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Perceptions of Safety in Urban Spaces: The Fan District, Richmond, VA

An Honors Program Project Presented to

the Faculty of the Undergraduate

College of Integrated Science and Technology

James Madison University

In Partial Fulfillment of the Requirements

For the Degree of Bachelor of Science

By Lindy Westenhoff

May 2016

Accepted by the faculty of the Department of Integrated Science and Technology, James Madison University, in partial fulfillment of the requirements for the Degree of Bachelor of Science.

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PUBLIC PRESENTATION

This work is accepted for presentation, in part or in full, at the Annual Meeting of the Association of American Geographers, on March 31, 2016, and the Integrated Science and Technology Senior Symposium, on April 15, 2016, and the Honors Symposium, on April 15, 2016, and the AOL GIS Forum, on May 10, 2016.

Dedication

This thesis is dedicated to three seniors who have worked alongside me throughout this process: Abigail Compton, Jacqueline Scott, and Emma Martin. Each from a different major, but with the same purpose of building me up and helping me succeed, these women have been nothing less than wonderful. Thank you, and may your futures take you amazing places.

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In addition, I would like to thank Dr. Helmut Kraenzle, my original thesis advisor, for being so kind as to let me change my topic so drastically and directing me to professors within our department who would have more expertise on the new subject.

Finally, I would like to thank Bill Harrison and Debra Terry of Diversity Richmond, as well as Keri of the James River Transgender Society, for letting me work with them on this project. I was received with such a positive and welcoming atmosphere that I never felt any doubts about my data collection or research. In addition, I'd like to thank Madison Equality for letting me work with them in the second half of my research. Your enthusiasm made a huge difference!

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Abstract

This project identifies and spatially analyzes environmental factors that influence the perception of safety in populations of women within Richmond's LGBT community. The project was conceived due to increasing calls for awareness about street harassment. Its purpose is to examine what physical factors, at the street level, increase or decrease feelings of safety or discomfort for women within this community.

In the first part of the project, survey data was collected from volunteer participants, members of either Diversity Richmond, downtown Richmond's local LGBT resource center, or Madison Equality, the LGBT student organization at James Madison University. Using blank paper maps provided, participants highlighted areas of the city that they felt as "safe" with green, "less safe" with yellow, "neutral" with blue, or "unknown" with orange.

The second part of the project aggregated the map data and determined areas of agreement using GIS technology, identifying points of overlap in both safe and less safe areas. These points of overlap were seen mainly at intersections.

The third and final phase of the project evaluated the overlapping intersections. To do this, photos were taken in the field and researchers walked the area. Using a 16-factor metric, researchers tallied environmental factors influencing perceptions of safety and less safety in the area. This metric, developed from previous studies conducted on safe and unsafe urban areas, provides eight "safe" and eight "unsafe" qualities to be assessed per location. Safety factors included line of sight, lighting, vegetation alongside the walkway, and the width of the sidewalk. Factors contributing to the perception of less safety included the presence of graffiti, badly-maintained sidewalks, and few people in an area.

By applying the 16-factor metric to the seven street intersections, the two sites considered safe were seen to have high instances of "safe" factors, with two "unsafe" factors each as well. Two of the five remaining intersections considered unsafe by participants met five and four "safe" criteria, as well as five and four "unsafe" criteria. This suggests further refinement of the safe/unsafe metric for future work.

Further research would incorporate applying the results found in this study to other city models, or expanding the survey instrument to incorporate demographic or age data, to possibly account for the consensus on areas considered safe, but less consistent consensus on unsafe.

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Chapter 1: Introduction

The aim of this project is to bring together GIS tools and urban geographical research to understand safe space design in contemporary cities. This study has illustrated that there are significant opportunities for geospatial technologies to productively combine with both urban planning and areas of social justice.

As topics of research in geography, women's safety and LGBT safety do not often overlap, especially when approached using geospatial technologies. Further, urban planners often do not foreground minority needs when designing or retrofitting urban areas. To approach the concept in an integrated fashion, this study works with four interconnecting areas: geographic theory, social activism issues, VGI and geographic information systems, and urban planning. The result is a pilot study design, implemented to focus specifically on women within the LGBT community of Richmond, Virginia.

The original idea behind the study was to determine where women in the LGBT community are harassed in public (though the topic has shifted considerably from that point.) To translate the overwhelming concept of street harassment into the exploration of what environmental factors could have an impact on participants' safety in Richmond was a challenge. However, the results of this study not only gave participants a feeling of agency, but the aggregated results will provide Diversity Richmond with some framework to move forward in pursuing safety issues with the Richmond police.

Courtney Richter's 2014 study on Muslim women's perceptions of safety[1] provided the inspiration for the research pursued here. However, rather than ask participants to sketch maps, I designed a paper map participants colored in, a method of data collection not seen in any case

[1] Richter, Courtney. *Visualizing Geographies of Perceived Safety: An Exploration of Muslim Women's Experiences in Public Space (Master's Thesis).* University of Missouri-Columbia: 2014.

studies I have encountered. I feel this not only expedited data collection and analysis, but also provided more context for participants in what information I, the researcher, was looking to examine in more detail.

In terms of scale and broader applicability, Richmond is a mid-sized city of more than 200,000 people, but my research focused on a quadrangle of one particular district, the Fan, and some surrounding areas. The factors I identify as particular street-level indicators of safety or discomfort could, hopefully, be upheld in other cities of a similar size in the southern United States.

Chapter 2: Background Information

Section 1: Feminist Geography and Social Activism

In the 1960's and 1970's, the emergence of radical geography reshaped human geography as a sub-discipline. Mainly associated with addressing imbalances of power, the research in this field became heavily associated with the geographies of fear, safety, and issues affecting minority groups.[2] Marxist and feminist geographies emerged from this broader field, though feminist geography is more widely studied today.

The most recent focuses in feminist geography tend to examine imbalances of power, similar to the focus of the 1970's, but instead of focusing chiefly on workplace issues and criticisms internal to the discipline, the lens has turned towards marginalized individuals and communities. In particular focus are the issues of safety and fear, for both heterosexual women and members of the LGBT community.[3] While technically a separate offshoot of cultural geography concepts in the 1980's, "Sexuality and Space," a qualitative examination of relations between humans that the space that they occupy, has become heavily associated with and intertwined with feminist geography, especially in examining issues of gender and place. There are three major issues both feminist geography and Sexuality and Space consistently engage with that are relevant to this study: street harassment, passing privilege, and intersectionality.

Street harassment is a common complaint within cities. Comments of harassment almost always originate from men, and almost always in some way relate to the victim's physical attributes.[4] Kissling goes so far as to label street harassment as a type of "sexual terrorism," in

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[2] Cresswell 132.

[3] Valentine, Gill. "The Geography of Women's Fear." *Area* 21, no. 4 (December 1989): 389.

[4] Kissling, E. A. "Street Harassment: The Language of Sexual Terrorism." *Discourse & Society* 2, no. 4 (1991): 452.

which fear of male actions prohibits women from engaging in their communities as men would, including going outside at certain times of day or dressing in certain ways.[5] Feminists have tried to combat street harassment with strategies such as the "Hollaback! Movement"[6] and the "Cards Against Harassment"[7] experiment; both of these projects tried to engage directly with the perpetrators of the comments about why street harassment is a problem for everyone, not just for women.

However, there are few if any case studies examining LGBT street harassment. The most comprehensive survey, undertaken by the European Union Agency for Fundamental Rights, found that just under half of the respondents said that they felt "personally discriminated against or harassed on the grounds of sexual orientation."[8] However, this survey provides little beyond data. The process of data-gathering is not explained, nor is there a methodology or procedure provided. As a governmental agency, that is logical, but once again, it leaves no model for researchers to engage with in a geospatial sense. There is also no corresponding study in the United States. There would seem, then, to be an opportunity here for a grounded, in-depth geographical analysis of this problem.

The data and the tools to examine street harassment from a quantitative standpoint exist, but researcher has yet put a framework together to unite the two. There is also the obvious issue of reporting street harassment to authorities and the lack of response typical in the United States. Instances of victims being followed or catcalled and not physically touched or assaulted may be

[5] Kissling 455.

[6] http://www.ihollaback.org/

[7] http://www.stopstreetharassment.org/2014/06/cardsagainstharassment/

[8] http://fra.europa.eu/sites/default/files/eu-lgbt-survey-factsheet_en.pdf

considered minor or less important by the police.[9] It is also worth noting that a mapping initiative to plot reported harassment in cities, led by the nonprofit Stop Street Harassment, is now defunct.

Feminist geography has successfully looked at the geographies of fear and safety (focusing on heterosexual women) by producing studies that illustrate that women are more fearful of leaving their homes at night,[10] more reluctant to go places without another person along,[11] and regard various environmental factors as elements that create issues of safety.[12] Regarded the most negatively, as found by Courtney Richter, are car parks, especially parking garages - [13] participants in the study reported they felt the least safe due to the factors of lighting and distance to help if something were to happen.[14]

Data from the Richmond Police Department puts the number of "sex offense" cases between February 2012 and March 2016 at 565. This is less than one percent of total crime within these same dates.[15] Further, the categories of "sex offense" include sexual battery, forcible rape, and stalking, but not catcalling and other forms of street harassment. Perhaps alarmingly, downtown Richmond's Fan district, the focus of the study, saw 21 total cases between these dates, the second-largest number of cases in one particular neighborhood. While the commonly

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[9] Bowman, Cynthia Grant (Jan 1993). "Street Harassment and the Informal Ghettoization of Women". *Harvard Law Review* 106 (3): 548.

[10] Valentine 389.

[11] Jorgensen, L. J., G. D. Ellis, and E. Ruddell. "Fear Perceptions in Public Parks: Interactions of Environmental Concealment, the Presence of People Recreating, and Gender." *Environment and Behavior* 45, no. 7 (2012): 816.

[12] Nasar, Jack L., and Kym M. Jones. "Landscapes of Fear and Stress." *Environment and Behavior* 29, no. 3 (May 1997): 292-293.

[13] Richter 70.

[14] Richter 77.

[15] 565, divided by 137,428 crimes in total = 0.41%

used statistic in the United States is that one in four women will experience harassment in their lifetime, police reports consistently do not reflect that.[16]

In a different vein, members of the LGBT community may feel harassed for simply existing and being seen publicly, due to the uncomfortable subject of "passing privilege." Passing privilege is rooted historically in the African-American community, in which men and women of fairer skin received more societal benefits than members of the same race who had a higher melanin content in their skin.[17] The term has now come to be used in many aspects, moving beyond race into ethnicity, gender, disability, and even religious aspects, though this study focuses on the gender aspect.

Passing in the LGBT community means appearing as heterosexual and cisgender. Women in the LGBT community often self-censor their queer identities for workplace promotions, avoidance of social awkwardness, and safety reasons - to avoid harassment or societal stigma.[18] Further, the LGBT community includes transgender and intersex individuals whose primary and/or secondary sex characteristics are, at least in some ways, inconsistent with biological sex. In the transgender community, to "pass" is to appear as a member of one's self-identified gender, rather than the gender assigned to one at birth.

