEM) processes that allow for handling missing data through a maximum likelihood function and also allow for clustering options to account for non-independent observations such as people being nested in blocks. SEM analyses were selected because of these features. The first set of analyses is used to produce five models focused on (1) block demographics controls, (2) Block business and employee counts (3) block business and employee counts using an inverse distance decay for a .5 mile area around a block, (4) block level conditions from the NOBs dataset, and (5) key individual information derived from the LAFANS survey.

Model 1 is shown in the following equation:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + e$$

Where $\widehat{nsp}$ is the predicted level of neighborhood spatial perception: $\beta_1 \boldsymbol{BControls}$ captures a series of block level control variables with error term *e.* Model 2 incorporates block level business features as shown below:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + e$$

The third model adds inverse distance decay business measures for the .5 mile area surrounding a block:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_3 \boldsymbol{DecayBiz} + e$$

Additional information on block characteristics are included in the fourth model:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_3 \boldsymbol{DecayBiz} + \beta_4 \boldsymbol{BChars} + e$$

And the final model includes key individual variables from the adult module of LAFANS:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_3 \boldsymbol{DecayBiz} + \beta_4 \boldsymbol{BChars} + \beta_5 \boldsymbol{IndVar} + e$$

While the previous set of models (b) include block and inverse distance decay measures in analyses, the following models replace these measures with egohood levels data. This attempts to capture average jobs and businesses throughout a .5 mile area with the focal block included. Changing these measures allows for an exploration of how the spatial modeling aspects of aggregate data influence the strength and significance of results. That is to ask what matters more, the block, features surrounding the block, or the overall area in which one resides. Changing these parameters results in modifications leading to the following 4 equations:

Model 1 is shown in the following equation:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + e$$

Where $\widehat{nsp}$ is the predicted level of neighborhood spatial perception: $\beta_1 \boldsymbol{BControls}$ captures a series of block level control variables with error term *e*. This first model is identical to the previous analyses. Model 2 incorporates egohood level business features as shown below:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{EgoBiz} + e$$

Additional information on block characteristics are included in the third model:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{EgoBiz} + \beta_4 \boldsymbol{BChars} + e$$

And the final model includes key individual variables from the adult module of LAFANS:

$$\widehat{nsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{EgoBiz} + \beta_4 \boldsymbol{BChars} + \beta_5 \boldsymbol{IndVar} + \text{e}$$

A combination of features related to community attachment and activity patterns can provide unique insight into how the larger contextual environment shapes resident boundary perceptions in meaningful ways. While scholars have attempted to understand the relation between context and NSP, much of this work was qualitative in nature or more narrowly focused. Prior research was unable to account for features such as the aesthetics of an area and business distributions, which may significantly influence these perceptions in important ways. Many of the key variables included here have been found to influence levels of attachment to a neighborhood, but have not been explored in terms of spatial boundaries to these neighborhoods (NSPs). Though prior research provides much needed insight on how these features may be associated with these perceptions, these indicators have not been compiled and tested in a comprehensive manor. The following series of models attempts to capture a more complete picture of NSPs in relation to four key dimensions of neighborhood backcloth that seem to be represented in the literature.

This project expands on previous research by empirically testing how the contextual backcloth of the environment shapes the contours of neighborhood in ways associated with NSPs. Studies that limit analyses to focus on specific dimensions of neighborhood backcloth could suffer from omitted variable bias. By building a more complete model of neighborhood backcloth, we can gain greater insight into the importance of various elements within each of these dimensions. The inclusion of additional dimensions of contextual backcloth should also help to improve the explanatory power of models. Exploring the features contained within each of these dimensions that are associated with these perceptions is the first step towards developing more accurate modeling techniques that accurately capture contextual effects on NSPs. The

following analyses tests a variety of hypothesis surrounding the theorized relationships discussed thus far. A list of the hypotheses can be seen below.

1. Race and ethnicity will be associated with smaller NSPs
2. Home ownership will be associated with smaller NSPs
3. Ethnic heterogeneity and population density will be associated with smaller NSPs
4. Schools will be associated with larger NSPs
5. Places of worship will be associated with larger NSPs
6. Grocery and retail stores will be associated with smaller NSPs
7. Social services will be associated with smaller NSPs
8. Recreational spaces will be associated with larger NSPs
9. Manufacturing and retail jobs will be associated with smaller NSPs
10. Major roads, traffic lanes, and traffic flow will be associated with smaller NSPs
11. Public transportation will be associated with larger NSPs
12. Trees will be associated with smaller NSPs
13. Building conditions will be associated with larger NSPs
14. Disorder will be associated with smaller NSPs
15. Women will be associated with larger NSPs
16. Age will be associated with smaller NSPs
17. Income and education will be associated with larger NSPs
18. Participation in local or civic groups will be associated with larger NSPs
19. Cohesion will be associated with larger NSPs
20. Informal control will be associated with larger NSPs
21. Safety will be associated with larger NSPs
22. Owning a car will be associated with larger NSPs

Results

Descriptive statistics for the sample are included in Table 1. During the disclosure review process, reviewers asked that minimum and maximum values were removed from descriptive tables. The mean for the dependent variable (neighborhood spatial perceptions) in the sampled data is ~2.15, which corresponds to a neighborhood size slightly larger than "several blocks or streets in each direction" with a standard deviation close to 1. This shows that there is a fair amount of variation in the outcome, with the majority of respondents selecting either (1) the block or street they live on, (2) several blocks or streets in either direction, or (3) an area larger than a 15 minute walk. The descriptive summary also provides means and standard deviations

for the independent variables. The discrepancy in the number of observations for the outcome variable is due to skip patterns in the adult model as noted in the data section (see table 2 for more information on the outcome measure).

Table 1: Descriptive Statistics for Individual Neighborhood Spatial Perception Models (Wave 1)

Variable	N	Mean	Standard Deviation
Individual Spatial Perceptions	2,597	2.14	1.05
% Asian	3,358	8.81	12.52
% Black	3,358	7.80	11.86
% Hispanic	3,358	58.80	32.15
% Other	3,358	2.45	2.82
Ethnic Heterogeneity	3,358	0.38	0.21
% Housing Owner	3,358	41.75	32.55
Log Population Density	3,426	7.40	1.37
Schools	3,557	0.03	0.20
Religious	3,557	0.18	0.54
Grocers	3,557	0.06	0.26
General Retail	3,557	0.05	0.21
Recreation	3,557	0.02	0.16
Social Services	3,557	0.13	0.58
Manufacturing Jobs	3,557	4.57	29.50
Retail Jobs	3,557	4.83	37.98
(IDD) Schools	3,557	2.93	2.27
(IDD) Religious	3,557	9.65	10.85
(IDD) Grocers	3,557	4.99	6.00
(IDD) General Retail	3,557	3.07	4.57
(IDD) Recreation	3,557	1.36	2.03
(IDD) Social Services	3,557	5.90	8.80
(IDD) Manufacturing Jobs	3,557	698.19	1429.30
(IDD) Retail Jobs	3,557	990.60	1082.20
(Ego) Schools	3,557	3.04	2.21
(Ego) Religious	3,557	9.78	10.55
(Ego) Grocers	3,557	4.96	5.77
(Ego) General Retail	3,557	3.19	4.47
(Ego) Manufacturing Jobs	3,557	206.49	408.38
(Ego) Recreation	3,557	1.35	2.04
(Ego) Social Services	3,557	6.14	9.08
(Ego) Retail Jobs	3,557	294.77	331.55
Average Traffic Lanes	3,539	2.49	0.56
Average Traffic Flow	3,539	2.21	0.68
Average Public Transit	3,539	0.10	0.14
Average Trees	3,539	2.65	0.61

Average Building Condition	3,539	3.41	0.64
Average Disorder	3,539	1.70	0.40
Road Distance	3,557	2.64	1.82
Hispanic Respondent	3,521	0.58	0.49
Black Respondent	3,521	0.07	0.26
Asian Respondent	3,521	0.10	0.30
Other Respondent	3,521	0.01	0.10
Female	3,557	0.69	0.46
Age	3,553	38.81	13.52
Income	3,455	4.42	3.19
Education	3,500	11.92	4.51
Cohesion Total	3,557	18.51	12.33
Informal Control Total	3,557	6.00	4.23
Participation	3,557	0.44	1.02
Safety	2,582	2.80	0.81
Car Ownership	3,557	0.35	0.48

Table 2: Wave 1: When talking about your neighborhood is it:

Response	Frequency	Percent
(1) The block or street you live on	959	37
(2) Several blocks or streets in either direction	620	24
(3) Area within a 15-minute walk	691	27
(4) Area larger than a 15-minute walk	327	12
Total	2,597	100

Table 3 displays the results of these analyses. Model 1 highlight the relationship between block level individual controls and individual NSP. Significant coefficients have been highlighted in red (negative association) and green (positive association) to highlight directionality. Here we see significant negative effects for racial/ethnic minority groups. Compared to neighborhoods with a higher percentage of whites, significant coefficients for percent Asian, percent black, and percent Hispanic suggest respondents in neighborhoods characterized by a higher percentage of these groups tend to see their neighborhood in smaller spatial terms. The percentage of home ownership in a block is also significant and negative,

showing that higher percentages of home ownership in a respondent's block tends to be associated with smaller spatial perceptions. These results remain fairly consistent for all models in both series of analyses.

Model 2(b) includes business data for each respondent's block. General merchandise retail approaches significance ($p<.1$) and has a negative coefficient suggesting that the availability of stores in ones block is associated with smaller NSPs. Overall retail employment and manufacturing employment also have a significant negative association with NSP. Residents in blocks characterized by more employment opportunities tend to see their neighborhoods as smaller places than those without these job opportunities. While not significant, the coefficient for schools is positive, which is the expected direction of the relationship. The control variables from the previous model remain relatively consistent.

The third model (3b) adds inverse distance decay measures for businesses in the .5 mile area surrounding a block. Block level general merchandise retail loses significance when inverse distance decay measures are included, and recreational spaces approaches significance ($p<.1$) with a positive coefficient suggesting that blocks with recreational spaces are associated with an increase in respondent NSPs. The only significant inverse distance decay measure is for social service organizations. Blocks characterized by higher levels of social service organizations in the surrounding area are associated with smaller resident reported NSPs.

The addition of block level feature characteristics to model 4(b) results in few changes to the coefficients found in the previous model. Aside from slight changes in significance levels, the inverse distance decay measure for religious organizations is now significant and positive. Additionally, inverse distance decay measures now approach significance for general merchandise retail (negative association) and retail employees (positive association). Social

service organizations remain significant and in the negative direction. When looking at block level feature characteristics, the average number of traffic lanes in a block and average block building condition are positive and approach significance. The average amount of trees also approaches significance and is associated with smaller reported NSPs. Finally, block average traffic flow (-.16) is significantly associated with smaller NSPs among the sampled respondents.

The final model (5b) includes key individual level variables of particular interest to the study of community attachment and NSP. Three individual level predictors approach significance. While controlling for block level racial/ethnic composition, we see that black and other race respondents tend to see their neighborhoods in larger spatial terms. There is also a negative association between reported levels of neighborhood safety and NSP. Asian respondents have a significant negative coefficient suggesting that Asian respondents view their neighborhoods as smaller spaces. Significant positive coefficients can be seen for participation in local groups and education. Those reporting more participation or higher levels of education are associated with larger reported NSPs. In comparison to the previous model, average building conditions and inverse decay measures for general merchandise retail and retail jobs no longer approach significance. Block level manufacturing jobs, the effects of average lanes surrounding a block, and the block average building condition also no longer approach significance.

Table 3: Effects of Physical and Social Features on Individual Neighborhood Spatial Perceptions (Wave 1)

	Model 1	Model 2	Model 3	Model 4	Model 2 (b)	Model 3 (b)	Model 4 (b)	Model 5 (b)
Block Chars								
% Asian	-.005*	-.005*	-.005*	-.002	-.004+	-.005*	-.004+	-.002
% Black	-.007*	-.010**	-.009*	-.010**	-.007*	-.009**	-.009**	-.010**
% Hispanic	-.007***	-.008***	-.007***	-.004**	-.007***	-.008***	-.007***	-.005***
% Other	-.014	-.012	-.007	-.006	-.011	-.010	-.006	-.006
% Owner	-.002*	-.003**	-.004***	-.003**	-.003*	-.003**	-.004***	-.004**
Ethnic Heterogeneity	-.069	-.047	-.123	-.109	-.083	-.053	-.140	-.120
Population Density (log)	.027	.036	.015	-.004	.018	.026	.013	-.009
Businesses **(Block)**								

Schools					.102	.132	.110	.101
Religious					-.021	-.020	-.001	.002
Groceries					-.086	-.052	-.039	-.058
Retail					-.141+	-.090	-.041	-.023
Social Services					-.001	.015	.013	.004
Recreational					.136	.138+	.214*	.197*
Manufacturing Jobs					-.002**	-.002**	-.001+	.004
Retail Jobs					-.0004*	-.001*	-.001**	-.001*
***Businesses* (IDD)**								
Schools						-.004	-.011	-.014
Religious						.005	.008**	.007*
Groceries						.001	.009	.011
Retail						-.013	-.017+	-.015
Social Services						-.007*	-.009*	-.006+
Recreational						-.004	-.009	-.007
Manufacturing Jobs						.0000	.0000	.0000
Retail Jobs						.0000	.0001+	.0001
***Businesses* (Egohood)**								
Schools		-.010	-.029+	-.021*				
Religious		.006+	.009*	.007*				
Groceries		-.003	.007	.010				
Retail		-.009	-.012	-.011				
Social Services		-.006+	-.006+	-.004				
Recreational		-.005	-.003	-.001				
Manufacturing Jobs		.0001	.0001	.0001				
Retail Jobs		-.0000	.0000	.0000				
Block Features								
Traffic Lanes			.084	.081			.109+	.098
Traffic Flow			-.143*	-.130*			-.164**	-.145*
Public Transit			.216	.156			.247	.198
Trees			-.068	-.076+			-.084+	-.089*
Building Conditions			.122+	.097			.129+	.096
Disorder			-.106	-.086			-.089	-.074
Major Roads			.004	.006			-.0003	-.002
Respondent Features								
Hispanic				-.104				-.101
Black				.148				.166+
Asian				-.227*				-.214*
Other				.395+				.381+
Female				.062				.062
Age				-.001				-.001
Income				-.006				-.005
Education				.025***				.024***
Participation				.063**				.062**
Cohesion				.002				.003
Informal Control				.008				.007

Safety				-.057+				-.059+
Owns Car				.052				.054
N	3,426	3,426	3,426	3,426	3,426	3,426	3,426	3,426
R-Squared	.02	.04	.05	.07	.03	.04	.06	.07
+ p<.1, * p<.05, ** p<.01, *** p<.001								

Model 1 replicates model 1(b) with a series of block level controls so they are identical. These results are fairly consistent across analyses. The addition of egohood level business and employment data in model 2 results in two coefficients that approach significance. The average number of religious establishment within a .5 mile area is associated with larger reported NSPs and the number of social service organizations in that area is associated with smaller reported NSPs (consistent with inverse distance decay measures in the b models). With the inclusion of block level feature characteristics to model 3, we now see that schools in the area approach significance and are associated with *smaller* reported NSPs and the number of religious organizations becomes significant while maintaining its positive directionality. Average traffic flows are significant and in the negative direction (consistent across analyses), while average building conditions are positive and approach significance.

Key individual indicators in model 4 are nearly identical in significance and magnitude to the previous models, although the percent black is not significant for model 4. The average number of the schools in the area maintains significance, and a negative coefficient here suggests that having more schools in the area is associated with smaller NSP which is not found in the previous set of models. Religious organizations maintain their significance, and are positively associated with larger NSPs. Trees now approach significance showing a negative effect on NSPs (consistent with models b).

Replication with Wave 2

Although several issues with wave 2 complicate direct comparisons between models, it can still be useful to see if certain associations remain stable between waves. To do this, data from wave 2 were matched to the models in wave 1 as closely as possible. The following section reviews and discusses these models in comparison to the results of wave 1.

Results

Table 4 highlight the distribution of the outcome variable. Table 5 contains descriptive statistics for wave 2 data. Individual NSP has a mean of 2.14 with a standard deviation close to 1. This is fairly similar to the distribution of wave 1, and show that there is a fair amount of variation in these measures.

Table 4: Wave 2: When talking about your neighborhood is it:

Response	Frequency	Percent
(1) The block or street you live on	667	35
(2) Several blocks or streets in either direction	505	28
(3) Area within a 15-minute walk	474	25
(4) Area larger than a 15-minute walk	229	12
Total	1,875	100

Table 5: Descriptive Statistics for Individual Neighborhood Spatial Perception Models (Wave 2)

Variable	N	Mean	Standard Deviation
Individual Spatial Perceptions	1,875	2.14	1.04
% Asian	2,070	11.03	15.48
% Black	2,070	7.39	11.10
% Hispanic	2,070	58.05	31.30
% Other	2,070	2.01	2.20
Ethnic Heterogeneity	2,070	0.39	0.21
% Housing Owner	2,070	47.25	31.90
Log Population Density	2,070	9.69	0.86
Schools	2,319	0.04	0.24
Religious	2,319	0.16	0.51
Grocers	2,319	0.08	0.34

General Retail	2,319	0.03	0.18
Recreation	2,319	0.04	0.25
Social Services	2,319	0.12	0.45
Manufacturing Jobs	2,319	2.38	21.30
Retail Jobs	2,319	4.67	32.83
(IDD) Schools	2,319	12.22	11.59
(IDD) Religious	2,319	29.90	36.74
(IDD) Grocers	2,319	19.12	27.33
(IDD) General Retail	2,319	11.50	16.80
(IDD) Recreation	2,319	4.89	8.49
(IDD) Social Services	2,319	19.65	33.89
(IDD) Manufacturing Jobs	2,319	455.11	1143.55
(IDD) Retail Jobs	2,319	936.34	1241.04
(Ego) Schools	2,319	3.47	3.09
(Ego) Religious	2,319	8.48	10.17
(Ego) Grocers	2,319	5.15	6.92
(Ego) General Retail	2,319	3.36	4.64
(Ego) Recreation	2,319	1.39	2.37
(Ego) Social Services	2,319	5.58	9.43
(Ego) Manufacturing Jobs	2,319	133.85	341.27
(Ego) Retail Jobs	2,319	282.68	387.99
Road Distance	2,319	2.33	1.87
Hispanic Respondent	2,314	0.61	0.49
Black Respondent	2,314	0.08	0.27
Asian Respondent	2,314	0.08	0.28
Other Respondent	2,314	0.02	0.14
Female	2,319	0.66	0.48
Age	2,318	39.26	14.61
Income	2,269	5.91	3.46
Education	2,299	12.42	4.23
Cohesion	2,319	16.63	10.85
Informal Control	2,319	5.71	3.82
Participation	2,319	0.72	1.37
Safety	1,859	2.80	0.80
Car Owner	2,319	0.47	0.50

Results are shown in table 6. Across all models, percent Hispanic and ethnic heterogeneity have a significant negative relationship to NSPs. Religious organizations are shown to have a negative effect on NSPs in model 3, while recreational places are associated with increased spatial perceptions in models 2 and 3. The only significant block level business effect in models (b) are for grocery stores, which are associated with smaller NSPs. This effect

remains significant for models 2(b), 3(b), and 4(b). The only significant inverse distance decay measure for businesses is recreational space which is associated with larger NSPs. Individual social indicators are similar across all models. Female respondents are associated with smaller NSPs, and increased age is associated with decreased NSPs. Income and participation have significant positive effects, and increased safety is associated with decreased NSPs.

Table 6: Effects of Physical and Social Features on Individual Neighborhood Spatial Perceptions (Wave 2)

	Model 1	Model 2	Model 3	Model 2 (b)	Model 3 (b)	Model 4 (b)
Block Chars						
% Asian	.0002	.002	.002	.0001	.002	.003
% Black	-.003	.001	-.0004	-.003	.0004	-.0005
% Hispanic	-.007***	-.006***	-.003+	-.007***	-.006***	-.003+
% Other	-.004	-.002	-.0002	-.005	-.003	-.001
% Owner	-.0001	.001	.001	-.0006	.0003	.0004
Ethnic Heterogeneity	-.453*	-.478*	-.452*	-.440+	-.443*	-.421+
Population Density (log)	-.045	-.062	-.064	-.044	-.064	-.063
Businesses **(Block)**						
Schools				.093	.120	.152
Religious				-.031	-.024	-.028
Groceries				-.132+	-.154*	-.148*
Retail				-.089	-.101	-.110
Social Services				.044	-.009	.001
Recreational				-.013	-.015	-.031
Manufacturing Jobs				-.0003	-.0004	-.0005
Retail Jobs				-.001	-.0004	-.0003
Businesses **(IDD)**						
Schools					-.001	-.003
Religious					-.001	.002
Groceries					-.0000	.001
Retail					.002	.002
Social Services					.001	.001
Recreational					.011**	.011**
Manufacturing Jobs					.0000	.0000
Retail Jobs					-.0000	-.0000
Businesses **(Egohood)**						
Schools		-.006	-.005			
Religious		-.006	-.009*			
Groceries		-.002	.001			

Retail		.010	.010			
Social Services		.003	.005			
Recreational		.035*	.033*			
Manufacturing Jobs		.0001	.0001			
Retail Jobs		-.0001	-.0001			
Respondent Features						
Hispanic			-.096			-.108
Black			.133			.114
Asian			-.025			-.046
Other			.188			.125
Female			-.130*			-.139**
Age			-.004*			-.004*
Income			.019*			.018*
Education			.011			.010
Participation			.052*			.052*
Cohesion			-.004			-.004
Informal Control			.011			.011
Safety			-.090*			-.091*
Owns Car			.069			.073
Road Distance			.013			.016
N	2,071	2,071	2,071	2,071	2,071	2,071
R-Squared	.02	.03	.07	.03	.04	.07
+ p<.1, * p<.05, ** p<.01, *** p<.001						

While there are some differences between the results using wave 1 and wave 2 data, some similar trends emerge. Both series of analyses show significant negative coefficients for percent Hispanic and ethnic heterogeneity. When looking at businesses across both sets of analyses we do see very different effects for wave 2. Outside of religious organizations (which have a negative effect in model 3), all of the other significant wave 2 findings surrounding businesses are different from wave 1 results. In wave 2 we see a significant positive effect for recreational spaces in models 2 and 3. Results from model 3b show a significant negative coefficient for grocery stores, and a significant positive coefficient for the inverse distance decay measure of recreational spaces. Wave 2 data show a significant negative coefficient for female and age, which was not captured with wave 1 data. Wave 2 also shows a positive effect of income on NSPs that was not found in the prior wave. Participation and safety are similar across each set of

analyses. Respondents reporting higher perceptions of safety are associated with smaller NSPS, while participation is associated with an increase in NSPs. Block level features were not included for wave 2 so we are unable to compare these.

Discussion

Previous research has highlighted several dimensions of significance to the study of community attachment and activity spaces, including demographic composition, local businesses and employment opportunities, neighborhood feature characteristics, and individual level social indicators. While some aspects within these dimensions have been explored, they had yet to be combined into a single model. These results highlight that facets of each of these dimensions are significantly associated with the spatial scale of neighborhood that respondents perceive. One of the main contributions of this research is the ability to model business counts and types within an area. In particular, it seems that the location and distribution of businesses within a given area significantly impact results. This can be seen when comparing the previous tables. While schools were not significant at the level of the block or surrounding areas (using the inverse distance decay measures), they are significant in the egohood models that capture averages within a .5 mile area surrounding a respondent. While the negative association may seem contrary to the literature, it could support the idea that schools can be anchors for residents. That is, having a school in the general area may not stretch ones NSP, but would rather contain it to that given area. Both series of analyses also highlight the role of religious institutions in bringing people from multiple areas/blocks together under the same roof. This provides a space for residents to understand more macro level connections shared by the community which may lead towards larger awareness spaces- thus larger NSPs.

While jobs in an area seem like they would play an important role in shaping NSPs, they were largely unexplored in prior literature. These analyses were able to theorize and incorporate them as a key element of the social backcloth. Results indicate that block level employment opportunities are significant and have a negative relationship to NSP (but not at the egohood level) suggesting those blocks with more employment opportunities might limit one's awareness space. The exact operationalization of these is a bit unclear, but having these employment centers on a block may provide residents with nearby employment opportunities that limit exposure to outside areas in certain ways. This could also be the result of hard boundaries large manufacturing or retail businesses may present to residents within a block. Additionally, the use of egohood level data creates averages that smooth out data in ways that can influence significance levels. Averages calculated from these features may reduce some of these effects in important ways. While recreational spaces at the block level are significantly associated with larger NSPs as the literature suggests they might be, the average number in a given area has no significant association. Recreational spaces are somewhat limited, as reflected by the average contained in the summary statistics (.027). Overall, both sets of models provide insight into the relation between NSPs, local businesses, and employment opportunities in ways prior research was unable to capture.

Given the rarity of some businesses among blocks, moving forward it seems best to include egohoods to capture this information because of their ability to address these issues through the creation of overall averages in an area. This is not to say that block and inverse distance decay measures are not meaningful and important; there are just some problematic assumptions that may limit the predictive power of these measures. They still provide valuable

information surrounding the distribution and effects that local businesses have on resident NSP that prior research was unable to capture.

Many of the key individual level measures are consistent with their theorized relationships based on the findings suggested and produced by research surrounding community attachment. Even when accounting for overall structural and demographic characteristics of an area, respondents that participate in more local groups tend to see their neighborhoods as larger spaces, and greater perceptions of neighborhood safety are associated with smaller NSPs. While cohesion and informal social control are not significant, their coefficients are positive as literature would suggest. Ties and connections within and beyond the neighborhood may provide more opportunity for residents to understand and be exposed to a variety of contexts that expand their NSPs. Feeling safe in one's neighborhood may allow one to identify more strongly to specific bounds. While these analyses were unable to capture perceptions of safety for the area surrounding ones block, there may be uncertainty or reductions in perceptions of safety tied to nearby blocks that would further anchor resident perceptions of their neighborhood to smaller areas. Education is significant and positively associated with NSP, possibly reflecting how education can increase exposure and understanding of more meso or macro level connections that blocks may share in the larger context of neighborhood.