It is still legal in 33 states to fire someone over their gender identity and legal in 30 states to fire someone over their sexual orientation, so there is plenty of precedent as to why LGBT

[16] http://www.oneinfourusa.org/statistics.php

[17] Mizock, Lauren, and Ruben Hopwood. "Conflation and Interdependence in the Intersection of Gender and Sexuality among Transgender Individuals." *Psychology of Sexual Orientation and Gender Diversity* 3, no. 1 (2016). 95.

[18] Bell, David, and Gill Valentine. *Mapping Desire: Geographies of Sexualities.* London: Routledge, 1995. 61.

women want to pass.[19] Passing is even more difficult for double or triple minority individuals - such as a transgender woman of color, or a Latina genderqueer person. This brings us to the next social activism concept crucial to the study: intersectionality.

This concept, established in the 1970's by African-American feminists, argued that the "shared experiences" referenced by major feminist movements were not actually universal. Rather, the argument ran, the experience of being Black and the experience of being a woman could not be separated from each other, and in fact enforced each other. This has since grown to encompass many areas of feminist theory.[20]

In a surprising contrast, intersectionality can pose a problem in feminist circles. Some feminists argue that to be a true feminist is to focus only on issues that relate to all women.[21] My counter to that line of thought, and articulated much more succinctly by the late lesbian feminist Audre Lorde, is that "there is no such thing as a single issue struggle because we do not live single issue lives."[22]

The purpose of this study is to look at not just members of the LGBT community, and not just women – but rather, at the crux of their intersection. Women's experiences alone, and the experiences of the LGBT community, are very different from each other, but the points of intersection, women who are members of the LGBT community, are the focus of this research.

Section 2: VGI/NeoGeography and GIS

OpenStreetMap is a valuable example of what citizen science should look like. This project, begun in 2004, has grown to parallel the work of governmental organizations like the

[19] https://www.aclu.org/map/non-discrimination-laws-state-state-information-map

[20] O'Brien, Jodi. *Encyclopedia of Gender and Society.* A-L. Los Angeles: Sage Publications, 2009. 468.

[21] O'Brien 469.

[22] Lorde, Audre. *Sister Outsider: Essays and Speeches.* Trumansburg, NY: Crossing Press, 1984.

USGS in terms of accuracy and reliability.[23] However, while USGS pays their geography professionals a salary, OpenStreetMap is user-created and curated, with some minor exceptions.[24] More broadly, there has been a surge of user-generated content upon the emergence of the Web 2.0 in the early 2000's. Because it is intuitive and results are obvious, participants feel they are contributing to a greater cause.[25] Goodchild uses the term "neogeography" while Parker uses the term Volunteered Geographic Information (VGI), or volunteer-generated content. Either way, participants are not professional geographers. These people may be motivated for a variety of reasons, but financial motivation is not one of them.

VGI/NeoGeography is a relatively new phenomenon within geography. Some geographers feel it devalues the discipline, as "now anyone can be a geographer,"[26] and some go so far as to say these citizen scientists are "superficial, lacking depth and obligatory commitment."[27] Others, rather, argue it creates new opportunities to engage with civic organizations and provide theoretical framework for studies done by and for a local community.[28]

The fact that anyone can map anything with the proper, now affordable tools has certainly created new opportunities for professional geographers. A study of the White-Tailed

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[23] Goodchild, Michael. "NeoGeography and the Nature of Geographic Expertise." *Journal of Location Based Services* 3, no. 2 (2009): 87-88.

[24] Goodchild 89.

[25] Dodge, Martin, and Rob Kitchin. "Crowdsourced Cartography: Mapping Experience and Knowledge." *Environment and Planning A* 45, no. 1 (2013): 20.

[26] Goodchild 94.

[27] Dodge 20.

[28] Parker, Christopher J. *The Fundamentals of Human Factors Design for Volunteered Geographic Information.* Leicestershire, UK: Springer, 2014. 5.

Ptarmigan, performed concurrently with a geography field team and by volunteer hikers, proved to be almost the same level of quality when their data was analyzed by the professional team.[29]

VGI-supplemented studies are becoming far more common. On the analysis side, too, many components of GIS are now free. Though ESRI products remain proprietary, QGIS, GRASS, and Mapbox provide everyday users with essentially the same tools used by professionals. This further creates more opportunities for VGI, which is both exciting and alarming for professionals.

Further complicating matters for this study, while it is common for professionals to work with local communities for VGI opportunities,[30] LGBT and other minority groups are often wary of data-gathering focused specifically on them. There are many good, historical reasons for this, the Tuskegee Experiment being one of the most unsettling;[31] however, today that translates to issues with data gathering. There have been several organizations in Richmond, for example, that tout themselves as "LGBT-friendly" according to the board of visitors.[32] However, there are no numbers available that look at how many people within Richmond consider themselves to be part of the queer community, presumably for safety reasons.

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[29] Jackson, Michelle M., Sarah E. Gergel, and Kathy Martin. "Citizen Science and Field Survey Observations Provide Comparable Results for Mapping Vancouver Island White-tailed Ptarmigan (Lagopus Leucura Saxatilis) Distributions." *Biological Conservation* 181 (2015): 162-72.

[30] Boschmann, E. Eric, and Emily Cubbon. "Sketch Maps and Qualitative GIS: Using Cartographies of Individual Spatial Narratives in Geographic Research." *The Professional Geographer* 66, no. 2 (2014): 236-48.

[31] Flicker, Sarah, Robb Travers, Adrian Guta, Sean Mcdonald, and Aileen Meagher. "Ethical Dilemmas in Community-Based Participatory Research: Recommendations for Institutional Review Boards." *Journal of Urban Health* 84, no. 4 (2007): 478-93.

[32] http://www.visitrichmondva.com/about-richmond-region/diversity/lgbt/shoppinglgbt/

A final component of VGI that was the initial data collection plan, but was altered for reasons explained in methodology, is the rise in using participant-sketched maps to gather data from survey participants. Areas individuals know very well are very detailed, while others remain ambiguous.[33] Rather than having participants sketch their own maps, this study asked participants to color on a pre-determined map, eliminating the issues of ambiguity.

Section 3: Urban Design and the Social Life of Small [Richmond] Spaces[34]

The late, great William H. Whyte's profound work, *The Social Life of Small Urban Spaces,* took the examination of urban areas to the next level in terms of detail. He lists many factors in his work that make people want to be in a space (or plaza, as his emphasis lies): proximity to sitting space, the presence of elements of nature such as trees and running water, and even the accessibility to food along the street face.[35] Jan Gehl articulates this further in *Cities for People,* moving beyond individual factors and focusing on a more crucial element: scale.

Certain measurements and street dimensions make people feel comfortable and safe. An example for this is the 4:1 rule, in which the dimensions of any building surrounding the street should be no more than four times taller than the width of the street. The area of Richmond along Broad Street does this very well.[36] Another example is that people typically move at the pace of three miles an hour, but to keep a walk interesting, there should be a new "thing" to look at just about every 20-30 feet. Richmond's downtown does a good job of providing this three mile an hour pacing along both Cary Street and Broad Street. In addition, along the tree-lined, mostly

[33] Boschmann 239.

[34] With all respect to the late William H. Whyte.

[35] Whyte, William Hollingsworth. *The Social Life of Small Urban Spaces.* Washington, D.C.: Conservation Foundation, 1980.

[36] Gehl, Jan. *Cities for People*. Washington, DC: Island Press, 2010. 163.

connected sidewalks, old neighborhoods near the Fan provide a green space otherwise not distinctively provided, except on the campus of Virginia Commonwealth University.

In contrast to what makes a city attractive to people, there are three major studies cited in this thesis focused on what factors cause people to feel unsafe. The first, "Landscapes of Fear and Stress," essentially started the national conversation on how gender was a factor in determining safety and creating a difference in levels of comfort in public places between the male-female binary.[37] Nasar and Jones came to the conclusion that most females associated fear of attack with places people could hide. The presence of a stranger when walking alone increased that fear, while being in a populated space reduced that fear. The other study, Stamps' "Enclosure and Safety in Urbanscapes," confirms the findings of Nasar, and adds the component of lighting as being one of the most significant aspects to impact feelings of safety, as their study artificially lightened or darkened images using image manipulation software.[38] These findings give structure to the final step of research - identifying the multiple street level factors described here that offer either a sense of safety or one of discomfort. Blobaum's "Perceived Danger in Urban Public Space: The Impacts of Physical Features and Personal Factors" built upon both of these previous studies.[39] While Blobaum's was focused on campus settings, the environmental factors attributed in her study were still relevant as they did not focus on campus-specific resources alone. These three sources provided the basis for the assessment as to the safety of the street intersections.

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[37] Nasar, Jack L., and Kym M. Jones. "Landscapes of Fear and Stress." *Environment and Behavior* 29, no. 3 (May 1997): 291-323.

[38] Stamps, A. E. "Enclosure and Safety in Urbanscapes." *Environment and Behavior* 37, no. 1 (2005): 102-33.

[39] Blobaum, Anke, and Marcel Hunecke. "Perceived Danger in Urban Public Space: The Impacts of Physical Features and Personal Factors." *Environment and Behavior* 37, no. 4 (2005): 465-86.

Chapter 3: Methods and Procedures

Section 1: Data Collection

The first phase of the project entailed data collection using an IRB-approved expedited survey. From early January to the first week of February, I worked with the JMU Institutional Research Board to create and modify a survey to administer to participants. At the same time, I contacted Diversity Richmond, one of two LGBT resource centers in the area and the closest in distance to the Fan, and worked with their outreach coordinator to design a survey with which women in the LGBT community would be most comfortable. Her input was that the less detailed questions were asked, the more participants would agree to take the survey, and that more participants would be likely to contribute if the survey was given at Diversity Richmond itself. While demographic data would be useful, I did not ask questions of their race, orientation or gender, and instead designed what I'm referring to as a "pre-sketched" map as my survey instrument.

My product was a grayscale map of streets, with major streets and four reference points labeled. I then asked participants to highlight the map using different colors, essentially sketching their emotional connections to areas of the Fan District. I avoided the use of red due to its largely negative connotations in American culture, such as being the symbol for "stop" in traffic lights[40] as well as the more practical consideration of red not being a standard color in highlighter sets. I chose to use yellow instead to represent less safety. Green remained the standard symbol for comfort. Blue stood for neutral, and orange for unknown. I used the language of "comfortable" and "uncomfortable" rather than "safe" and "unsafe" on the maps to make participants feel more at ease. I did not provide a north arrow or more than minimal street

[40] Elliot, Andrew J., Markus A. Maier, Arlen C. Moller, Ron Friedman, and Jörg Meinhardt. "Color and Psychological Functioning: The Effect of Red on Performance Attainment." *Journal of Experimental Psychology: General* 136, no. 1 (2007): 154-68.

names to avoid clutter. A blank example map is shown in figure 3A and a highlighted map, selected at random, is shown in Figure 3B.