Analyzing Change

The final section of this chapter is focused on understanding how changes in the built and social environment over time influence NSP. Several challenges arose when matching respondents between waves and merging data to the wave 2 adult survey. A good proportion of respondents moved outside of the study area, social observational data was only completed for wave 1, non-response was present in wave 2, and some respondents died between waves. Even

with this being the case it still seems important to look at changes with the remaining combined sample. Given these factors and the decision addressed above to move forward with egohood level business data, the following 3 models are tested:

Model 1 is shown in the following equation:

$$\widehat{\Delta nsp} = \beta_0 + \beta_1 \Delta \boldsymbol{BControls} + e$$

Where $\widehat{\Delta nsp}$ is the predicted change in neighborhood spatial perception: $\beta_1 \Delta \boldsymbol{BControls}$ captures block level difference measures in control variables with error term *e.* Model 2 incorporates changes in egohood level business features as shown below:

$$\widehat{\Delta nsp} = \beta_0 + \beta_1 \Delta \boldsymbol{BControls} + \beta_2 \Delta \boldsymbol{EgoBiz} + e$$

Additional information on changes in key individual variables are included in the final model:

$$\widehat{\Delta nsp} = \beta_0 + \beta_1 \Delta \boldsymbol{BControls} + \beta_2 \Delta \boldsymbol{EgoBiz} + \beta_4 \Delta \boldsymbol{IndVar} + \text{e}$$

Again, errors are clustered at the block level and SEM is used with the maximum likelihood function to account for missing data. Outcomes for both waves of the dependent variable are shown in table 7. Descriptive statistics for variables in the change models can be seen in table 8.

Table 7: Waves 1 and 2: When talking about your neighborhood is it:

	Wave 2				
Wave 1	**1**	**2**	**3**	**4**	**Total**
(1) The block or street you live on	189 (16)	101 (9)	86 (7)	28 (2)	404 (34)
(2) Several blocks or streets in either direction	100 (8)	92 (8)	79 (7)	32 (3)	303 (26)
(3) Area within a 15-minute walk	90 (8)	83 (7)	102 (8)	36 (3)	311 (26)
(4) Area larger than a 15-minute walk	63 (5)	33 (3)	46 (4)	26 (2)	168 (14)
Total	442 (37)	309 (27)	313 (26)	122 (10)	1186 (100)
					Count/(percent)

Table 8: Descriptive Statistics for Change in Individual Neighborhood Spatial Perceptions			
Variable	**N**	**Mean**	**Standard Deviation**
Change in Spatial Perceptions	1,185	-.11	1.37
Change in % Asian	1,289	1.54	10.99
Change in % Black	1,289	-0.43	10.35
Change in % Hispanic	1,289	0.43	17.65
Change in % Other	1,289	-0.45	2.95
Ethnic Heterogeneity	1,289	0.00	0.17
Change in % Owners	1,289	4.57	24.08
Change in Log Population Density	1,318	2.29	1.32
Change in Schools	1,525	0.39	2.84
Change in Religious	1,525	-2.04	8.24
Change in Grocers	1,525	0.01	5.37
Change in Retail	1,525	0.19	4.37
Change in Manufacturing Jobs	1,525	-74.56	438.35
Change in Recreation	1,525	0.04	2.03
Change in Social Services	1,525	-0.74	7.89
Change in Retail Jobs	1,525	-15.98	339.13
Change in Income	1,469	1.36	2.82
Change in Education	1,295	0.49	1.26
Change in Cohesion	1,525	-3.58	7.62
Change in Informal Control	1,525	-0.88	3.01
Change in Participation	1,525	0.23	1.30
Change in Safety	1,166	0.04	0.83
Change in Car Owner	1,525	0.12	0.55

Descriptive statistics based on this sample show that there was an average (-.11) reduction in NSP reported by residents with a standard deviation of 1.36 showing a fair amount of variation around this average. This does suggest that reported NSPs for this sample were slightly smaller in wave 2. As shown in the table, the sample size is roughly half of the previous models. The table also provides descriptive statistics for the independent variables included in analyses.

Change models are highlighted in table 9. Model 1 shows that an increase in the percent Asian at the block results in an increase (.01) in reported NSP, and that an increase in the

percentage black in a block result in reductions (-.01) in NSP. Consistent with the previous analyses, an increase in the percent of home owners is associated with decreased NSPs- though this only approaches significance (p<.1). These results remain consistent in model 2. The inclusion of changes to egohood level business and employment variables produces one coefficient that approaches significance. An increase in the number of schools in the area results in an *increase* in reported NSP. This coefficient loses significance in the final model. The final model does show that an increase in grocery stores results in smaller NSPs, although this relationship only approaches significance. When looking at the key individual indicators, we can see that an increase in informal social control results in an increase in reported NSPs (.03). Increased levels of participation operate in the expected direction, resulting in increases to respondent NSP (.05) approaching significance (p<.1). Changes in perceptions of safety are also significant and consistent with the prior models. Increased levels of participation result in respondents reporting smaller NSPs. While these models are limited in what they can explore due to lack of observational data for wave 2 and the smaller sample size, it does provide evidence that resident NSP is dynamic in nature. Residents seem to be interacting with structural and social features within their neighborhood in ways that redefine these boundaries over time.

Table 9: Effects of Change in Physical and Social Features on Change in Individual Neighborhood Spatial Perceptions

	Model 1	Model 2	Model 3
Block Chars			
Change in % Asian	.010*	.011*	.010*
Change in % Black	-.001+	-.009+	-.010+
Change in % Hispanic	-.001	.001	.001
Change in % Other	-.004	-.004	.004
Change in % Owner	-.004+	-.004+	-.004+
Change in Ethnic Heterogeneity	-.127	-.166	.043
Population Density (log) Change	-.075	-.084	-.083
Businesses			
Change in Schools		.030+	.026
Change in Religious		-.008	-.008
Change in Groceries		-.017	-.019+

Change in Retail		.001	.001
Change in Social Services		-.001	.0003
Change in Recreational		.037	.036
Change in Manufacturing Jobs		-.0000	-.0000
Change in Retail Jobs		-.0001	-.0001
Respondent Features			
Change in Income			.018
Change in Education			.004
Change in Participation			.053+
Change in Cohesion			.004
Change in Informal Control			.029*
Change in Safety			-.132*
Change in Own Car			.175*
N	1362	1362	1362
R-Squared	.02	.02	.04
+ p<.1, * p<.05, ** p<.01, *** p<.001			

Overall Discussion

Four main dimensions of neighborhood were addressed by these models. First, demographic information provided details on the composition of the immediate area one resides in. Second, business and employment information captures neighborhood amenities that influence exposure and resolve needs. No prior research has been able to incorporate the number and types of businesses residents may be exposed to into their analyses. The ability to capture these features at various geographical levels extends our knowledge of these relationships. Block level conditional data helps us to better understand how ones block may be experienced, and key individual social indicators provide information on social relationships people develop within their neighborhoods. We see significant results throughout all of these dimensions that highlight a processes of knowledge and interaction that influence and (re)shape perceived boundaries in important ways.

While capturing all meaningful facets of a neighborhood is nearly impossible and many limitations surround working with geographically identified survey data (especially those sensitive in nature), the previous models provide much needed insight into the backcloth of the environment that informs resident perceptions of the neighborhood in a more complete way. This chapter empirically examined the relationship between contextual environment and NSPs for two waves of data and modeled changes between these waves. Models accounted for the number and types of businesses in an area in a way that prior research has yet to explore. Businesses were selected based on their association with activity spaces which this dissertation theorized to be related to NSPs (e.g. grocery stores or retail stores) or their significance in prior research (e.g. schools and recreational spaces). Results suggest that some businesses do operate in the expected way, often constraining NSPs to a smaller spatial scale (e.g. manufacturing jobs or grocery stores). On the other hand, result indicate that some features (e.g. recreational spaces) might broaden neighborhood perceptions in a way that helps make sense of their positive association with NSPs.

Beyond accounting for the number and types of businesses and job opportunities, these models are also able to expand research and theory through the measurement of block aesthetic conditions. Data from wave 1 show that traffic flow and the presence of more trees are in fact associated with smaller reported NSPs. These features may aid in containing neighbors to a smaller focal area. Results also suggest a positive association between building conditions and NSP, which is in the opposite direction of the theorized relationship. It may be that better building conditions are shared with a larger area, though the exact mechanism of this relationship warrants further exploration. Overall, these findings contribute to theory by highlighting that aesthetics do matter when it comes to resident reported NSPs.

Theory and findings of previous research from both qualitative and quantitative realms throughout multiple disciplines provided a framework for considering the various features that may be influential to NSPs, and these analyses suggest that a framework of community attachment and activity spaces does help to explain these outcomes. Many of the key individual indicators associated with community attachment have a similar relationship to NSPs. Although some indicators were not significant (cohesion and informal social control), they did operate in the theorized direction.

This empirical examination is in important step in framing NSPs as a construct of the larger contextual environment in which residents live. Given the findings presented thus far, it does provide evidence that theories on community attachment and activity patterns do provide a useful framework for understanding neighborhood spatial perceptions. It also highlights the need for modeling techniques focused on neighborhoods to draw from multiple dimensions of this context in a more complete way that accounts for the distribution of people and places in a given area. Below, a list of hypotheses is presented to provide the overall summary of results.

1. Race and ethnicity will be associated with smaller NSPs
    a. Mainly support, % Asian is positive in change model
2. Home ownership will be associated with smaller NSPs
    a. Negative directionality but not significant
3. Ethnic heterogeneity and population density will be associated with smaller NSPs
    a. Negative directionality but not significant
4. Schools will be associated with larger NSPs
    a. Mixed findings
5. Places of worship will be associated with larger NSPs
    a. Mainly support
6. Grocery and retail stores will be associated with smaller NSPs
    a. Overall negative directionality, grocery stores significant in wave 2
7. Social services will be associated with smaller NSPs
    a. Mainly support
8. Recreational spaces will be associated with larger NSPs
    a. Support in wave 2
9. Manufacturing and retail jobs will be associated with smaller NSPs

    a. Support in wave 1, very small effects
10. Major roads, traffic lanes, and traffic flow will be associated with smaller NSPs
    a. Only measured in wave 1. Support for traffic lanes
11. Public transportation will be associated with larger NSPs
    a. Only measured in wave 1. Positive directionality but not significant
12. Trees will be associated with smaller NSPs
    a. Only measured in wave 1. Mainly support
13. Building conditions will be associated with larger NSPs
    a. Only measured in wave 1. Positive directionality, some significance.
14. Disorder will be associated with smaller NSPs
    a. Only measured in wave 1. Negative directionality, not significant
15. Women will be associated with larger NSPs
    a. Not supported in wave 2. Positive directionality in wave 1 but not significant
16. Age will be associated with smaller NSPs
    a. Some support. Negative directionality and significant in wave 2
17. Income and education will be associated with larger NSPs
    a. Education supported wave 1 and Income supported wave 2.
18. Participation in local or civic groups will be associated with larger NSPs
    a. Support
19. Cohesion will be associated with larger NSPs
    a. Directionality mixed, not significant
20. Informal control will be associated with larger NSPs
    a. Positive directionality but not significant
21. Safety will be associated with larger NSPs
    a. Significant but negative (opposite hypothesized direction)
22. Owning a car will be associated with larger NSPs
    a. Positive directionality, not significant

Chapter 3: Explaining Variation in Neighborhood Spatial Perceptions

The previous chapter has helped to contextualize NSPs as a product of the social and physical backcloth that contains and guides residents in their daily lives. While a large body of research has been helpful in identifying the various factors that may influence NSPs, qualitative research has uncovered troubling findings for scholars that engage in aggregate research. When looking at neighborhood boundaries, residents are rarely in agreement with typical census measures. Beyond this, residents in close proximity to each other (i.e. on the same block) can vary widely in these perceptions (Coulton et. al., 2012). These findings provide motivation for an examination of the various dimensions of neighborhood and their association with block level consensus in NSP among neighbors.

Individual level analyses have shown that residents are in conversation with their environments in a way that shape how big or small they perceive their neighborhood to be. These same social and physical environments can be experienced and interacted with in different ways (Nejat, 2018). While some features may lead residents to expand or narrow how they spatially define their neighborhoods, some (e.g. schools) may be less relevant to other respondents and have less influence on NSPs. If this is the case, we should be able to find a relationship between many of these features and block level variance in NSPs. That is, areas characterized by certain social or physical features should be significantly associated with more or less agreement in NSPs by residents living on the same block.

The current chapter begins with a discussion on the four main dimensions of neighborhood (discussed in the previous chapter) and how these features may operate in creating differences in NSP. Next, these relationships are empirically tested using a measure of block level standard deviations in reported NSP. While much of the modeling technique remains

similar to the previous chapter, examining these block level differences provides valuable insight towards our understanding of why those in close proximity to each other might share or disagree on their views of NSP.

Explaining block level differences in NSP

The racial and ethnic composition of a neighborhood has been tied to many key social outcomes. For example, ethnic heterogeneity is a measure based on differences in ethnicity in a given area. These differences have been shown to limit the ability of residents to form strong social relationships within their communities (Putnam, 2007). They have also been shown to be associated with outcomes such as higher crime rates (Wo, 2022), lower rates of voter turnout (Bellettini et. al., 2015), lower levels of affective community attachment (Laurence & Bentley, 2016), and psychological health (Johnson-Singh et. al., 2018). Given these results, it follows that higher levels of racial/ethnic heterogeneity within a given area (in this case, the block) may be associated with more disagreement between neighbors on the extent of their neighborhood bounds. In other words, higher levels of heterogeneity reflect greater differences among people that may be linked to less consensus in vies on NSPs.

Beyond racial/ethnic composition, population density can also influence neighborhood attachment in ways relevant to the study of NSP. The more people in a given area, the more likely residents are to form relationships with people closer to them. Closeness to people and connections to them may result in greater consensus in NSPs. Alternatively, areas characterized by high population density may represent transitional neighborhoods, higher rates of residential turnover, and added difficulties in forming community connections. Therefore, respondents living in areas of high population density may share very different views on the extent of their community.