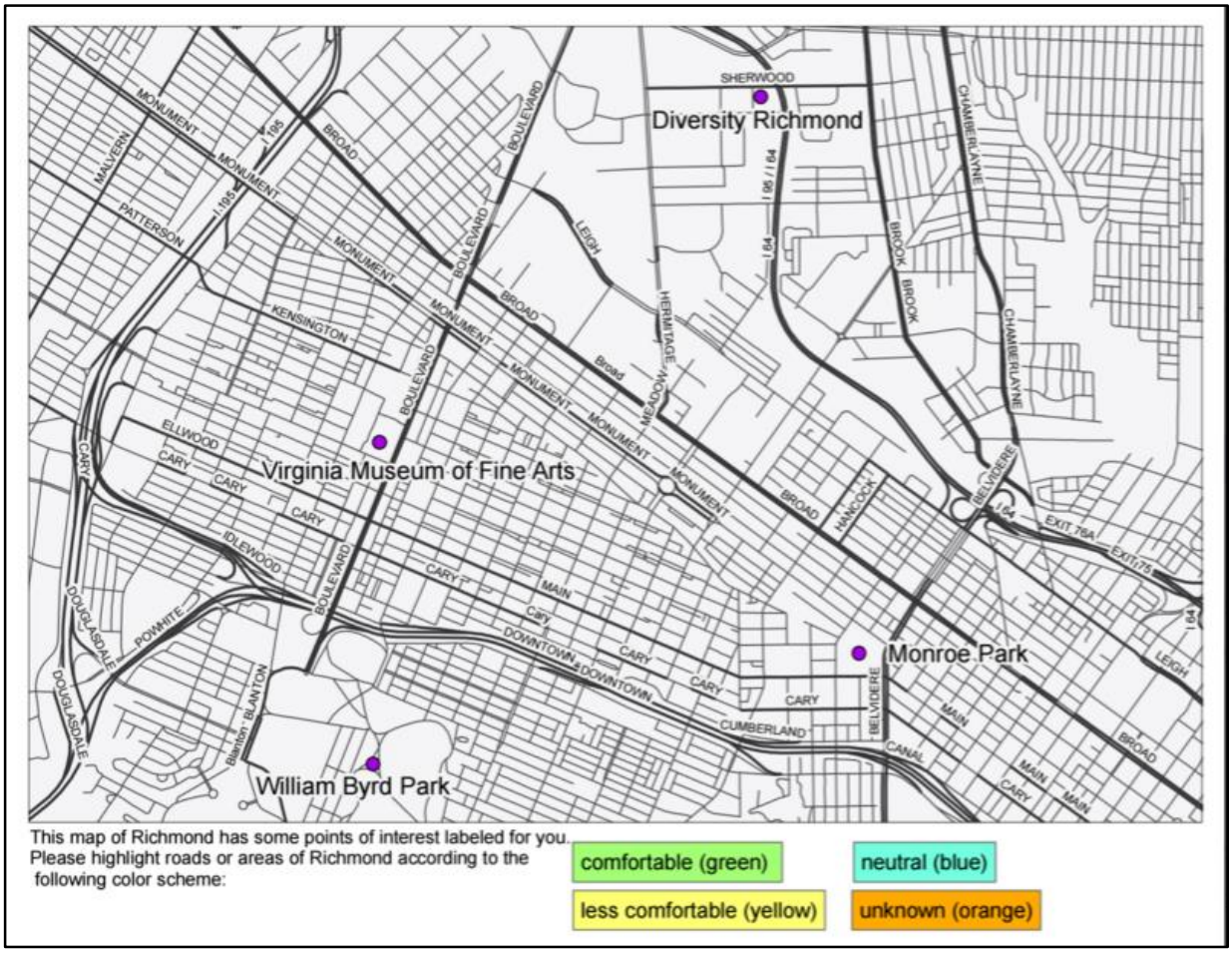


Figure 3A: The map handed to survey participants

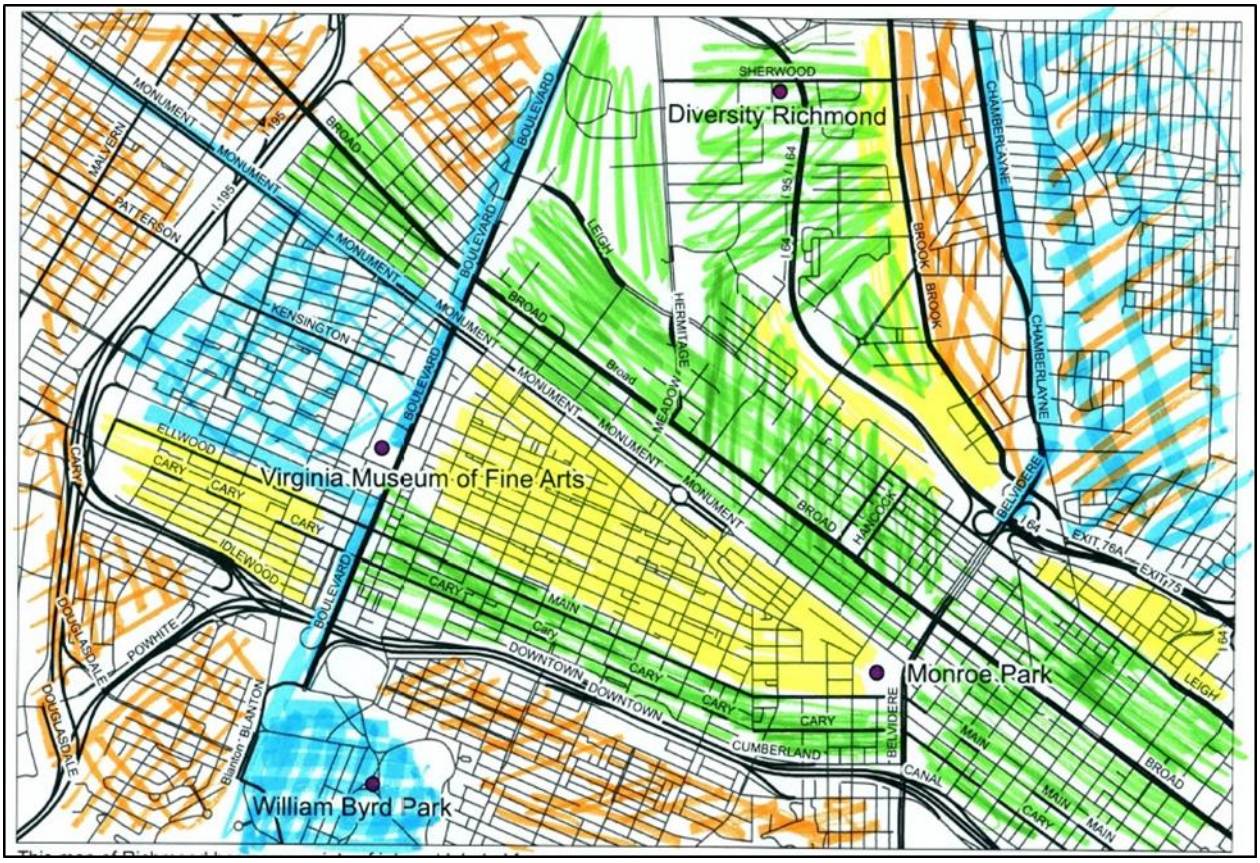


Figure 3B. A selected paper map highlighted by a participant

I did two dates of data-gathering, with a total of 33 results, from Diversity Richmond participants. I was pleased that I had a reasonable sample,[41] but contacted Madison Equality, the LGBT+ student organization on campus, to see if any members were interested in participating. Several students volunteered to assist me, bringing the total number of participants up to 58.

The paper maps were kept in two different manila envelopes (one for the Diversity Richmond group and one for the JMU student group) and in a locked desk drawer when not being scanned. They will be destroyed upon the completion of the study.

[41] While this data sample is quite small for a typical research project, most of the references I used to design this study had at most 30 participants. This is due to the common perception in the LGBT+ community that research gathered by institutions is either misleading to participants, used unethically, or both, similar to how many African-Americans regard institutional research due to the Tuskegee Experiment. While there is no singular event in the history of the LGBT+ community that has led to this perception, the fact remains that there are few participants in institutional research studies.

Section 2: GIS Integration

Once the maps were collected, I scanned them in batches of three at a time, creating digital images from the paper maps participants had highlighted, and immediately returning the paper maps to their manila envelope. These images, housed on an encrypted external hard drive, were then imported into ESRI ArcMap for georeferencing.[42]

After georeferencing, I digitized each layer of each factor. To do this, I created a new polygon with no features, and used the Editor function to draw polygons where participants had highlighted. Figure 3C serves as an example of what the completed digitizing process looks like.

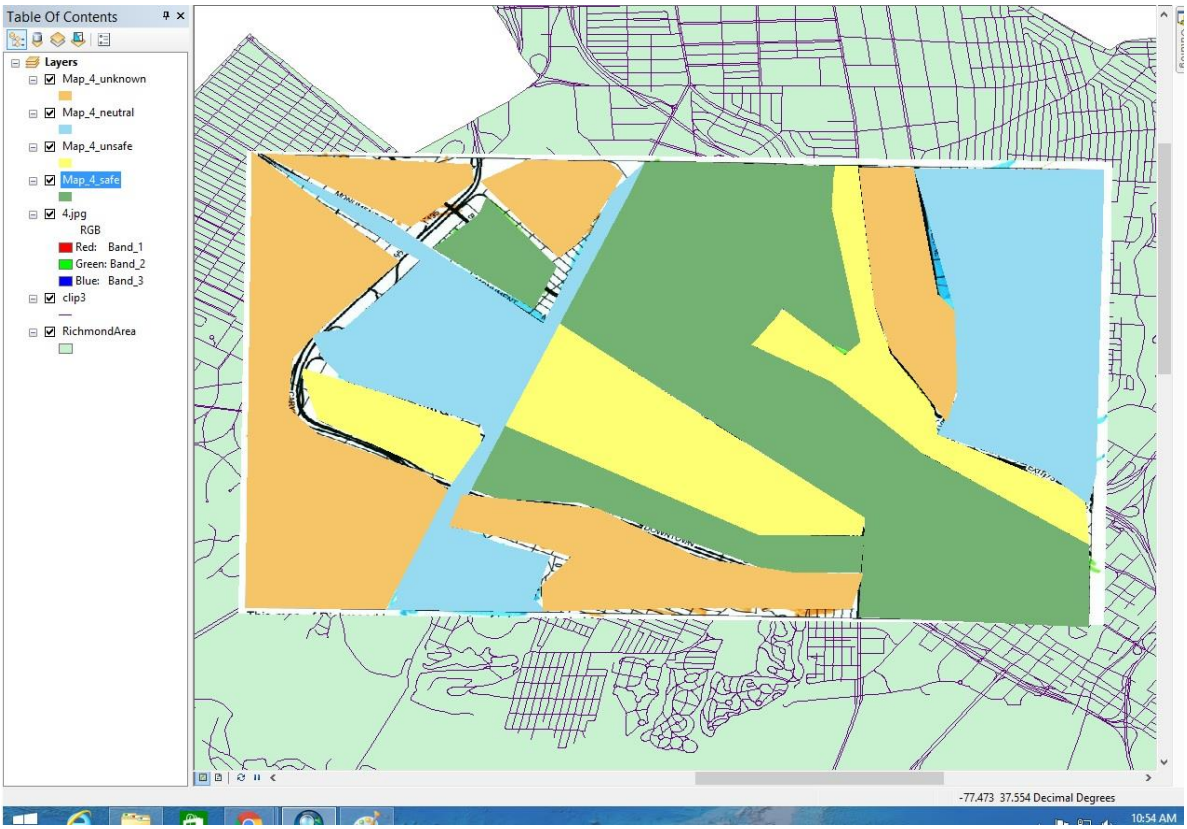


Figure 3C. The completed digitizing of the highlighted paper map from Figure 3B

[42] Essentially, an image alone has no physical location. Thus, each digital image has to be assigned coordinates in space that correspond to the physical location they represent. After georeferencing is finished, that image has spatial location assigned to different pixels, and will remain in the same area.

Finally, the last step was to take the aggregated results of each safe, unsafe, neutral and unknown area and see where they most intersected. To do this, I merged all the safe/unsafe map components into one massive "master" file, then applied the Count Overlapping Polygons geoprocessing tool. This may seem a fairly simplistic procedure, but it is a reliable method of assessing which areas most participants were focused on.

Two maps below demonstrate my findings, and use a color gradient to illustrate higher numbers (darker indicates higher numbers, as indicated by the legend.)

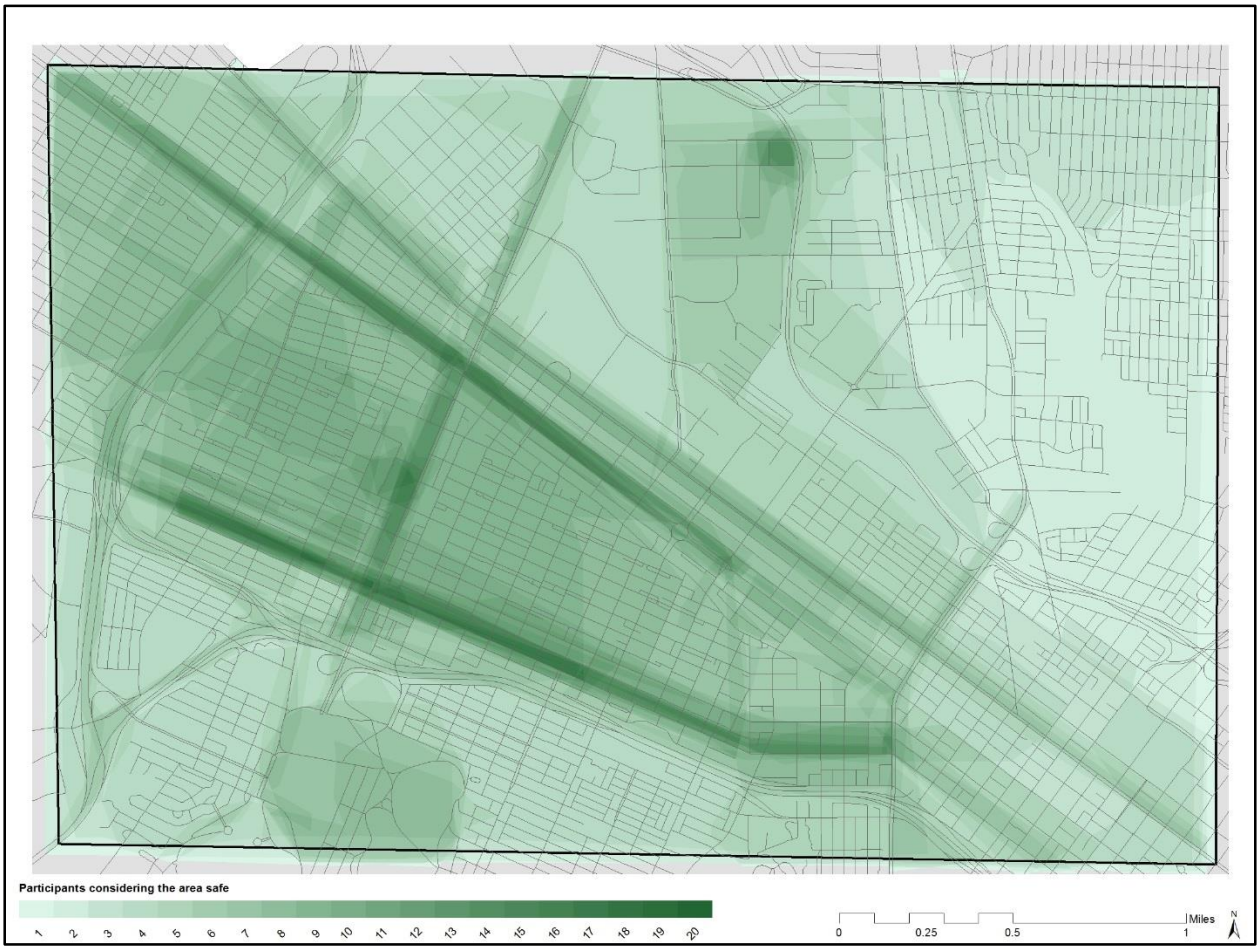


Figure 3D. Aggregated responses from participants on areas they consider safe

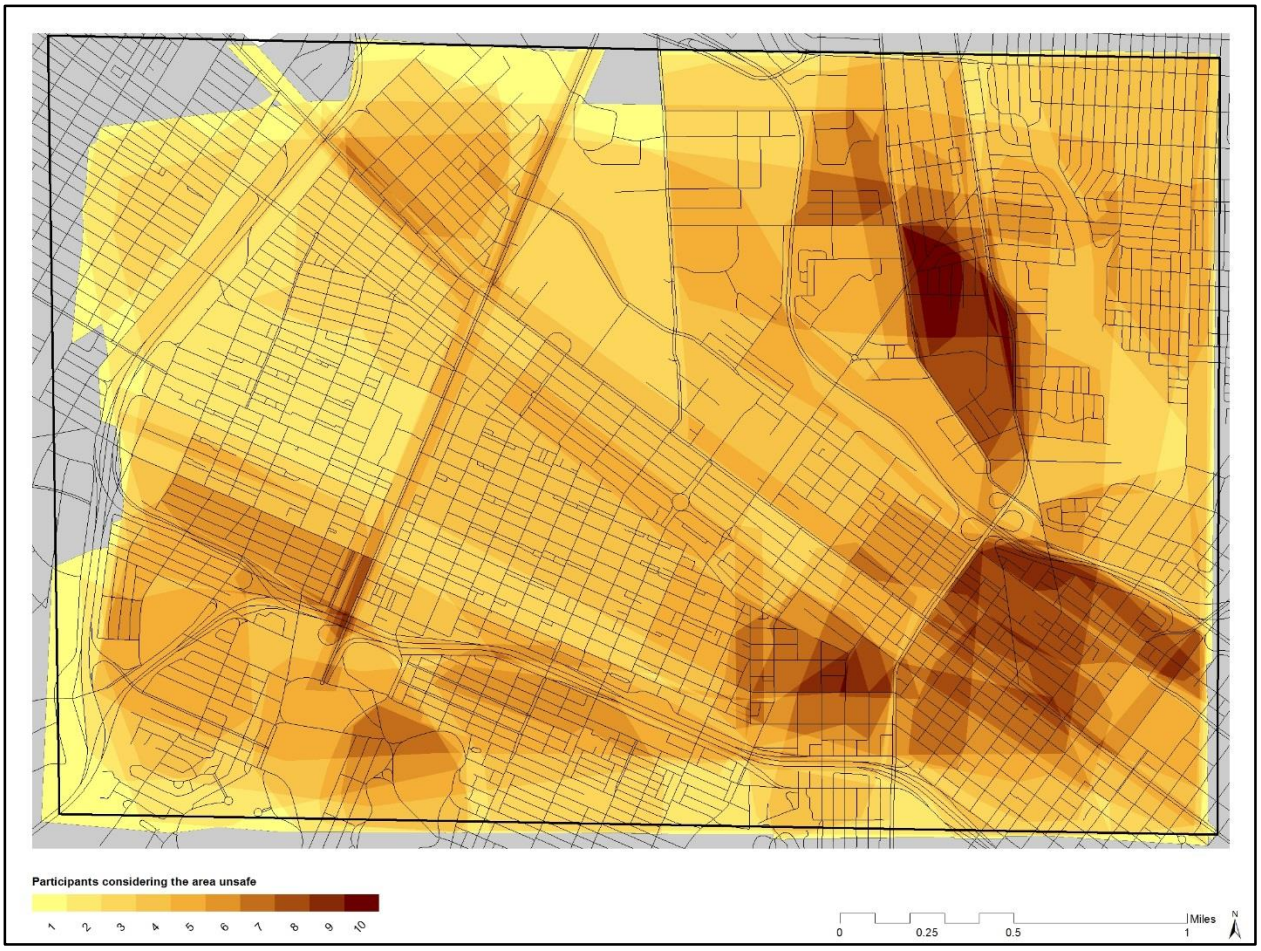


Figure 3E. Aggregated responses from participants on areas they consider less safe

My raw data results from this step produced the following:

Total number of participants	58
Total overlap on "safe"	20
Total overlap on "unsafe"	10

Safe streets (n=19 and 20):

- Cary Street and S Boulevard
- Cary Street and S Colonial Ave

Less safe streets (n=10):

- North 1st Street and East Broad Street W
- Idlewood Avenue and S. Boulevard
- W Leigh Street and Smith Street
- Brook Road and School Street
- Chamberlayne Avenue
- Sledd Street and Roberts Street

There are some fairly obvious discrepancies, such as a number of participants stating they felt unsafe near Monroe Park, but an equal number of participants saying they felt safe near Monroe Park. Further, the students at James Madison University differed greatly on what areas they considered safe and unsafe - perhaps as a result of having not been in Richmond recently.

Because of the nature of participatory research, there will always be discrepancies like this in which people feel differently from each other, but instead of "picking" one, it is best research practice to investigate the area indicated for both safe and unsafe street factors. Below, I additionally compare the results from the adults living in and around Richmond compared to the results from the students at James Madison University.