Businesses in an area can be utilized by residents in different ways, or might not be utilized at all. Some may travel much further to visit specific retailers, shop at their preferred grocery stores, travel to work, or attend school. Others may rely on local businesses due to their close proximity and ease of access. While the previous chapter has shown that the location and distribution of local businesses have a significant association to NSPs, it is just as likely that they may also help in explaining differences or similarities in boundary perceptions among residents. While the current project is unable to account for individual rates of exposure to these businesses, the availability of certain businesses to an area may operate as neighborhood anchors that ameliorate differences in these perceptions. Churches, schools, service organizations, recreational, and retail settings can serve as key features that residents are drawn to which might solidify these perceptions among residents. Alternatively, religiosity and associations with schools could be anchors for certain people and not others, which would influence consensus in NSPs.

The previous chapter has also shown that certain feature characteristics of a block also have the ability to influence NSP. Heavy traffic flows, multiple road lanes, and major highways can create hard boundaries that have been shown and theorized to be associated with smaller NSPs. These physical constraints may be more likely to ameliorate differences in NSP. They might contain residents in important ways that drive a shared perspective of neighborhood bounds. Blocks characterized by better overall building conditions, the presence of trees, and lower levels of disorder could represent stronger community ties and higher levels of consensus in the reported NSPs of people residing on the same block.

Overall perceptions of social ties and informal interventions could also be significant factors leading towards general consensus in NSPs. Residents with higher rates of cohesion have

the ability to discuss what the neighborhood means, and may have increased interest in understanding and sharing the areal context with others. This could help solidify opinions in ways that would reduce disagreement among neighbors. Average reported rates of participation in local groups at the block level can also be influential to levels of agreement. The previous chapter shows that participation tends to be associated with larger reported boundaries which suggests areas characterized by more participation among residents may be more spatially diverse. This would lead to lower levels of consensus on spatial boundaries. Alternatively, it could also be associated with greater consensus in NSPs as resident involvement increases leading towards shared views of these larger bounds. Given these considerations it seems relevant to include average rates of participation when modeling an outcome focused on explaining variation in these perceptions.

Data

Data is consistent to the previous chapter except for some changes in the calculation of some key variables (Discussed below). The primary source of data is the adult module of the LAFANS questionnaire. This contains a measure of NSPs and key social indicators with block level identifiers. Additional data on neighborhood feature characteristics are drawn from the LAFANS social Observational dataset. Block level census data from 2000 was merged to the adult module to incorporate demographic characteristics. Business data for 2000 from RefUSA are also merged to the adult module to capture areal business and employment opportunities.

Dependent Variable

The dependent variable for analyses is based on perceived neighborhood size. In the LAFANS adult questionnaire, respondents were asked; when talking about neighborhood is it,

(1) the block or street you live on? (2) Several blocks or streets in each direction? (3) Area within a 15-minute walk? (4) Area larger than a 15-minute walk? The outcome of interest now is the variance in neighborhood spatial perception, which is captured by calculating the standard deviation in NSP for each sampled block as follows:

$$sd = \sqrt{\frac{\Sigma_{i=1}^{N}(x_i - \bar{x})^2}{N-1}}$$

This results in a continuous variable that measures differences in agreement within each block as shown in figure 1. You cannot calculate variation for blocks with one household, so these observations were removed from analyses. Because this is survey data and the number of responses varies by block, a control variable is also included to account for the number of respondents. Response control is a count of these observations that allows models to control for the number of observations in each block.

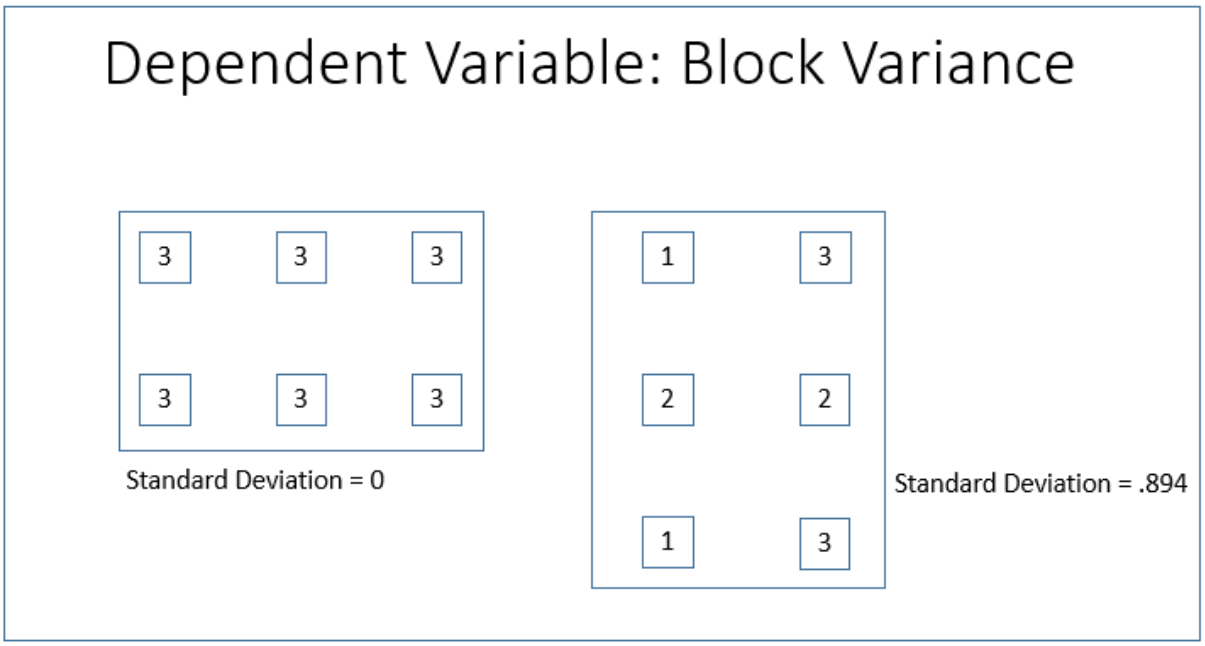

Figure 1: Block Variance in NSP

Independent Variables

Block level demographic information from the US census is used to measure the percentage of black, Hispanic, Asian, and other racial ethnic backgrounds within each block. Also included are a measure of ethnic heterogeneity, population density (logged), and the percentage of home owners within each of these blocks. These variables are included to control for underlying population characteristics and their usefulness towards understanding variance in NSPs as discussed in the previous section. A control is also included for the number of responses for each block, as more responses likely has an influence on variance levels.

Business data is examined using block level, .5 mile egohood level, or the .5 mile area around a block using an inverse distance decay function aggregations. This includes schools, religious organizations, grocery and retail stores, and employment information on retail and manufacturing jobs. Different units of analyses allow for further insight into the sensitivity of these features given their geographic location surrounding the focal block. While the previous chapters focused on business types and locations and whether they were generally associated with smaller or larger perceptions of individual NSPs, this chapter questions whether these businesses influence consensus in this measure among residents of the same block. While schools may be generally associated with larger NSPs, schools in an area may also have greater meaning for certain residents of a neighborhood. While some may broaden the spatial scale of their perceptions to include these areas, others may not associate with them in any way. In a case like this, we would expect schools to reduce consensus in NSP.

Social observational data from LAFANS provide information on the average traffic flow, availability of public transportation, number of trees, building condition, and disorder for each face block of the LAFANS sample. Each observation of a given face block is then averaged and aggregated to the block level. Data were then merged into the adult module to provide precise

information on neighborhood conditions and features that resident's experience. Census Tiger Line shape files for road features were buffered and these buffers were then merged to blocks to indicate their distance from major roadways. Roadways can be used in different ways, which may lead to a decrease in levels of consensus in NSP, and block aesthetics may increase consensus through their symbolic representation of a clean and organized neighborhood.

Perceptions of social cohesion and informal social control are drawn from the adult survey module, and measured by a mean-rating scale based on the following items; (1) would you consider this to be a close-knit neighborhood, (2) are there adults in the neighborhood that kids can look up to, (3) are people in the neighborhood willing to help their neighbors, (4) your neighbors generally don't get along (reverse coded), (5) people don't share the same values (reverse coded), (6) people in neighborhood can be trusted, (7) parents in neighborhood know kids friends, (8) adults in neighborhood know local kids, (9) parents in neighborhood know each other, (10) neighbors would do something if kids hang out and cause trouble, (11) there are adults in neighborhood that watch out that kids are safe, (12)neighbors would do something if they see kids doing graffiti, (13) would scold a kid if showing disrespect. A mean score was calculated for each individual based on items 1-9 (cohesion) and 10-13 (informal control). This resulted in scale reliability coefficient of .84 for cohesion and .73 for informal social control. These mean scores were then aggregated to the block in order to capture average perceptions of cohesion and informal social control. Higher rates of cohesion and informal social control could represent factors that tie community members together in ways that increase consensus in NSPs

Levels of participation in various community organizations are drawn from the LAFANS adult module, and include whether a resident participates in: (1) neighborhood or block meeting, (2) business or civic group, (3) nationality or ethnic pride club, (4) local or state political

organization, (5) volunteered for a local organization, (6) veterans groups, (7) labor unions, (8) art discussion group, or (9) fraternity or sorority. Total individual levels of participation were calculated (based on sum) and averaged to the block level, allowing for an examination of the association between overall higher rates of participation and consensus in NSP. Blocks characterized by higher rates of local and civic groups may represent higher rates of social capital among members of a block. These connections could pull resident perceived boundaries in different directions resulting in lower levels of consensus in NSP.

The processes discussed thus far inform the following hypotheses that will be tested in this chapter;

1. Race and ethnicity will be associated with less consensus in NSPs
2. Home ownership will be associated with more consensus in NSPs
3. Ethnic heterogeneity will be associated with less consensus in NSPs
4. Population density will be associated with more consensus in NSPs
5. Schools will be associated with less consensus in NSPs
6. Places of worship will be associated with less consensus in NSPs
7. Grocery and retail stores will be associated with more consensus in NSPs
8. Social services will be associated with more consensus in NSPs
9. Recreational spaces will be associated with less consensus in NSPs
10. Manufacturing and retail jobs will be associated with more consensus in NSPs
11. Major roads, traffic lanes, and traffic flow will be associated with less consensus in NSPs
12. Public transportation will be associated with less consensus in NSPs
13. Trees will be associated with more consensus in NSPs
14. Building conditions will be associated with more consensus in NSPs
15. Disorder will be associated with less consensus in NSPs
16. Women will be associated with more consensus in NSPs
17. Income and education will be associated with less consensus NSPs
18. Participation in local or civic groups will be associated with less consensus in NSPs
19. Cohesion will be associated with more consensus in NSPs
20. Informal control will be associated with more consensus in NSPs
21. Safety will be associated with less consensus in NSPs

Analyses

Given the continuous nature of the outcome and the missing data patterns previously discussed, SEM is used to test 4 models focused on (1) underlying block level population characteristics, (2) businesses in the .5 mile local area, (3) key feature characteristics of a block, and (4) key individual level social indicators averaged to each block.

Model 1 is shown in the following equation:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{Controls} + e$$

Where $\widehat{sdnsp}$ is the predicted standard deviation of NSP: $\beta_1 \boldsymbol{Controls}$ captures a series of block demographic features with error term *e.* Model 2 incorporates business features as shown below:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{Social} + \beta_2 \boldsymbol{EgoBiz} + e$$

Block averages for key block characteristics are added in model 3:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{EgoBiz} + \beta_4 \boldsymbol{BChars} \text{ ++e}$$

The final model adds key social indicators averaged to the focal blocks:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{EgoBiz} + \beta_4 \boldsymbol{BChars} + \beta_5 \boldsymbol{IndAverges} \text{+e}$$

Similar to the previous chapter, models were also created using block level and inverse distance decay measures to explore varying geographical contexts resulting in the addition of a 5th equation and changes to models 2, 3, and 4 as follows:

Alternative model 2:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz}$$

Alternative model 3:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_3 \boldsymbol{DecayBiz} \text{+e}$$

Alternative model 4:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_3 \boldsymbol{DecayBiz} + \beta_4 \boldsymbol{BChars} \text{+e}$$

Additional model 5:

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_3 \boldsymbol{DecayBiz} + \beta_4 \boldsymbol{BChars} + \beta_5 \boldsymbol{IndAverages} + e$$

A combination of features related to community attachment and activity patterns can provide unique insight into how the larger contextual environment shapes resident boundary perceptions in meaningful ways. While scholars have attempted to understand the relation between context and NSP, much of this work was qualitative in nature or focused on individual level differences. Analyses from the previous chapters has also highlighted that many of the same factors that explain community attachment are related to NSPs in important ways. These models expand on the previous chapter and prior research by empirically testing how the contextual backcloth of the environment shapes the contours of neighborhood in ways that influence consensus in NSP among residents of the same block. Research focused on consensus in these opinions is sparse. Although qualitative research surrounding resident drawn maps of neighborhood boundaries finds distinct differences in perceived neighborhoods, few correlates have been explored in relation to these differences.

Given that the outcome for these models is the standard deviation in block level neighborhood spatial perceptions, significant associations now indicate features related to consensus in NSP. For example, a significant positive effect for ethnic heterogeneity would suggest that blocks with higher rates of this measure are associated with lower rates of consensus in NSPs. Greater variability in the ethnic makeup of an area is then associated with higher levels of disagreement in the size of the neighborhood among residents living on the same block. Advancing an understanding of the features that are associated with differences in these perceptions is the next step towards developing more accurate modeling techniques that may be able to explain levels of consensus among neighbors.

Results

Descriptive statistics are shown in table 10. The outcome is the standard deviation in NSP for each block, and it has a mean of .96 with a standard deviation of .37 suggesting a reasonable amount of difference in NSP within blocks. Details for independent variables are also shown below.

Table 10: Descriptive Statistics for Difference in Neighborhood Spatial Perceptions

Variable	N	Mean	Standard Deviation
NSP (SD)	327	0.96	0.37
% Asian	325	8.18	12.36
% Black	325	7.90	12.67
% Hispanic	325	56.00	33.60
% Other	325	2.39	2.80
Ethnic Heterogeneity	325	0.37	0.21
% Housing Owner	325	48.69	32.20
Log Population Density	331	7.26	1.30
Schools	331	0.04	0.23
Religious	331	0.15	0.50
Grocers	331	0.06	0.26
General Retail	331	0.05	0.21
Manufacturing Jobs	331	3.55	29.20
Recreation	331	0.01	0.11
Social Services	331	0.14	0.68
Retail Jobs	331	4.21	37.41
(IDD) Schools	331	3.10	2.39
(IDD) Religious	331	9.43	9.92
(IDD) Grocers	331	4.96	5.89
(IDD) General Retail	331	3.00	4.50
(IDD) Manufacturing Jobs	331	653.59	1433.73
(IDD) Recreation	331	1.23	1.58
(IDD) Social Services	331	5.86	9.13
(IDD) Retail Jobs	331	967.38	1051.25
(Ego) Schools	331	3.15	2.14
(Ego) Religious	331	9.41	9.54
(Ego) Grocers	331	4.83	5.53
(Ego) General Retail	331	3.14	4.51
(Ego) Manufacturing Jobs	331	185.67	379.04
(Ego) Recreation	331	1.25	1.57
(Ego) Social Services	331	6.03	9.22
(Ego) Retail Jobs	331	290.57	323.23

Average Traffic Lanes	331	2.47	0.55
Average Traffic Flow	331	2.19	0.64
Average Public Transit	331	0.11	0.14
Average Trees	331	2.65	0.61
Average Building Condition	331	3.43	0.67
Average Disorder	331	1.66	0.39
Road Distance	331	2.64	1.81
Female	331	0.70	0.16
Age	331	39.67	6.54
Income	331	4.77	2.50
Education	331	12.18	3.25
Cohesion	331	2.79	0.25
Informal Control	331	2.89	0.38
Participation	331	0.47	0.51
Safety	331	2.82	0.52
Response Control	331	10.29	7.67

The first model is identical between analyses (see table 11). The percentage Hispanic on a block is significant and positively associated with consensus in NSP. Areas characterized by a higher proportion of Hispanic residents are predicted to have a greater difference in opinions of NSPs. The coefficient for racial/ethnic heterogeneity is significant, and in the expected direction. Blocks characterized by higher levels of ethnic heterogeneity are predicted to have less consensus in NSPs. This shows that greater variation in the ethnic composition of people is associated with greater disagreement in NSPs among neighbors. It is worth highlighting this result, as it is one of the higher magnitude findings throughout this paper's extent. The coefficient for population density is significant and in the negative direction. Higher levels of population density predict more agreement on NSPs. This suggests that residents in densely populated blocks are more likely to share similar views on NSPs. Results from chapter 2 suggest that these residents identify their neighborhoods as smaller spaces, possible indicating that population density may have the ability to contain and constrain NSPs in a similar fashion among block residents.

These results remain consistent in model 2, which now shows a negative association between social service organizations in a .5 mile area and NSPs. There are some differences between analyses that should be highlighted. Model 2(b) shows two main significant business effects. Blocks with more manufacturing jobs or social service organizations are associated with less difference in reported NSPs. These coefficients remain stable when inverse distance decay measures are added to model 3(b). Home ownership now approaches significance in this model, suggesting higher ownership is associated with greater consensus. Within the distance decay measures, places of worship and social service organizations also have a significant effect on variance. While the significant negative effects of social services on difference in NSPs is consistent across all analyses, the positive association between places of worship and variation in NSP is only found in the inverse distance decay measure. This suggests that blocks with places of worship located outside the focal block (but within a .5 mile area surrounding it) are predicted to have lower levels of consensus in NSPs. This could reflect different relationships people have with religion and churches. In other words, this may partially be due to differences in religious affiliation and/or varying levels of religiosity among neighbors.

When block level feature characteristics are added to model 4(b), we see one coefficient that approaches significance. Block disorder has a negative association with block level variance in NSP. Shifting back to the other set of models (model 3) we do not see this finding. Instead we see that blocks located closer to major roadways are predicted to have increased variance in NSP, which is contrary to the theorized directionality of this relationship. The final models include several respondent level indicators that produce one more significant finding. Both sets of analyses predict that greater block level participation in local groups is associated with an

increase in the variance of block level NSPs. The effects of average levels of participation in local groups are consistent between analyses.

Table 11: Effects of Physical and Social Features on Difference in Neighborhood Spatial Perceptions								
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2 (b)**	**Model 3 (b)**	**Model 4 (b)**	**Model 5 (b)**
Block Chars								
% Asian	-.001	-.001	-.003	-.001	-.0004	-.001	.0000	-.0002
% Black	.001	-.001	-.0005	-.001	.0008	-.002	-.001	-.001
% Hispanic	.004***	.028**	.003*	.003+	.004***	.003***	.003*	.003*
% Other	-.010	-.009	-.009	-.011	-.010	-.010	-.009	-.011
% Owner	-.001	-.001	-.002	-.0003	-.001	-.002+	-.002	-.001
Ethnic Heterogeneity	.466**	.456**	.375*	.364*	.486**	.496***	.409**	.427**
Population Density (log)	-.068*	-.059*	-.041	-.016	-.082**	-.069**	-.047+	-.020
Response Control	.006*	.005+	.005*	.006*	.006*	.004	.005*	.006*
Businesses **(Block)**								
Schools					-.025	-.006	.017	.025
Religious					-.044	-.054	-.059	-.051
Groceries					-.054	-.030	-.036	-.037
Retail					.023	.036	.066	.094
Social Services					-.065*	-.060*	-.057+	-.074*
Recreational					.178	.185	.190	.171
Manufacturing Jobs					-.002**	-.002**	-.002*	-.001*
Retail Jobs					-.0004	-.0002	-.0002	-.0002
Businesses **(IDD)**								
Schools						-.001	-.003	-.004
Religious						.006*	.006+	.006+
Groceries						-.008	-.002	-.003
Retail						.002	.001	.001
Social Services						-.006*	-.006*	-.006*
Recreational						-.009	-.012	-.014
Manufacturing Jobs						.0000	.0000	.0000
Retail Jobs						.0000	.0000	.0000
Businesses **(Egohood)**								
Schools		.010	.001	.001				
Religious		.004	.003	.003				
Groceries		-.009	-.004	-.005				
Retail		.003	.002	.004				
Social Services		-.008**	-.007*	-.008**				
Recreational		-.0006	-.003	-.006				
Manufacturing Jobs		.0001	.0001	.0001				
Retail Jobs		-.0001	-.0001	-.0001				
Block Features								
Traffic Lanes			.049	.031			.055	.038

Traffic Flow			-.035	-.015			-.032	-.013
Public Transit			.081	.083			.155	.132
Trees			-.035	-.046			-.032	-.047
Building Conditions			-.017	-.033			-.027	-.050
Disorder			-.138	-.108			-.171*	-.143
Major Roads			.022+	.023*			.016	.017
Respondent Features								
Female				.076				.054
Age				-.003				-.002
Income				-.014				-.010
Education				.005				.006
Participation				.102*				.114*
Cohesion				-.048				-.021
Informal Control				-.053				-.043
Safety				.083				.092
N	331	331	331	331	331	331	331	331
R-Squared				.205				.243
+ p<.1, * p<.05, ** p<.01, *** p<.001								

While the results within these models are somewhat mixed, one of the overall goals of this chapter is to see which method explains the most variance in the outcome. Higher R-Squared values should indicate the preferred method of capturing areal features, which the inclusion of block and inverse distance decay measures seems to do here. R-squared statistics suggests that block and inverse distance decay measures help to explain roughly 4% more variance in differences in NSPs. In this case, models that capture both the focal block and the area surrounding these blocks do a better job of explaining block level differences in NSPs.

Discussion

Results indicate some fairly stable effects between models. Alternate units of business measurement seem to do little to change the effects of underlying demographic features- which remain consistent across models. Areas characterized by greater ethnic heterogeneity are associated with lower levels of consensus among neighbors. This makes sense given that greater

differences in the ethnic makeup of people tend to be associated with different views and outcomes in a variety of research (see Wo, 2020). Population density is associated with greater consensus in NSPs which may reflect more direct access to and opportunity for social and physical connections to a focal block. We see in chapter 2 that population density tends to be associated with smaller NSPs, and this result highlights population density as an important measure associated with consensus in these views. Both models find that participation is associated with greater differences in reported NSPs. This is a fairly interesting finding that may come down to the locations of groups that one attends. We know from Chapter 2 that higher rates of participation tend to be associated with larger NSPs, though it would appear that blocks high in this measure tend to have less consensus in terms of NSPs. Unfortunately, these measures were not geocoded, so exploring differences in distance to groups one attends will have to be an avenue for future research.

Here we can also see that major roads are associated with greater variance in NSPs. Again, the exact mechanism leading towards this difference is unknown and warrants further examination. Social services are shown to be associated with greater consensus in NSPs. Social services may focus on a specific area, which could further solidify conceptualizations of neighborhood among residents. Manufacturing jobs on a block may also contain residents to smaller areas with the availability of nearby jobs. Alternatively, they may represent hard boundaries that confine individuals to an area. Religious organizations in the surrounding area as measured by inverse distance decay values are associated with greater variation in these perceptions. This may come down to the role of religion in one's life, where stronger religious values bring greater value to these institutions and their spatial context in one's neighborhood. Below, a list of hypotheses is presented to summarize overall results;

1. Race and ethnicity will be associated with less consensus in NSPs
    a. Less consensus for percent Hispanic
2. Home ownership will be associated with more consensus in NSPs
    a. More consensus but not significant
3. Ethnic heterogeneity will be associated with less consensus in NSPs
    a. Supported
4. Population density will be associated with more consensus in NSPs
    a. Supported
5. Schools will be associated with less consensus in NSPs
    a. Mixed directionality and not significant
6. Places of worship will be associated with less consensus in NSPs
    a. Mixed, but some support in distance decay model
7. Grocery and retail stores will be associated with more consensus in NSPs
    a. Negative directionality for grocery stores but not significant
8. Social services will be associated with more consensus in NSPs
    a. Supported
9. Recreational spaces will be associated with less consensus in NSPs
    a. Mixed directionality, not significant
10. Manufacturing and retail jobs will be associated with more consensus in NSPs
    a. Not significant
11. Major roads, traffic lanes, and traffic flow will be associated with less consensus in NSPs
    a. Support for major roads. Less consensus for traffic lanes but not significant. More consensus for traffic flow but not significant.
12. Public transportation will be associated with less consensus in NSPs
    a. Less consensus but not significant
13. Trees will be associated with more consensus in NSPs
    a. Not supported, directionality suggests less consensus
14. Building conditions will be associated with more consensus in NSPs
    a. More consensus but not significant
15. Disorder will be associated with less consensus in NSPs
    a. Less consensus, mixed significance
16. Women will be associated with more consensus in NSPs
    a. Not supported, directionality suggests less consensus
17. Income and education will be associated with less consensus NSPs
    a. Mixed and not significant
18. Participation in local or civic groups will be associated with less consensus in NSPs
    a. Supported
19. Cohesion will be associated with more consensus in NSPs
    a. More consensus but not significant
20. Informal control will be associated with more consensus in NSPs
    a. More consensus but not significant
21. Safety will be associated with less consensus in NSPs
    a. Less consensus but not significant

Taken as a whole, these results provide further evidence that NSPs are drawn from the contextual and social features that surround individual lives. Residents are in conversation with their environments in ways that shape similarities and differences in the extent of their perceived neighborhood boundaries. Now that the features and processes by which these perceptions are developed have been explored, it is important to consider the role of NSPs in informing aggregate techniques. The goal of the following chapter is to continue expanding this framework with the practical applications of NSPs to the creation of a more meaningful aggregate unit of analyses.

Chapter 4: Creating Meaningful Boundaries

The previous chapter has helped to contextualize NSPs as a product of the social and physical world in which residents find themselves. The following chapter explores how these perceptions might be applied to aggregate research to create more meaningful neighborhood boundaries. To do this, separate models will be created at three levels of analyses. Modeling data at the block, .5 mile egohood, and NSP levels allows for a comparison between the spatial aggregations techniques being used. In particular, model R-Squared can be compared across models to highlight which level of modeling explains the most variation in the outcome measure. Models with higher R-Squared values are preferred because they indicate that the independent variables explain a higher proportion of the variance in the outcome measures. Because the only difference between the independent variables in these models is the areal unit of analyses, higher R-Squared values for a model would suggest it is doing a better job of capturing relevant indicators. That is, they would suggest that we are capturing a more appropriate area in relation to the outcome of interest. Block level models represent a standard aggregate approach, while egohoods expand on the typical census measures to account for the movement of people. NSP level models extend egooods by accounting for the movement of people within the areas residents define as their neighborhood. Explanatory power should be increased through incorporating these perceptions into modeling techniques.