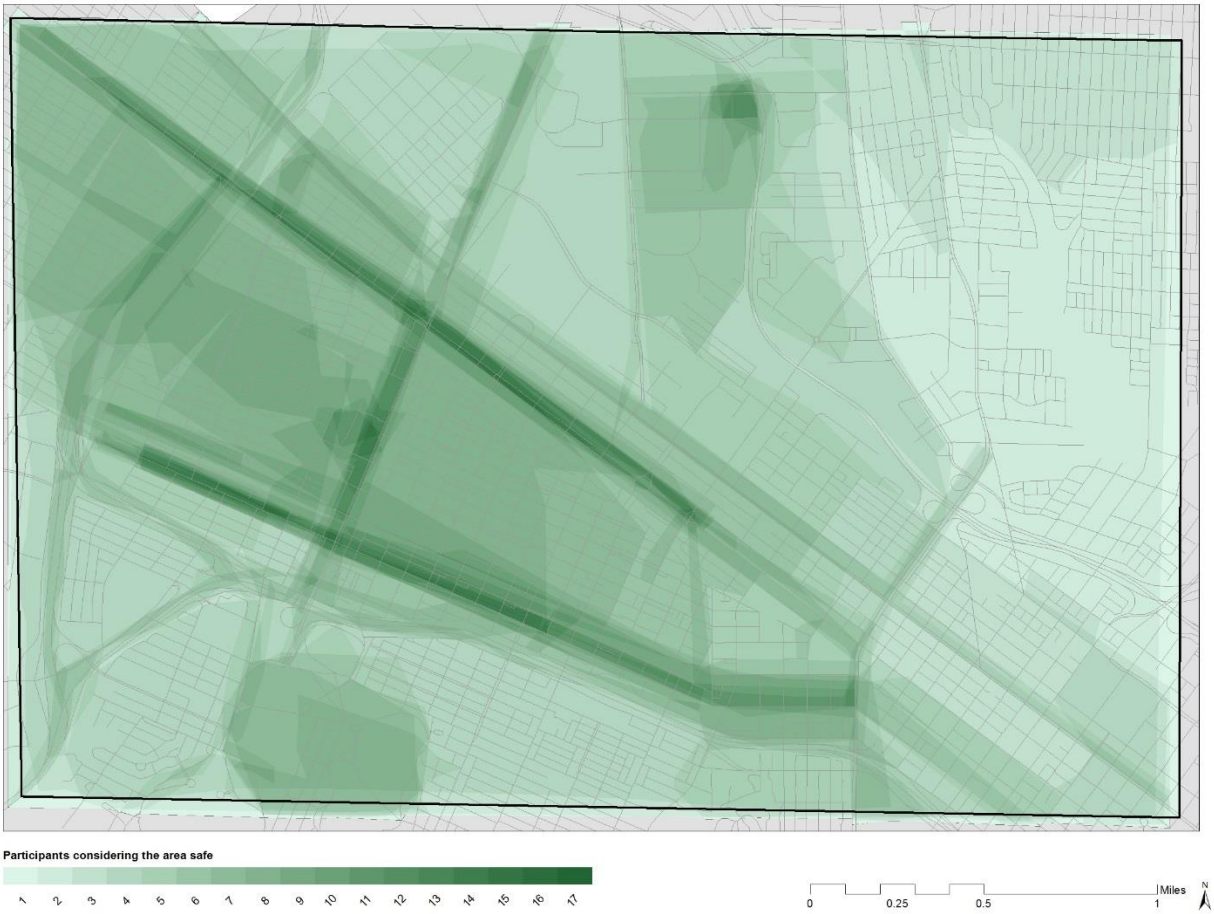


Figure 3F. Responses of "safe" areas from Diversity Richmond participants

Figure 3G. Responses of "safe" areas from Madison Equality participants

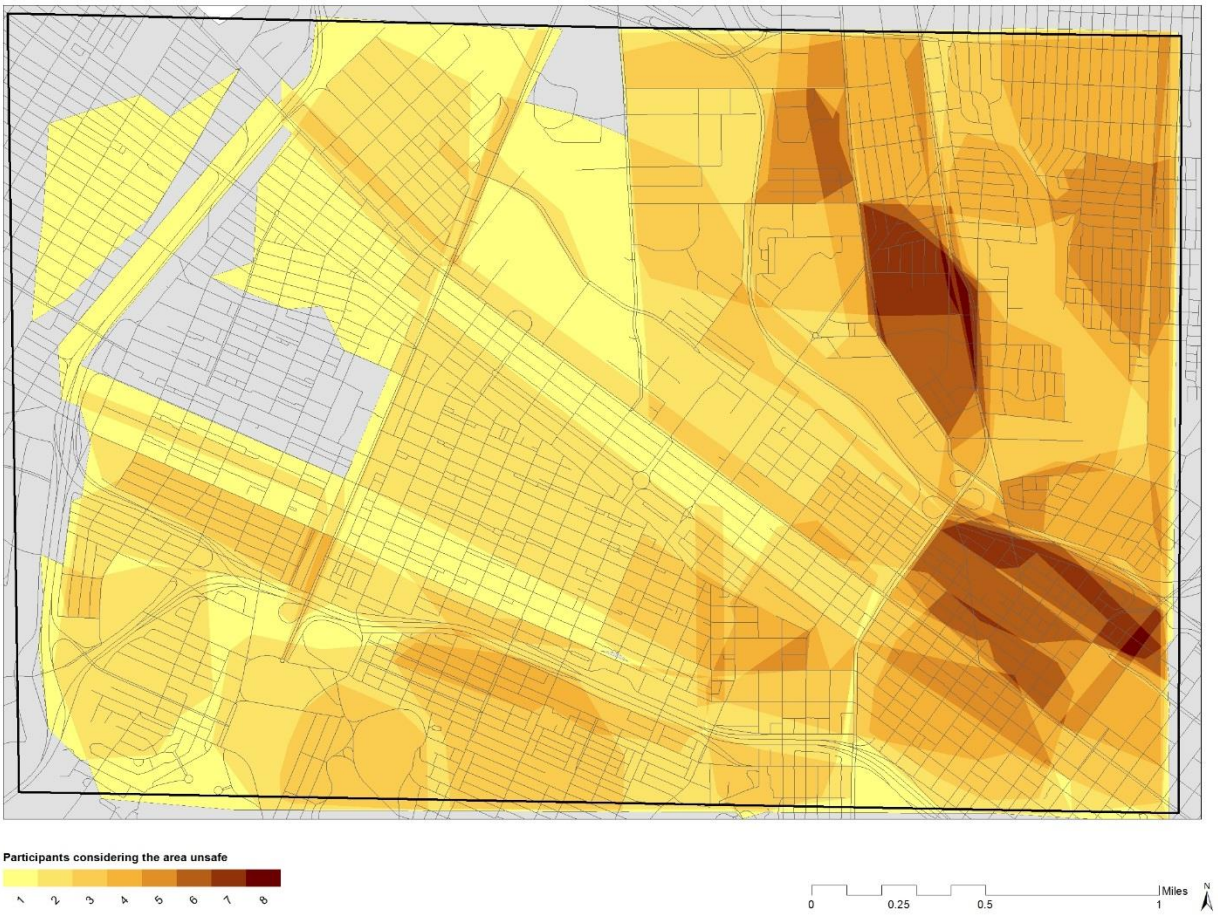


Figure 3H. Responses of "less safe" areas from Diversity Richmond participants

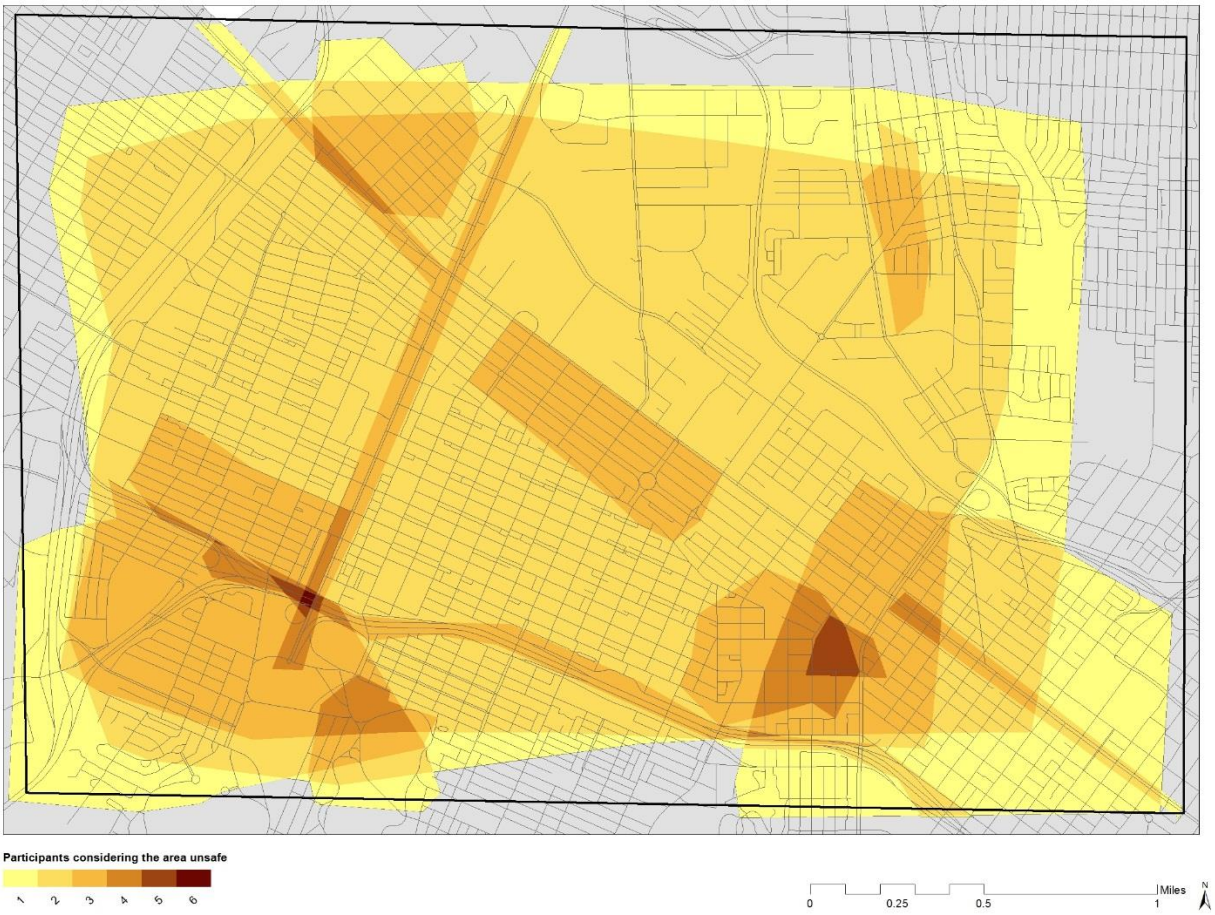


Figure 3I. Responses of "less safe" areas from Madison Equality participants

Section 3: Street Factor Identification

Once I had identified particular areas of comfort and discomfort, I took my camera and went to photograph the areas of the study on March 20th. I took several photos per area, standing at a diagonal to the intersection to capture as much of the area as possible. The day was overcast and rainy at times; thus, every photograph displayed in this section has been given a brightness and contrast value of plus 20 percent. Otherwise some elements I discuss in the analysis portion are not clearly visible and much more ambiguous.

I used a checklist built, as discussed earlier, from other studies[43] to assess environmental factors that could impact someone's feelings of safety or discomfort at each location. There are no "subjective" items on the checklist, just tangible factors that are directly observable from the photographs. The checklist was applied at the location, in the moment of taking the photos, and again in the lab to determine the accuracy of the field assessment. Each set of photographs below has its checklist underneath, along with commentary on the area that would potentially be of interest to future researchers - in particular, things not particularly visible in the photographs or events that happened on site during the photography session.