The first series of models extends on the previous chapter by continuing an exploration of variance in NSPs at the block level. Each series of analyses has the outcome of variance in NSP at the block level, so it is the same outcome in each model. Explanatory predictors are then aggregated to each of the three areal units. This means that block level variation can be explained by (1) block level predictors, (2) .5 mile egohood level predictors, and (3) NSP level predictors. While egohood levels account for the movement of people within space, adjusting these

boundaries based on the average reported NSPs for each block will allow us to explore the role the factors in the *perceived* area influence.

Next, a similar process is used to examine an important conceptual aspect of community social organization- neighborhood cohesion. Again, cohesion is held constant at the block level across each set of analyses, with predictor variables varying at the three levels of aggregation previously discussed. A third set of models then explores these aggregation techniques for an outcome of block standard deviations in neighborhood cohesion. These are held constant at the block level for each model in order to explore how areal effects operate on these block level differences. Again, R-Squared can be compared across models to see which level tends to explain more of this variation.

When residents living on the same block experience and interact with their social and physical environment, they may identify neighbors in different ways that could have significant implications to neighborhood research based on aggregate units focused on perceptual measures. While the previous chapters have focused on examining the various features that contribute to the variation and stability of NSP, this final chapter examines the utility of NSP to advance data aggregation for modeling perceptual neighborhood phenomena. NSP represents perceptions of neighborhood size drawn from varying levels of exposure to the social and physical environment. Features of the environment help people form meaning, help to organize human interactions, and organize patterns of activity in ways that could bias models focused on static aggregate units. By using these perceptions to inform an aggregate unit of analysis, a more accurate measure of neighborhood could be developed that reflects the experience and views of residents in a community.

One approach scholars have been using to address boundary issues is through the creation of egohoods (see Hipp & Boessen, 2013). Egohoods are a series of overlapping boundaries that capture averages across spatial units within a specified buffer size. Typically, the same size buffer is used across all of the units of analyses, with the selected buffer size derived from a theoretical or data driven approach. For example, in the previous chapters a .5 mile egohood buffer was used because it was in line with one of the larger NSP selections and the most common 'large' unit selected by respondents. The previous chapters have also focused on businesses using several units of analyses in an attempt to account for the spatial dispersion of these features. The goal of this chapter is to move beyond static units by modeling average levels of NSP at the block level and using these averages to determine a buffer size for each block.

While egohoods tend to explain more variance than models based on typical census units, buffers could be informed and developed in a more meaningful way by incorporating resident NSP into the calculation of these boundaries. Applying static buffers across all blocks would ignore the differences people perceive in their neighborhood boundaries. Creating buffers for each block based on average NSPs then seems like the next logical progression of egohood level research, in particular when survey data is being spatially modeled and explored.

The following section begins by outlining the processes of creating NSP boundaries, and the process of aggregating data to these units. These boundaries are then applied to analyses from the previous chapter, allowing for comparison between block level, .5 mile egohood level, and NSP level aggregate models. After discussing these results, issues surrounding our understanding of neighborhood cohesion are discussed. This discussion motivates another series of analyses that models block level cohesion as the outcome. These analyses are focused on uncovering differences between using block, .5 mile egohood, and NSP boundaries to aggregate independent

variables in the analyses. These results are then discussed in terms of prior research and theoretical relationships.

Creating NSP Boundaries

The first step in creating NSP boundaries involved calculating average NSP values for each block. These averages were then rounded to the nearest integer to provide distinct block categories of perceived neighborhood bounds. Average block level NSP values and block identifiers were exported to MS Excel. A Tiger Line shape file for LA county blocks in 2000 were downloaded from the US Census and added to the restricted data server. Using ArcGIS pro, the Excel file was joined to each block using a unique block ID. Blocks that reported an average NSP of 1 were selected and a .1 mile buffer was created for each of them. A .1 mile buffer typically only intersected with blocks sharing the same street as the focal block. For blocks that reported an NSP of 2, a .25 mile buffer was created that typically corresponded to several blocks in either direction. A .5 mile buffer was created for each block that reported an NSP of 3. This represents a leisurely 15 minute walk. Finally, those blocks reporting an average NSP of 4 were given a .75 mile buffer. This unit was selected because no blocks falling outside of this area were sampled. A much larger unit would be needed to capture additional sampled blocks, and theoretically it does not make sense to include blocks located in other parts of the city.

This process resulted in 4 sets of buffers for each block average reported NSP. Each buffer included attribute information for the unique block ID and NSP value from which it was developed. Next, each buffer was spatially joined to the full block file, creating an attribute column of unique block identifiers for all blocks contained within a buffer unit. These processes resulted in a 4 column attribute table containing (1) unique block IDs for the focal block that was buffered, (2) unique block ID's for each block contained within that buffer, (3) the NSP value

that was used to generate the buffer, and (4) a numeric value for each buffer. Focal block IDs were duplicated to tie each block within the buffer area back to that block. After gathering these attributes, each set of buffers was exported as data base files.

Data base files were imported into Stata and appended together. A unique ID for each buffer was created by multiplying the numeric value for each buffer by 10000 and transforming this value to a string variable. The NSP value was then also transformed to a string variable, and placed at the end of the previous value. This resulted in 331 unique values for each buffer. The adult module was then merged to the values from column (2) and aggregated to each unique buffer ID, producing a data aggregation method that accounts for resident perception of neighborhood. Additionally, another aggregation crosswalk file was created for .5 mile egohoods. All blocks were given a .5 mile buffer, and a similar process was used to create a file tying each block to those blocks contained within its buffer. This allows for survey data to be aggregated to the egohood level in order to compare effects across methods.

Analyses

These initial analyses are meant to compliment those from the previous chapter. Some key differences arose when considering varying units of measurement surrounding business data, so it seems fitting to begin this chapter by applying these new aggregate units to the data. Rather than providing stepwise models, here we compare the full models along 3 separate lines of aggregation- block, egohood, and NSP levels. The questions, analyses, and discussions developed throughout this project have focused on enhancing an understanding of block level differences in neighborhood boundary perceptions. Given these considerations, the outcome for each set of analyses is block level standard deviation in NSP. However, all independent variables

are aggregated to the spatial units being tested. This can be seen in the adjustments to the previous equation as shown below:

The first model simply aggregates independent variables to the block level.

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{BControls} + \beta_2 \boldsymbol{BBiz} + \beta_4 \boldsymbol{BChars} + \beta_5 \boldsymbol{BIndAverges} + e$$

The second model aggregates predictive variables to the egohood level

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{EControls} + \beta_2 \boldsymbol{EBiz} + \beta_4 \boldsymbol{EChars} + \beta_5 \boldsymbol{EIndAverges} + e$$

The last model aggregates independent variables based on NSP boundaries

$$\widehat{sdnsp} = \beta_0 + \beta_1 \boldsymbol{NSPControls} + \beta_2 \boldsymbol{NSPBiz} + \beta_4 \boldsymbol{NSPChars} + \beta_5 \boldsymbol{NSPIndAverges} + e$$

Once again, Stata SEM analyses were used to account for missing data.

Results

Descriptive statistics for the block, egohood, and NSP level analyses can be seen in tables 12-14.

Table 12: Descriptive Statistics for Difference in Neighborhood Spatial Perception (Block)

Variable	N	Mean	Standard Deviation
NSP (SD)	327	0.96	0.37
Cohesion	331	2.79	0.25
Cohesion (SD)	327	0.33	0.15
% Asian	325	8.18	12.36
% Black	325	7.90	12.67
% Hispanic	325	56.00	33.60
% Other	325	2.39	2.80
Ethnic Heterogeneity	325	0.37	0.21
% Housing Owner	325	48.69	32.20
Log Population Density	331	7.26	1.30
Schools	331	0.04	0.23
Religious	331	0.15	0.50
Grocers	331	0.06	0.26
General Retail	331	0.05	0.21
Manufacturing Jobs	331	3.55	29.20
Recreation	331	0.01	0.11
Social Services	331	0.14	0.68
Retail Jobs	331	4.21	37.41

Average Traffic Lanes	331	2.47	0.55
Average Traffic Flow	331	2.19	0.64
Average Public Transit	331	0.11	0.14
Average Trees	331	2.65	0.61
Average Building Condition	331	3.43	0.67
Average Disorder	331	1.66	0.39
Road Distance	331	2.64	1.81
Female	331	0.70	0.16
Age	331	39.67	6.54
Income	331	4.77	2.50
Education	331	12.18	3.25
Informal Control	331	2.89	0.38
Participation	331	0.47	0.51
Safety	331	2.82	0.52
Response Control	331	10.29	7.67

Table 13: Descriptive Statistics for Egohood Level Aggregations			
Variable	**N**	**Mean**	**Standard Deviation**
NSP (SD)	327	0.96	0.37
Cohesion	331	2.79	0.25
Cohesion (SD)	327	0.33	0.15
% Asian	331	8.97	9.67
% Black	331	10.17	13.74
% Hispanic	331	51.65	28.93
% Other	331	2.53	1.63
Ethnic Heterogeneity	331	0.38	0.15
% Housing Owner	331	52.74	23.78
Log Population Density	331	6.13	0.89
Schools	331	0.04	0.02
Religious	331	0.12	0.11
Grocers	331	0.06	0.06
General Retail	331	0.04	0.05
Manufacturing Jobs	331	2.60	4.68
Recreation	331	0.02	0.02
Social Services	331	0.08	0.10
Retail Jobs	331	3.17	3.07
Average Traffic Lanes	331	2.46	0.39
Average Traffic Flow	331	2.18	0.46
Average Public Transit	331	0.11	0.09
Average Trees	331	2.66	0.49
Average Building Condition	331	3.43	0.60
Average Disorder	331	1.65	0.35
Road Distance	331	2.65	1.70
Female	331	0.70	0.17
Age	331	38.95	6.21

Income	330	4.68	2.24
Education	331	12.13	3.15
Informal Control	330	2.91	0.41
Participation	331	0.44	0.46
Safety	330	2.83	0.52
Response Control	331	10.87	6.78

Table 14: Descriptive Statistics for NSP Level Aggregations

Variable	N	Mean	Standard Deviation
NSP (SD)	327	0.96	0.37
Cohesion	331	2.79	0.25
Cohesion (SD)	327	0.33	0.15
% Asian	330	9.02	10.60
% Black	330	9.66	13.01
% Hispanic	330	52.54	30.02
% Other	330	2.52	1.84
Ethnic Heterogeneity	330	0.38	0.17
% Housing Owner	330	51.74	25.16
Log Population Density	331	6.28	1.13
Schools	331	0.04	0.04
Religious	331	0.12	0.13
Grocers	331	0.06	0.08
General Retail	331	0.04	0.06
Manufacturing Jobs	331	2.70	8.66
Recreation	331	0.02	0.03
Social Services	331	0.08	0.13
Retail Jobs	331	3.06	4.58
Average Traffic Lanes	331	2.47	0.55
Average Traffic Flow	331	2.19	0.64
Average Public Transit	331	0.11	0.14
Average Trees	331	2.65	0.61
Average Building Condition	331	3.43	0.67
Average Disorder	331	1.66	0.39
Road Distance	331	2.64	1.81
Female	331	0.69	0.34
Age	331	38.58	10.01
Income	331	4.78	2.87
Education	331	12.37	3.83
Informal Control	331	2.89	0.54
Participation	331	0.44	0.74
Safety	331	2.84	0.65
Response Control	331	10.29	7.67

Looking at block characteristics, there are no results that are significant between all of the models (see table 15). However, the block and NSP level models do show a significant positive effect for the percent Hispanic and the response control (although the effect of Hispanic only approaches significance in the NSP model). Ethnic heterogeneity has a significant positive effects on differences in NSP in the block model, although this result only approaches significance in egohood model. Percent black approaches significance in the egohood model, showing a negative association with differences in NSP.

Business data show that social services have a significant negative effect on differences in cohesion, and this relationship is consistent between all models. Areas characterized by more social service organizations tend to have more agreement in NSPs. Manufacturing jobs have a negative coefficient, but are only significant in the block level model. Schools show a significant positive association with differences in NSPs, but only at the NSP level.

Major roads have a significant positive effect on NSP and this result is consistent across all models. Areas closer to major roadways are predicted to have greater differences in NSPs. Block level models also show two other block features that approach significance. Building conditions and disorder are associated with lower levels of disagreement in NSPs. Traffic lanes have a significant negative effect, but only in the egohood level model.

When looking at respondent features, participation is significant in the block level model. Areas characterized by higher rates of participation in local groups are predicted to have more disagreement in NSPs. Informal social control is significant in the egohood level model, suggesting that areas with higher levels of perceived informal control see fewer differences in NSPs. Age is significant in the NSP models, showing a negative effect between age and NSPs.