Safe factors	**Unsafe factors**
Interesting and adequate line of sight	Impeded or boring line of sight
Sidewalk/pedestrian lighting	No lighting or only street lighting
Sizable green spaces	Bushes at hip height, trees to conceal attackers
Presence of people	Few people, or homeless people
Enclosure elements/<1:4 ratio	Wide or too small spaces
Sidewalk connectivity	Unconnected or badly maintained sidewalk
Bicycling infrastructure (sharrows, lanes)	Graffiti
Other (explain)	Other (explain)

[43] Blobaum, Nasar and Jones, and Stamps, as well as Gehl and Whyte.

Figure 3J. Opposite corners of the intersection of Cary Street and South Boulevard

Site: Cary Street and South Boulevard. Lat/long coordinates: 37.551585, -77.476224

Line of sight	X	Green space	X	Enclosure/<4:1 ratio		Bicycling infr.	X
Lighting	X	Presence of people	X	Sidewalk connectivity	X	Other	
Bad line of sight		Bushes/trees to conceal	X	Wide/too small spaces	X	Graffiti	
No sidewalk lighting		Few/homeless people		Bad/unconnected sidewalk		Other	

Factors clearly identifiable from these photos include the presence of green spaces and, down Cary Street, intriguing lines of sight. Enclosure elements are there, as seen in the last photograph, though not meeting the 4:1 ratio. All the sidewalks in this part of Richmond connect, and there were people out and about in this intersection even on a rainy day. Both roads were too wide to be considered consistent to the 4:1 rule, though incorporated walk signals and street lights created a more pedestrian-friendly environment. There's a great variety in the house and building faces; they echo each other without seeming too similar (images 3Hc and 3Hd in particular). Further south along South Boulevard, that sameness seems to start, but for that intersection, all four points prove interesting and different.

Factors that were less safe included bushes at knee and hip level that served little purpose along the median and down some parts of South Boulevard, as well as the northern half of South Boulevard seeing very fast traffic. The speed of traffic, while not part of my analysis factors, was far faster than I was comfortable walking alongside. The sidewalk width was an issue along South Boulevard, but not Cary Street. However, many people along South Boulevard did not seem bothered by the sidewalk width. Joggers, in particular, would simply step into the road for a moment to go around a walking person or someone walking a dog.

Figure 3K. Opposite corners of the intersection of Cary Street and Colonial Avenue

Site: Cary Street and South Colonial Avenue *Lat/long coordinates: 37.551953, -77.477296*

Line of sight	X	Green space	X	Enclosure/<4:1 ratio	X	Bicycling infr.	X
Lighting	X	Presence of people	X	Sidewalk connectivity	X	Other	
Bad line of sight		Bushes/trees to conceal	X	Wide/too small spaces		Graffiti	X
No sidewalk lighting		Few/homeless people		Bad/unconnected sidewalk		Other	

This intersection, just down the road from the previous one, has many of the same features. Some factors that differ is a lack of green space. There are occasional trees and an attempt at a median, but nothing like the tree-lined path and grassy median seen along South Boulevard. Further, while the sidewalk does connect properly, there is no crosswalk to cross South Colonial Avenue. There was little traffic at the time the photograph was taken, but that could easily change by day.

Cary Street is, as mentioned before, a one-way, which one might think should slow down traffic, but rather, it seems drivers seem more comfortable going faster. Gehl mentions this in *Cities for People* as a side effect of on-the-street parking providing an unintentional buffer for walkers.[44]

I had not expected to see this in an area focused on pedestrian commerce, but I also witnessed several people crossing the street during green lights, and not crossing at crosswalks. Perhaps there is an equal assumed safety for pedestrians when the street is a one-way. The line of sight that worked in the last intersection no longer works here; these streets are both straight and long, not visually appealing, definitely more car-focused.

Another component I hadn't particularly considered was the difference between street art and graffiti. As seen on the wall of the red house in image 3Ie, there's a skeleton wreathed in flowers, painted as a mural. I considered it art, but someone else might consider it threatening.

[44] Gehl.

Figure 3L. Opposite corners of the intersection of West Main and Laurel Street

Site: West Main Street and North Laurel Street Lat/long coordinates: 37.545839, -77.451566

Line of sight		Green space	X	Enclosure/<4:1 ratio	X	Bicycling infr.	X
Lighting	X	Presence of people		Sidewalk connectivity	X	Other	
Bad line of sight		Bushes/trees to conceal	X	Wide/too small spaces	X	Graffiti	
No sidewalk lighting		Few/homeless people	X	Bad/unconnected sidewalk	X	Other – **parking garage**	X

Our first less safe intersection is north of Monroe Park. The intersection is wide, and both streets are both ways. There is a linear line of sight along the streets, but Monroe Park, just south of the point indicated by the data, provides more intriguing lines of sight. There were bicycles within the park, as seen by Image 3Je. There were also instances of graffiti, plus an element Richter's participants found the most uncomfortable and unsafe: a parking garage. While it is a paid garage for VCU students, it sets a rather imposing tone on that corner opposite to the park.

At the intersection itself, there were more people; we passed a VCU alumnus and his daughter going to tour the school, for instance. There were lighting options along the street (though less in the park) and connected sidewalks, as well as a movie theater along Laurel Street.

There were a number of people within the park, but the "homeless," as Whyte refers to them, were the most people seen. Many of them were men, and many of them were clearly sleeping rough. None of them spoke to us or appeared threatening, but as you can see circled in Image 3Je, police cars discreetly positioned along the other side of the park as if in preparation, not particularly inspiring for personal safety. Perhaps in the summer the scene is different, but at this time of year Monroe Park is a refuge for the homeless. Perhaps, also, there were a higher incidence of them the day of the photographs due to an informal soup kitchen taking place within the park.

Figure 3M. Opposite corners of First Street and East Broad Street

Site: North First Street and East Broad Street W Lat/long coordinates: 37.545108, -77.441046

Line of sight		Green space	X	Enclosure/<4:1 ratio	X	Bicycling infr.	
Lighting	X	Presence of people		Sidewalk connectivity	X	Other	
Bad line of sight	X	Bushes/trees to conceal		Wide/too small spaces		Graffiti	X
No sidewalk lighting		Few/homeless people	X	Bad/unconnected sidewalk		Other - **harassment**	X

This intersection proved the most unsafe for myself, physically. Due to the nature of some of these streets, I brought along a research assistant. As we were taking photos, I could hear a whistling noise like a bird call. Looking around for the bird, I saw two men across the street trying to make eye contact, and my research assistant pointed them out as the source of the noise. These photographs, taken just after, are inferior due to my discomfort from the incident.

There was a nice green median running down the middle of the street, so I consider green space to be a factor here – however, aside from lighting and the sidewalk connecting, there was little desirable about visiting the area. The stores along both streets were mainly pawn shops, hair salons and jewelers. There have been some attempts to beautify the street, such as the street art featuring the James River above, but also visible is the graffiti directly on top of it.

Interestingly, this street met the 4:1 ratio along Main Street; the buildings actually provided a 2:1 ratio, which is even more desirable and aesthetically pleasing in urban planning. Further, the shops varied at the 20 to 30 feet range that is desirable, which really demonstrates that urban planning elements alone cannot dictate people desiring to frequent an area. Emotional connections to the area in particular are a dictating force. Women in my study may have been physically harassed here as I was, or perhaps just by reputation found it uncomfortable. Either way, it is more difficult to see the same urban revitalization as has been the case further along Main Street and in other areas of urban Richmond.

Figure 3N. Opposite corners of Idlewood Avenue and South Boulevard

Site: Idlewood Avenue and South Boulevard Lat/long coordinates: 37.549230, -77.477521

Line of sight		Green space		Enclosure/<4:1 ratio	X	Bicycling infr.	
Lighting		Presence of people	X	Sidewalk connectivity		Other	
Bad line of sight	X	Bushes/trees to conceal		Wide/too small spaces	X	Graffiti	X
No sidewalk lighting	X	Few/homeless people		Bad/unconnected sidewalk	X	Other - **bridge**	X

This intersection, in comparison to some previous examples, proves almost tame. While the street is wide and there is a bridge directly across the road, it leads to a wide green space with lots of trails. Though some women in the LGBT community may feel wide spaces are less comfortable, the combination with the green area often indicates more safety than less.

The trees along this intersection, before the bridge as seem in Image 3Ke, provide a sense of enclosure. We came across VCU students running along the street towards the park, only to double around and come back along the other side of the street. Perhaps in this sense the straight-line aspect of the road is appealing.

There were, however, some elements that spoke to a different environment upon occasion; there were graffiti tags on a monument along the median and on the bridge itself. Further, the houses, while quite grand in size, all had visible security systems. The lighting was minimal, mainly at the intersection, and additionally illuminating the bridge as well. There was no lighting specifically for the sidewalk.

The sidewalk, while minimally connected, was far narrower here. It was difficult to pass other people without stepping into the street. While I did not feel unsafe here, perhaps the speed of the traffic, combined with a bridge providing minimal opportunity of routes to escape, created a more unsafe environment for women living in and around this area.

Figure 3O. Opposite corners and median of Leigh and Smith Streets

Site: West Leigh Street and Smith Street Lat/long coordinates: 37.551609, -77.444460

Line of sight	X	Green space		Enclosure/<4:1 ratio		Bicycling infr.	
Lighting		Presence of people		Sidewalk connectivity		Other	
Bad line of sight		Bushes/trees to conceal		Wide/too small spaces	X	Graffiti	
No sidewalk lighting	X	Few/homeless people		Bad/unconnected sidewalk	X	Other	

This particular intersection was actually just one corner of a much larger road – West Leigh and Smith are actually part of Belvidere and Smith. This is one of the widest roads we saw in this study, and the speeds were easily at 50 miles an hour when the lights were green. There was adequate time to cross the street for me, though I am able-bodied and many pedestrians may not have been able to make it in time. The highway interchange is just down the street, too, another reason for the fast speeds.

The sidewalks were not what I was hoping for, proving very narrow, though happily, they did have adequate curb cuts and the material along the sidewalk was different than the road. Also, a smaller road leading to a neighborhood ran parallel to Belvidere, creating opportunities for parking and for traveling more slowly and perhaps with different vehicles, though there were no bike lanes or sharrows indicated on the pavement.

We did get honked at while crossing the street. In this case, I don't think it was harassment, but rather impatience at pedestrians blocking their right on red turn.

There was minimal lighting, which seems to be a theme in Richmond. There were instances where lamp posts were in place, as seen in Figure 3Le, but the lighting seemed much more focused on the road, rather than the sidewalk parallel to the road.