Table 15: Effects of Physical and Social Features on Difference in Neighborhood Spatial Perceptions at 3 Levels of Aggregation			
	Block	**Egohood**	**NSP**
Block Chars			
% Asian	.001	-.001	.000
% Black	.0005	-.005+	.002
% Hispanic	.004*	-.001	.003+
% Other	-.013	-.036	-.004
% Owner	-.0001	.003	.001
Ethnic Heterogeneity	.413***	.442+	.207
Population Density (log)	-.011	-.030	-.023
Response Control	.006*	.003	.008**
Businesses			
Schools	.037	.700	1.13*
Religious	-.045	.510	.019
Groceries	-.068	-.433	.604
Retail	.095	-.616	.026
Social Services	-.081*	-.531*	-.330+
Recreational	.163	.681	-.568
Manufacturing Jobs	-.002*	-.002	-.001
Retail Jobs	-.0002	.002	-.003
Block Features			
Traffic Lanes	.043	-.254**	.064
Traffic Flow	-.015	.140	-.040
Public Transit	.187	-.086	.189
Trees	-.053	-.051	-.047
Building Conditions	-.010+	-.088	-.039
Disorder	-.161+	.080	-.147
Major Roads	.019+	.034*	.026*
Respondent Features			
Female	.072	-.099	.080
Age	-.003	-.003	-.004*
Income	-.002	-.025	.004
Education	.005	.007	-.003
Participation	.127***	.048	.038
Cohesion	-.029	-.056	-.079
Informal Control	-.033	-.205***	.036
Safety	.072	.048	.028
N	331	331	331
R-Squared	.205	.196	.203
+ p<.1, * p<.05, ** p<.01, *** p<.001			
Note: Standard Deviation in NSPs at the block level is the outcome for all models.			

R-Squared values show the amount of variance in the outcome explained by each model. Models with higher R-Squared values are typically preferred because it suggests that variables included in the model are capturing more variance in the outcome. In this case, the only difference between variables in the models is that independent variables were aggregated to different spatial units. Higher R-squared values here would suggest that a model is capturing more variance in the outcome because of the level of spatial aggregation used. Table 15 shows that block level models predict around 21% of the variance in differences in block NSP. Egohood models explain around 20% of the variance, which is nearly identical to the NSP models. Overall, these values are very similar which makes appropriate model selection difficult. We do see that NSP aggregation may be a slight improvement over egohood level models, although these initial results should be considered inconclusive.

Discussion

These models contain mixed findings across levels of aggregation. Initial analyses show similar R-Squared values which do little to suggest which model is preferred. NSP models may be a slight improvement over egohood aggregations, although the block level models explain the most variance. While there is little difference between the amounts of variance explained according to the R-Squared statistics, it should be noted that there are some significant limitations to NSP boundaries that will be discussed in the final chapter. While these results are somewhat inconclusive for model selection here, improving measures of NSP could further improve the model fit for this level of aggregation.

Though some of the results within these models differ, there are also some significant coefficients that can be seen across all models. Mixed results simply highlight that the way we account for contextual backcloth beyond one's block has an influence on the effects that will be

found. While the previous models attempted to tease apart these differences by incorporating multiple units of business data into the analyses, similar variation in results arise when using different aggregate boundaries. Overall, these models each still highlight the importance of underlying demographics, businesses and jobs, block features, and key social factors in explaining these differences.

The next series of analyses further tests these methods in their practical application to the study of neighborhood cohesion. Measures surrounding neighborhood cohesion rely on resident perceptions of neighbors, so it seems that this would be where accounting for boundaries as residents see them would be the most impactful. The following section models neighborhood cohesion (and the standard deviation in neighborhood cohesion) at the block level while aggregating predictors to three different spatial units to test their utility in investigating this relevant topic.

Shifting to neighborhood cohesion

The phenomena of collective efficacy was theorized as a mechanism to explain the relationship between adverse community conditions and crime (Sampson & Raudenbush 1997). Areas characterized by higher levels of perceived collective efficacy have been shown to mitigate the effects of social disorganization on a variety of criminal activities (Morenoff et. al, 2001). While less attention has been given to factors that may be associated with the formation (or lack thereof) of collective efficacy, recent scholarship has advanced the importance of understanding various facets of one of its components- social cohesion. Hipp and colleagues (2018) highlight general social distance as a key factor associated with more variation in perceptions of neighboring, cohesion, and informal social control. Using an egohood approach, a general social distance measure was generated using 15 variables focused on socioeconomic

status, stage of life course, race/ethnicity, social upbringing, and attachment to neighborhood. Data was then aggregated to quarter mile and half mile egohoods. Their study shows that cohesion and differences in its perception among residents may not simply be an artifact of error, but instead can be driven by meaningful social contexts. While they highlight the association between social distance and neighborhood cohesion, other contexts have yet to be explored.

Prior research suggests that further research is needed to understand neighborhood collective efficacy. Community contexts surrounding the physical and social environment create patterns of behavior and attachment that can differ among residents. When residents of the same block share different views of spatial boundaries the question shifts from "won't you be my neighbor?" to "are you my neighbor, what makes you one, and how does this effect my perceptions?" One way to improve on this research is to incorporate an aggregate spatial unit based upon the given average NSP reported by each resident on a block. The questions that measures of cohesion are developed from are usually based on survey data surrounding resident perceptions of neighbors. If neighbors on the same block perceive different levels of NSP, these questions seem to apply to the given area of reference rather than a static area for all respondents.

Analyses

Data and analyses remain similar to the prior models, although now social cohesion at the block level is the key outcome. Neighborhood spatial perceptions are dropped from analyses as they are incorporated into the NSP buffer aggregation method. Cohesion was measured by creating individual mean scale ratings for each individual and then aggregating these values to the block level. This creates a block level variable for the average rate of cohesion reported in each block.

Results

Descriptive statistics for block, egohood, and NSP levels of aggregation are shown in tables 12-14. Here we can see that the mean for block level neighborhood cohesion is 2.79 with a standard deviation of .25. A mean of 3 would indicate that residents perceive that neighbors are likely to engage in cohesive behavior, which is fairly close to the mean for sampled blocks in the study. A standard deviation of .25 shows that there is some variation between sampled blocks.

Results are shown in table 16. When looking at block characteristics, one variable is consistent between models. Percentage Hispanic has a negative relationship with neighborhood cohesion. Population density has a positive relationship to cohesion, but only in the block level model. Percent home owners is positive and approaches significance but only in the NSP model. The response control is significant in the egohood level model suggesting that more respondents in an egohood is associated with lower cohesion.

There are several significant findings when looking at businesses and jobs. Egohood level models do not capture any significant business effects. Block level models find a positive effect that approaches significance for manufacturing and retail jobs. While retail jobs are not significant in NSP models, manufacturing jobs are also significant with positive directionality in these results. NSP models also find a significant negative effect for grocery stores, while retail stores approach significance and have a positive relationship to cohesion. The effects of block features are different between models. Each model has 1 specific feature that approaches significance. For the block model, building conditions are associated with lower levels of cohesion. In the egohood model, disorder has a negative effect on cohesion. Finally, in the NSP model, traffic lanes are negatively associated with neighborhood cohesion levels.

Social indicator variables show one significant result between all models. Neighborhood safety is significantly associated with increased perceptions of neighborhood cohesion. Informal social control also has a positive relationship with cohesion, although this is only significant in the block and NSP models. Income is significant and positive, but only in the block and egohood models. Lastly, female is significant in the NSP models, suggesting that a higher proportion of female respondents within an NSP is associated with higher levels of cohesion.

Table 16: Effects of Physical and Social Features on Block Neighborhood Cohesion at 3 Levels of Aggregation

	Block	Egohood	NSP
Block Chars			
% Asian	.0004	.001	.0001
% Black	.001	.002	-.0004
% Hispanic	-.001+	-.003**	-.003***
% Other	.003	-.011	.003
% Owner	.001	-.004	.001+
Ethnic Heterogeneity	-.106	-.203	-.127
Population Density (log)	.023*	.006	.013
Response Control	-.002	-.004*	-.002
Businesses			
Schools	.012	.199	-.026
Religious	.003	-.243	.041
Groceries	-.048	-.338	-.449*
Retail	.020	.039	.341+
Social Services	-.018	-.170	-.062
Recreational	-.041	-.019	-.456
Manufacturing Jobs	.001+	-.0001	.003**
Retail Jobs	.0004+	.007	-.0002
Block Features			
Traffic Lanes	-.020	-.054	-.049+
Traffic Flow	-.022	.030	-.020
Public Transit	.040	-.247	.019
Trees	-.006	-.003	.008
Building Conditions	-.050+	-.069	-.025
Disorder	.010	-.133+	-.019
Major Roads	-.004	.001	-.001
Respondent Features			
Female	.027	.086	.050+
Age	.002	.001	.001
Income	.015*	.018*	.006
Education	.003	.0002	-.001

Participation	.018	-.007	-.008
Informal Control	.256***	.010	.117***
Safety	.121***	.106**	.065***
N	331	331	331
R-Squared	.205	.471	.540
+ p<.1, * p<.05, ** p<.01, *** p<.001			
Note: Perceptions of cohesion at the block level is the outcome for all models.			

The R-Squared values shown in table 16 suggest that block level models predict around 21% of the variance in cohesion. Egohood models explain around 47% of the variance, while NSP models explain the most (54%) variance in neighborhood cohesion levels. While the use of egohood units of aggregation seems to be associated with a substantial increase in explanatory power over the block level models, NSP aggregation improves on this by 6%. The goal of these analyses is to explain variance in block level perceptions of cohesion, and the higher R-Squared value does in fact suggest that NSP models are the preferred choice here. This suggests that aggregate units based on NSPs do a better job of capturing the features and connections that residents consider when thinking about various aspects of their neighborhood.

Again, findings within these models are a bit mixed. While there are some inconsistencies across models, the role of underlying population demographics, businesses and employment opportunities, block aesthetics, and social indicators can be seen in these results. However, a comparison of R-squared values does in fact suggest that NSP models are the more appropriate unit of aggregation in this case. Therefore, it can be inferred that greater weight should be given to the results found in the NSP aggregate results.

V*ariance in cohesion*

Prior research has also focused on factors that explain variance in cohesion. The final series of analyses uses the standard deviation in the cohesion measure at the block level in order to understand how the features discussed thus far are associated with *differences* in perceptions of neighborhood cohesion among residents located in close proximity to each other. A standard deviation was calculated for each block based on the mean scale rating cohesion value calculated based on Cronbach's alpha test. Descriptive statistics are shown in tables 12-14. The mean standard deviation for neighborhood cohesion is .33 with a standard deviation of .15. While this does indicate a fair amount of agreement among block residents, there is some variation here worth exploring.

When looking at block and NSP level models in table 17, we see that the response rate is the only significant underlying characteristic associated with variance in neighborhood cohesion. This makes sense given that more respondents offer more opportunity for variance to occur. This result is not significant for egohoods, although they do find a negative effect for percent black and a positive effect for ethnographic heterogeneity not found in the other models. There are no significant results when looking at businesses in the block model. Religious organization do show a significant positive association, but only in the egohood models. Schools have a positive association that approaches significance in the NSP models, and there is a significant positive effect for the coefficient for grocery stores that only appears in the NSP models.

The only block level feature that approaches significance is found in the egohood model. Public transit is associated with more consensus in neighborhood cohesion in this model. Block level models show 3 social predictors that approach significance. The proportion female and income have a positive association, while education has a negative association with differences in cohesion. In the egohood model, education is the only significant social predictor, although

the relationship seen here is now positive. In the NSP models, income has a significant positive association while informal control has a negative association with difference in cohesion.

Table 17: Effects of Physical and Social Features on Differences in Block Neighborhood Cohesion at 3 Levels of Aggregation			
	Block	**Egohood**	**NSP**
Block Chars			
% Asian	-.0004	-.001	-.001
% Black	-.0006	-.003**	-.0002
% Hispanic	-.0005	.0001	.0008
% Other	-.004	-.001	.008
% Owner	.0004	.0001	.0003
Ethnic Heterogeneity	.077	.218*	.090
Population Density (log)	-.003	-.006	-.008
Response Control	.002*	.001	.002*
Businesses			
Schools	.011	-.293	.379+
Religious	-.011	.319*	.033
Groceries	.021	.079	.331*
Retail	-.001	-.067	-.142
Social Services	.018	-.043	.038
Recreational	.007	-.469	-.254
Manufacturing Jobs	-.0002	.003	-.001
Retail Jobs	-.0001	-.003	-.001
Block Features			
Traffic Lanes	-.0002	-.013	.013
Traffic Flow	.036	.010	.020
Public Transit	-.105	-.223+	-.078
Trees	-.018	-.024	-.022
Building Conditions	-.012	.044	-.009
Disorder	-.018	.079	-.027
Major Roads	.024	-.002	.004
Respondent Features			
Female	.097+	-.001	.008
Age	-.002	.001	.001
Income	.011+	-.008	.012**
Education	-.010+	.014*	-.001
Participation	.026	.004	.014
Informal Control	-.122***	-.014	-.041*
Safety	.026	-.026	-.009
N	331	331	331
R-Squared	.126	.086	.115
+ p<.1, * p<.05, ** p<.01, *** p<.001			

Note: Standard Deviation in Cohesion at the block level is the outcome for all models.

Again, model R-Squared statistics are fairly similar across analyses. Block level aggregate models tend to explain the most variance (13%), followed by NSP (12%) and egohood (9%) units. The lower R-Squared value for egohood models suggests that they are not predicting as much variance as the other units of aggregation. There is only about a 1% difference between block and NSP models, which leaves model selection based on these results somewhat inconclusive. However, it can be said that NSP aggregations are preferred over the egohood level here. NSP boundaries may be capturing effects more accurately when moving beyond block level aggregate units.

Discussion

The current chapter sought to expand research on neighborhoods by incorporating and testing NSPs in the creation of an aggregate unit of analyses. NSP buffers were created for each block based on the average reported NSP and data were then aggregated to these buffers. Block level aggregations and egohoods were also developed in order to compare the new unit against a fairly standard census unit and the overlapping egohood approach that was developed to account for the movement of people. While some results were consistent, there are a good deal of mixed findings throughout the models. Though results do support the overall idea that people draw from various components of the social and physical contextual backcloth in forming their perceptions of neighborhood and neighbors, results suggest that the selection of aggregate unit is key to properly measure these environments.