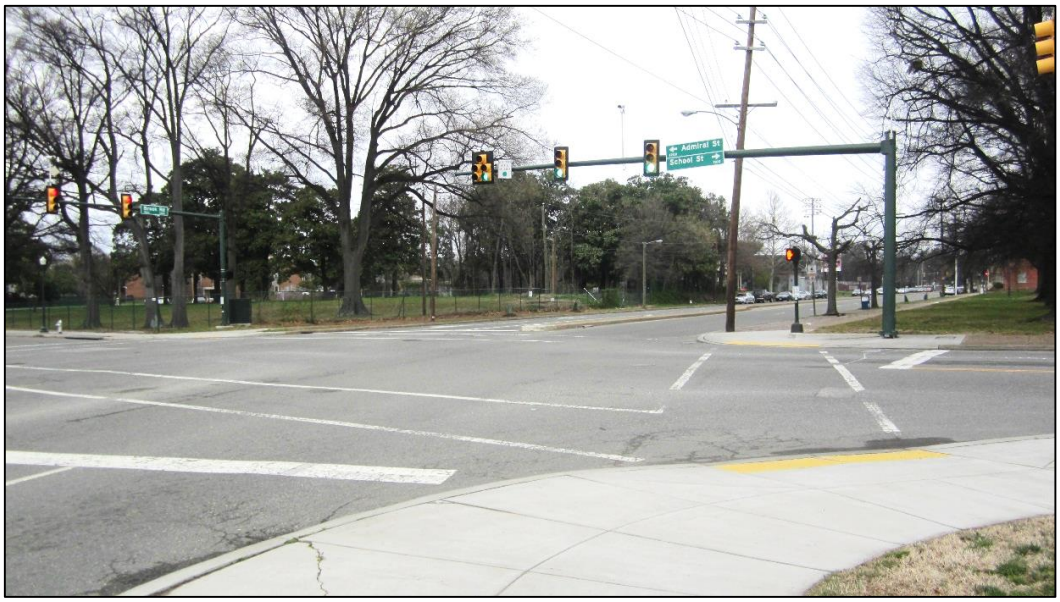


Figure 3P. Opposite corners of Brook Road and School Street

Site: Brook Road and School Street *Lat/long coordinates: 37.558945, -77.446893*

Line of sight		Green space	X	Enclosure/<4:1 ratio		Bicycling infr.	
Lighting		Presence of people		Sidewalk connectivity		Other	
Bad line of sight	X	Bushes/trees to conceal		Wide/too small spaces	X	Graffiti	
No sidewalk lighting	X	Few/homeless people		Bad/unconnected sidewalk	X	Other	

This is an area technically outside my interest area, but still within the survey quadrangle I gave my participants. Just on the opposite side of the far corner, seen in Image 3Ma, is a large green park. However, when we went to look for lighting and pathways, the entire area was fenced off. An inaccessible green space, however large, is pointless.

This is less of an area people would frequent, in general. There is little here to walk to, just industrial buildings and further down the street, a post office sorting center. The sidewalks are there, but narrow and poorly maintained. Street lighting is minimal at best and there is no sidewalk lighting.

With a little investigation, we found that, on the other side of the fenced-off green field, is Virginia Union University, a historically Black university. This area is bare of any sort of development; there are no students out for a walk in the afternoon because there are no places to go. Areas like Main Street and Cary Street become where students drive to, then walk, because of a lack of options where they are. This becomes a self-fulfilling prophecy, too. If a line of shops did go in, and no one went because no one walked to that area of town anyway, they would all close and the area would be bare once again.

It is also distressing that, with the road as wide as they built it, there is not a single case of bicycle infrastructure on either side of the road. There are six lanes across at this intersection, and yet there is no place for a single bike lane or indicated sharrow.

Figure 3Q. Opposite corners of Sledd and Roberts Street; along Roberts Street

Site: Sledd Street and Roberts Street *Lat/long coordinates: 37.562363, -77.443874*

Line of sight		Green space	X	Enclosure/<4:1 ratio		Bicycling infr.	
Lighting		Presence of people		Sidewalk connectivity		Other	
Bad line of sight		Bushes/trees to conceal		Wide/too small spaces	X	Graffiti	
No sidewalk lighting	X	Few/homeless people	X	Bad/unconnected sidewalk		Other	

This area is similar to Brook Road and School Street in that it is outside my area of interest, but within the survey quadrangle. A T-intersection, with Roberts Street leading back into housing, this area appears very suburban. A gas station sits opposite an auto parts store, and further up the road is High Road School of Richmond, an alternative high school for students with emotional needs that would benefit from a smaller classroom size and more one to one learning.

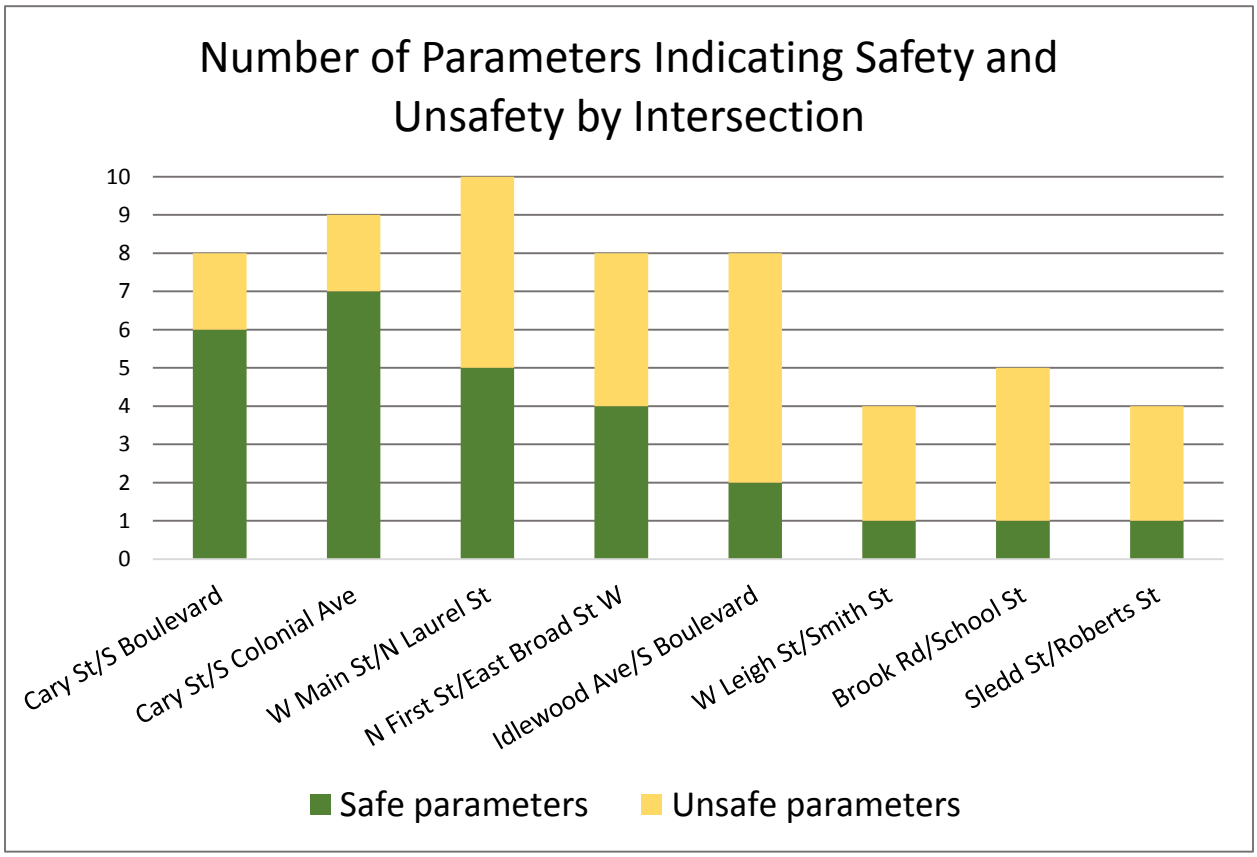
There were similar issues, as well, as seen on Brook Road and School Street, with little care for the sidewalk (and no sidewalk at all along Roberts Street). There were no crosswalks and very little green space, though there were small lots here and there that could be considered patches. In addition, following Roberts Street for a single block leads into single family homes on about half acre lots.

This particular area of Richmond is confusing - it seems to be city, suburbia and industrial all at the same time. The distinctions blur to a point that the definitions seem much more malleable than they should.

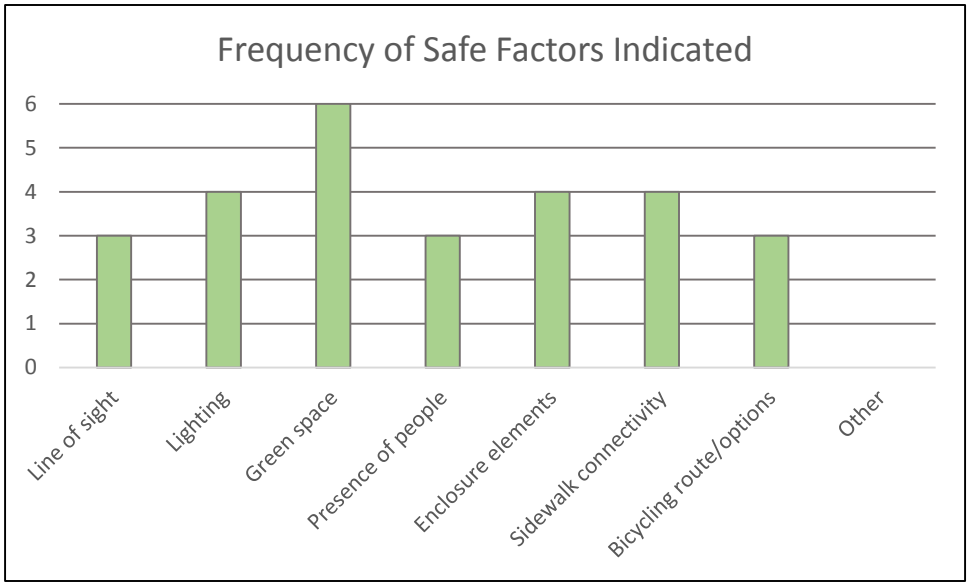
One homeless man with his belongings on a dolley was seen while we were taking photographs, but he did not approach or even look at us, staying close to his belongings.

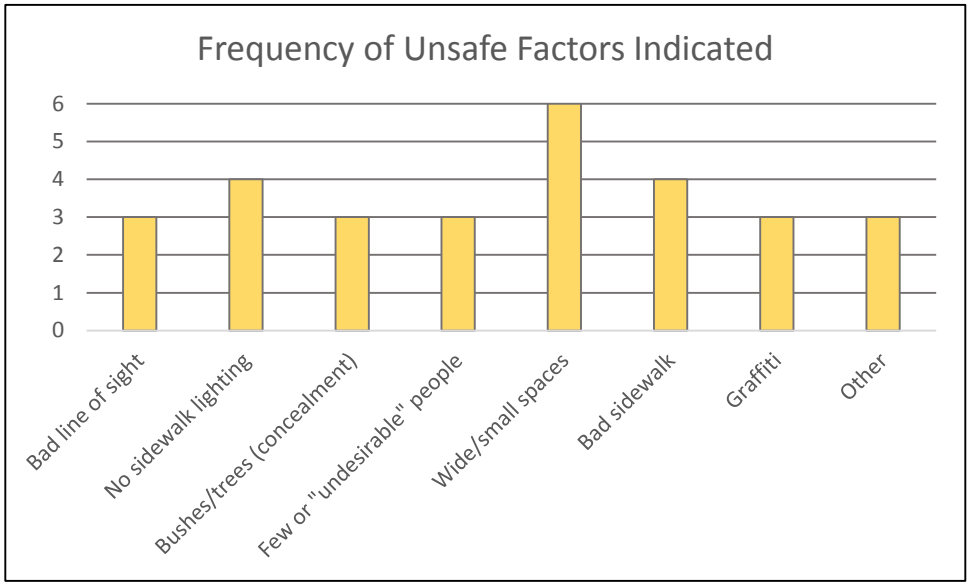
Chapter 4: Results and Initial Conclusions

With seven intersections surveyed and applying the 16-factor metric designed from the case studies I listed earlier, the two intersections considered safe had high instances of "safe" factors, with two "unsafe" factors each as well. The remaining intersections, considered the least safe by my participants, provided surprising amounts of safe factors on two intersections of West Main and Laurel Streets and North First and East Broad Streets, meeting five and four safety criteria.