The first series of analyses tested these aggregate techniques in modeling differences in NSPs, finding that each aggregate model tended to explain about the same level of variance in the standard deviation of block level NSP. Model selection based on these results was inconclusive, which suggests a need for further examination in future research. Analyses focused on cohesion found that NSP aggregation explained the most variance in the outcome. Model selection based on these results indicates that NSPs are the more appropriate unit to account for differences in block levels of cohesion.

The final series of analyses was focused on examining the variance in block level standard deviations of cohesion. While block level models were shown to explain the most variance in this outcome, NSP aggregations were an improvement over the egohood level. Model selection based on these results is inconclusive, though they do indicate that there may be some utility in NSP boundaries when aggregating beyond the block level. While some limitations may be present that "cloud" the measure of NSPs (addressed in the following chapter), these results do indicate that NSPs can be useful in the creation of aggregate boundaries. In some cases, NSP aggregations do in fact have greater utility over traditional and static approaches.

These results provide further evidence in line with Coulton's (2012) caution to scholars focused on neighborhood effects; "If researchers and practitioners craft neighborhood units of a size that differs from residents experience, this can result in measurement error, misspecification of models, and practical problems of looking for results or impact in the wrong places" (p. 140). The results of this chapter highlight that crafting these neighborhood units as residents experience and see them helps to enhance the explanatory power of models focused on measures conceptually rooted in neighborhood.

Chapter 5: Contextualizing the Current Project

Review of chapters

This project sought to capture the backcloth of the social and physical world from which residents come to connect with and understand their neighborhood and its bounds. As people go about their lives, they are connected to various spaces that provide goods and services to areas characterized by varying demographic compositions. The aesthetics of these areas differ in important ways driving levels of community attachment. Within these environments, residents form social relationships and connections to various organizations that further inform these perceptions in important ways. This contextual backcloth can ebb and flow, altering perceptions of neighborhood bounds over time. This context not only differs by area; individuals operate within these environments in different ways creating differences in these opinions. Some people may utilize certain businesses more than their neighbors leading to greater differences in areas characterized by some establishments. These factors highlight how meaningful boundary perceptions can be. These findings provided motivation towards a consideration of their role in research. Capturing these boundary perceptions and using them as neighborhood units allowed for neighborhood level processes to be captured within the bounds that residents themselves define. A comparison of models using three different levels of aggregation found varying effects, indicating the importance of properly selecting an aggregate unit. Model comparison statistics typically suggest that perceived boundary models tend to explain more variance than the other approaches explored. Future research should continue to explore the use of these boundaries, while also working to refine measures of NSP to increase their validity to this research.

The introductory chapter outlined a theoretical process where individuals come to form spatial perceptions of their neighborhood along 4 key dimensions. Underlying characteristics of

an area, businesses and jobs, block features, and individual social indicators were explored in relation to findings from a variety of fields. Theory on community attachment and activity patterns provides a fairly robust framework for understanding these relationships, but they had yet to be compiled into a single cohesive framework or been modeled to test these relationships. The goal of this chapter was to develop this framework in a way that places these various elements in the context of NSPs, allowing for an empirical examination of the influence they have on residents.

Chapter 2 explored the influence of these contextual factors on individual spatial perceptions at two points in time. Results highlight that there are significant demographic, business, block aesthetic, and social indicators that influence these perceptions. Results suggest that residents do draw from these dimensions in their formation of NSPs. While some differences were found between units of analyses for businesses, the majority of results shared some consistency. Limitations to wave 2 data make comparisons difficult, but significant indicators were found throughout all dimensions in the majority of analyses. While somewhat limited, the role of changing context was explored in relation to changing perceptions of NSP. This series of models highlights that NSPs are not a static feature, but instead are fluid boundaries that are guided by changing contexts. These individual models aimed to provide contextualization surrounding the social and physical world to create a more complete picture of their role in resident perceptions. These results provided motivation to examine these differences by theorizing and exploring differences in NSPs.

Differences in neighborhood spatial perceptions at the block level were explored in chapter 3. Again, results show that there are important features within the four dimensions being examined that have a significant influence on NSPs- specifically when looking at block level

consensus in these responses. Varying units used to incorporate business data showed some overall mixed results throughout all these models, although some similarities were found. These results suggest that NSPs may have significant implications towards creating more meaningful aggregate units of analyses beyond typical block census measures. This idea was explored and tested in the following chapter.

The application of these findings to the creation of aggregate boundaries was tested in chapter 4. The first series of analyses extended the results found in chapter 3 by modeling differences in NSPs at three different levels of aggregation. While there are some consistent results across models, a fair amount of difference can be seen here. Overall model selection based on R-Squared was somewhat inconclusive here. The NSP model does show a slight improvement over the egohood level, although block level models did explain the most variance. This does suggest that NSP models may have some utility when expanding areal units to account for features outside of the focal block.

The second set of analyses in chapter 4 also used three units of analyses in order to explore contextual neighborhood effects on block level neighborhood cohesion. Here, model selection results do highlight NSP models as the appropriate unit of aggregation. R-Squared statistics show that NSP models account for the most variance in levels of neighborhood cohesion. In fact, they explain roughly 6% more variance than those at the egohood level. This is fairly strong evidence towards the utility of these units in perceptual neighborhood analyses. Finally, the last series of analyses also results in inconclusive model selection statistics. Although R-Squared statistics are similar across models, egohoods are associated with the lowest value on this measure. Block and NSP level analyses explain roughly the same amount of

variance. These results could suggest that NSP models may be preferred when expanding areal units beyond the block level.

Taken as a whole, these results provide evidence that NSPs can be used and incorporated into research in important ways. In particular, they can help to increase the explanatory power of modeling focused on perceptions of neighbors by incorporating the people and places that residents consider a part of their neighborhood. Mixed findings here also suggest a need for further research to refine and advance measures of NSP to increase their validity and reliability as a method for spatial research

Connecting to and improving theory

Results across chapters are fairly consistent with theory. Overall, residents do draw from a wide variety of influences in their understanding of neighborhood boundaries. Demographic factors like racial composition, population density, and housing ownership levels in an area do have an influence on respondent perceptions in a variety of ways. Ethnic heterogeneity had a significant negative effect on individual NSPs in the wave 2 models. This suggests that people in blocks characterized by higher levels of ethnic heterogeneity see their neighborhood as smaller places. Models focused on block level differences in NSPs show that heterogeneity is associated with greater difference in these perceptions as theory would suggest (Putnam, 2007; Laurence & Bentley, 2016). An egohood level model also shows that areas characterized by higher heterogeneity have more disagreement in perceptions of cohesion. This indicates that measures of ethnic heterogeneity not only capture differences among populations, but also differences in the perceptions of the individuals within them.

Interesting results arise when looking at businesses in a given area. Coulton et al. (2012) found that residents tend to focus on schools when considering their neighborhood boundaries. Empirically, this study finds mixed results. While change in individual NSP models do show a positive relationship between schools and NSP, this result only approaches significance for model 2. Results focused on difference in social cohesion show that schools are associated with greater differences in this outcome, but again this only approaches significance. This provides mixed evidence that residents do tend to incorporate schools into their NSPs, and that schools may influence perceptions of cohesion in different ways. Though there are mixed results surrounding businesses and perceptions, these analyses confirm the idea that the location and distribution of businesses do inform resident perceptions in meaningful ways as community attachment and activity patterns research suggest (Lynch and Rodwin, 1958; Lynch, 1995; Banerjee, 2002; Coulton et al. 2012; Brantingham et al., 2017).

Block features seem to have an influence as well. Resident drawn maps were also used by Lohmann and McMurran (2009) to examine the relationship between construction of a major highway and NSP. They found that this reduced perceived boundary size among their sample due to the "hard boundaries" they create. Empirical findings throughout this paper do find a significant effect of being near major roadways, but only in models focused on differences in block level NSP. Results indicate that major roads are associated with greater differences in NSPs. No significant effects were found in individual level models. While this is not the hypothesized direction for this coefficient, it does provide evidence that major roads are associated with differences in NSP as reported by residents living on the same block. Future research should focus on uncovering the mechanism through which major roads influence these differences. We also see some significant influence surrounding various aesthetics within an

area. Trees, traffic flows, and other features have been shown to influence resident perceptions. Individuals in areas characterized by the presence of more trees and heavier traffic flows see their neighborhoods as smaller places. Trees may help create a neighborhood setting that promotes attachment to an area, while separating that space from neighboring areas. Results surrounding traffic flow suggest busy streets may restrict boundaries in ways noted by Lohmann and McMurran (2009).

Social indicators seem fairly well aligned with theory. Although associations between cohesion and neighborhood spatial perceptions are not significant, they do tend to operate in the theorized direction suggesting it may be linked to greater consensus in NSP, as well as larger perceived boundaries. Informal social control has a significant effect in some NSP models, although this relationship is stronger when looking at cohesion. This is not surprising given that cohesion and informal control are the main underlying constructs used when measuring neighborhood collective efficacy. Participation was theorized to result in larger neighborhood spatial boundary. Coulton et al. (2012) found support for this relationship in resident drawn maps, and this study offers empirical confirmation of these results. Residents who participate in more local or civic groups tend to see their neighborhoods as larger spaces. Beyond this, results indicate that participation is associated with greater variance in the perceptions. This relationship should be more carefully explored in future research.

Findings surrounding the four dimensions explored throughout this paper provide fairly strong evidence that Taylor's (2015) ideas can be applied outside the area of crime and deviance. Micro, meso, and macro level factors are organizing individual lives in ways that not only help to explain when and where crime occurs, but also in the mechanisms leading towards resident NSPs and the level of consensus neighbors share in these perceptions. Features from each of these

levels create patterns of activity and influence community attachment in ways that shape and guide a resident in their perception of spatial bounds.

Limitations and future research

One of the main limitations to this study is that the outcome of key interest here (NSP) was only asked to specific respondents in the sample (randomly selected adults). This means that perceptions on neighborhood bounds are generally limited to one person per household. This could have implications on the findings of individual and spatial analyses in important ways. Household level variation seems a worthwhile avenue for future research. Individual within household variation could also be used to help inform analyses. Averages and standard deviations from household members could be calculated at the household level and averaged to blocks in order to improve analyses. Additionally, the measure of neighborhood spatial perception is not the most ideal. While it does allow for the collection of neighborhood spatial data at a faster pace than qualitative research surrounding resident drawn maps (which represents a somewhat ideal measure), differences in spatial and temporal wording in the question asked of respondents may further complicate ordinal data issues in which there are blurred lines between categories. Further work should be done to clarify this measure to increase its validity and reliability for practical applications in social science research.

One goal of this research had originally been to include measures of distance to frequented locations to more accurately capture exposure to various business types. The current study was unable to accomplish this due to a large amount of missing data in these responses. Future research should incorporate the locations of where people work, shop, spend recreational time, and the schools they attend. This is meaningful information that can help advance an understanding of resident NSPs and block level differences or similarities neighbors have in

these perceptions. Additionally, participation in local and civic groups was significant to both individual NSP and block level variation in NSP. With results suggesting that greater levels of participation are associated with greater variance in NSP, it seems important to understand where these organizations are located. Locational data surrounding these participatory groups could further an understanding of the mechanisms leading to these differences.

Careful attention should always be paid to geo-located data. This did result in some limitations to the current study. Not all blocks from the adult survey matched on to census defined block boundaries, which resulted in lost cases reducing the possible overall sample size. Additionally, certain block level features were only collected for one wave of the LAFANS study. This produced significant limitations in creating change models and replicating results between waves. Even with these limitations, this study still provides strong evidence surrounding theories of community attachment and activity patterns in understanding resident NSPs, differences in these perceptions, and their possible utility to neighborhood effects research.

Expanding on these results

As measures are refined and gain greater reliability in measuring spatial perceptions, these aggregate techniques can be adopted by scholars focused on research surrounding health and wellbeing. Modeling neighborhoods as experienced by residents may offer a more nuanced approach in understanding the relationship between neighborhood and health. These NSP boundaries have been shown to be influenced by physical and social contexts that also have a significant relationship to important issues surrounding public health. Research focused on self-reported health can appreciate these insights as the places and people visited are reflected in these reports.

While theories of community attachment and activity patterns have been used to study and theorize the relationship between communities and crime, theories of crime typically do not focus directly on neighborhoods as residents perceive them. By incorporating more information on the contexts and perceptions of these areas, research could uncover new insights into the neighborhood/crime relationship. Although this can be more difficult to do when using census data, information uncovered about the relationship between context and NSP could be used to impute and construct aggregate units. That is, if we know the features associated with NSP, scholars could attempt to use values of these features to estimate NSPs for all units of analyses in a given area. Survey data has been shown in this paper to be useful in gathering this information, and provide new avenues of thought for practical applications.

The social and physical environment shape perceptions of NSPs and have an influence on neighborhood cohesion. These features also have the ability to influence views on policing, health, and crime, or even have the ability to influence motivations for mobilization on key social issues surrounding an area. The extent of these associations and the ability of NSP boundaries to explain these relationships can be tested in relation to each of these topics. Replication is needed, and alternate avenues of research may uncover additional findings that one should consider when examining a broad range of neighborhood level outcomes. As future research continues to explore these issues, this framework can continue to be modified and expanded in important ways.

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