I additionally graphed the frequency of criteria assigned to locations. Green space and uncomfortably wide spaces were both met in six of eight intersections.





As indicated in the research of Blobaum,[45] and earlier in that of Nasar and Jones,[46] many people can agree on what they consider "safe," but there are often disagreements or many elements that make an area "unsafe." Some participants felt industrial-looking areas were more unsafe than the local downtown, but others indicated they felt very uncomfortable near the

[45] Blobaum. 485-6.

[46] Nasar and Jones. 320.

college end of Cary Street, though it is considered one of the more high-income areas of Richmond.

Two conclusions from this study can be demonstrably reached. First, tangible environmental factors contribute to feelings of safety and discomfort. Additionally, there is a reasonable agreement on where women in the LGBT community feel safe from this study. Of 58 results, we received over a 33% consensus on safe areas.

However, when looking at the data for where women in the LGBT community feel less safe, agreement is much harder to determine. There are several reasons that could be attributed to this, but I think three are the most important.

First, I believe that not asking any demographics questions about gender, ethnicity, and/or socioeconomic status could have been responsible for some components of disagreement. If a participant is comfortable in one area of the city that is seen as "dangerous" by others due to the demographic breakdown of an area, that could produce definite inconsistencies. Alternatively, if I had a larger sample size, probably in upwards of 500 participants, that would have made the racial and socioeconomic differences distributed enough that there would be less inconsistency. However, having that many people in the LGBT community volunteer their information and time is unrealistic, especially since I am not a member of Diversity Richmond.

The second aspect is that of my language when administering the survey. I used both of the terms discomfort and unsafe, but perhaps the word choice was confusing for my participants. I did not want to color their perception by choosing safety and "un-safety", as these words are often associated with physical danger and fear, but I think "discomfort" as an alternative may have been too weak a word when administering the survey. Perhaps if I had chosen one word and

defined exactly what I was looking for, particularly in terms of personal safety, emotional safety, or otherwise, my results would have been more consistent.

Finally, the last component I should have addressed in the survey design is scale. I handed participants a map of an area, and assumed they would know locations. However, when I investigated the results my participants gave me, I was looking at a personal level, assessing factors that would not necessarily be what my participants would recall as they were not physically at the location at the time of the survey. Also, because of scale, I assumed participants would know I was thinking out walking around the streets, but I did not distinguish between walking, driving, and other modes of transportation. If I had emphasized walking within the city, results may have been more concrete.

In a larger view, aside from an overlay with LGBT-friendly businesses in Richmond coinciding with the areas LGBT women consider safe, there is no real way to demonstrate my results are specifically relevant to LGBT women. Part of this is the lack of literature on LGBT street harassment and safety, but I also feel this is a failure in study design on my part. In the future, perhaps an interview portion might help, getting some more voices in terms of what participants feel are particular elements of safety and unsafety rather than just looking at the environmental elements in the abstract. However, again, there will be fewer participants interested in participating in a larger, more involved survey. That balance between what is enough and what is too much is difficult to determine until the researcher really meets and builds a relationship with their participants.

Chapter 5: Discussion and Future Research

Section 1: Survey Group Differences

One component to this study that was not discussed in the results section was the division of age between the two survey groups. While I did not ask the ages of participants, most of the women in the Diversity Richmond group were no longer in college. In contrast, Madison Equality is a student organization built for undergraduates at James Madison. This difference, while not explaining all of the differences between the two survey groups, can possibly illustrate why Madison Equality saw more disagreement over what they considered safe and unsafe spaces. The women from Diversity Richmond lived, worked, have lives within Richmond. The students at JMU were from the area, but did not spend their whole lives in the area, and perhaps had never experienced the same unsafe factors that Diversity Richmond women indicated.

Also, perhaps contributing more than age, there is the very obvious (in retrospect) issue of asking students at James Madison, a university two hours away from Richmond, to recall the nature of the streets they have not walked very recently. At the time, I was hoping that since Winter Break was fairly recently past, they could recall their city more clearly. I think now that due to their lack of existing in the space consistently, there was a gap of recall that the women at Diversity Richmond did not exhibit.

Another major difference could be the atmosphere in which the survey was distributed. At Diversity Richmond, my survey came at the very beginning of their evening group sessions, and there had been some somber events regarding transgender individuals in the last few weeks they would be discussing that night. In contrast, Madison Equality students put my survey request at the very end of their meeting; most students who were interested in contributing also were eager to leave, as they had been sitting for almost two hours by that point. Perhaps they

rushed, or considered the material less important, because it was a request by a student and not what they might consider an authority. At any rate, their data was less consistent than that of Diversity Richmond's.

A final difference between the two groups that is quite obvious in retrospect is that of familiarity. I had worked with the Diversity Richmond events coordinator to make sure that I was incredibly transparent, accurate, and consistent with the mission of the resource center, and thus the participants regarded me as at least partially an authority on my research topic and survey. However, within Madison Equality, I am just one more student, albeit a student researcher asking for participants. Even though I am a graduating senior, so are other students, and as I am not a member of their executive council either, I have no real authority or rapport with their organizational heads. Their president is a friend of mine who did not participate as he is male, but I feel even he regarded me in less of a research light and more of a "help out a friend" light.

In future research, to address some of the issues described above, it would be good to work with a single group, rather than two disparate groups, if possible. Further, it would be helpful and perhaps more coherent of a study if the ages of participants were either identified in the survey information, or if they lay within a ten year span of each other. Additionally, determining the other subject matter being addressed within meetings would be useful for the researchers to know in the future, in case of topics that could cause participants to view certain areas as safer or more unsafe being discussed.

Section 2: LGBT Research and Participatory Mapping

In designing the study itself, there were very few examples to pull from in terms of structure and methodology. The two largest sources of information were either from sociological

experiments involving long interview processes, which participants were unlikely to want to engage in, or more VGI-structured, in that participants sought out and contributed the data I was looking for. Neither model worked with the structure I was looking for, though the sociological text did give me an understanding of what survey instruments typically looked like. Further, it became clear I would not be able to work with one or the other in my final survey design.

So why is it that there is so little LGBT research that has a geospatial component? Is there a simple lack of interest? At the AAG Annual Meeting of 2016, there were panels on queer geography actually conflicting for time because there were so many new papers and panels to discuss and digest, so disinterest seems unlikely.

My conclusion, though that could of course change as I further progress in academia, is that research on queer geography is often focused more on human geography, aspects that overlap with sociology and philosophy, and less focused on the incorporation of technology. While this style of research is certainly still valid and important, this brings up a bigger question of why human geography and GIS remain largely distant from each other, which could be a thesis on its own.

In short, my method of aggregating the results of participant's spatial safeties is relatively untried. More refinement of this instrument will provide future research with better and perhaps more consistent results. However, it is important to qualify that statement with a foundation of trust and understanding with the researcher and the participants.

Section 3: Monroe Park - An Invisible Green Space?

When asking a participant about a green space, a large field or forest almost immediately springs to mind, or perhaps a dog park or playground. The literature agrees that green spaces are

areas that people gravitate to,[47] and in urban planning, green spaces are, to some extent, to be seen as a sign of a walkable city.[48]

How, then, does Monroe Park act as the magnet that it does for people with no destination? A rough head count of homeless people, almost all men barring one woman, showed eight to ten people just walking around the park when we visited for site assessment.

Doing a little digging into the history of the park itself, the land has been waiting for years to see improvements. Several organizations exist that are working to improve lighting within the park and have it accessible to everyone, but VCU students in particular, since their campus is so close. One article published in 2012 by the local news outlet says as of that point in time, the park had been waiting for eight years for promised renovations.[49] A special collections report on Monroe Park, prepared in 2007 by Tyler Potterfield as part of Richmond's Master Plan, states that the last time the park received comprehensive renovations was in 1951.[50]

In that sense, perhaps Monroe Park is a green space that is utilized for a totally different function than what is common in the green space narrative. The inhabitants, invisible themselves, create a sort of invisibility blanket around the park as well. It is certainly shady and cool in a hot point of the day, the churches around the square wish to help feed and clothe those in need – but more importantly, there is no alternative destination for those sleeping rough to go.

A number of efforts are underway to address homelessness in Richmond, but few of them focus on Monroe Park, instead looking towards putting people immediately into temporary

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[47] Brook, Isis. "The Importance of Nature, Green Spaces, and Gardens in Human Well-Being." *Ethics, Place & Environment* 13, no. 3 (2010): 299.

[48] Seen most obviously in the New York Restoration Project: https://www.nyrp.org/green-spaces

[49] Avelino, Kelly. "New Richmond Developments Put Pressure on for Monroe Park Renovations." *NBC 12*, July 23, 2012. http://www.nbc12.com/story/19058772/new-richmond-developments-put-pressure-on-for-monroe-park-renovations.

[50] https://www.monroepark.com/wp/wp-content/uploads/2014/02/Monroe_Park_Report_Master_Plan_Chapter_2.pdf

housing instead of shelter solutions. Often praised as an innovative solution in the early 2000's to put a "dent" into homelessness issues,[51] groups working with the homeless say this doesn't address underlying issues. A public outcry at the proposed closing of Monroe Park for "long-needed" renovations in late 2015 brought these issues back to the surface of the city, but the underlying issue remains that there is no alternative destination to direct people when the park does finally close.[52]

Bringing this back to the green space and the initial question, one of the underlying values attributed to green space is that anyone can use it. But if one is afraid, or considers a space inaccessible, due to people groups utilizing the space, how useful is it? Alternatively, is this green space serving a new function, not one it was designed for, but certainly one that is needed, since Richmond has been cutting funding to homeless initiative programs?[53]

There are no clear answers – but as for now, this space is the invisible, yet one of the largest, green spaces in downtown Richmond.

Section 4: An Absence of Color

On a technical note to discuss, the research method conducted in part two of the methods, in which the data was digitized, aggregated, and then the overlap of polygons was counted, produces some patterns to explore in more detail. One of the largest questions to ask is about the spaces that are not marked with either color, not seen as more or less safe, but neither as neutral or unknown. These areas are few and small, and there are no areas that do not have at least one

[51] Martz, Michael. "Virginia Puts a Dent in Homelessness Figures." Richmond Times-Dispatch. June 25, 2013. http://www.richmond.com/news/virginia-puts-a-dent-in-homelessness-figures/article_032e8331-bb1a-5205-bb0e-d8ede4c876f7.html.

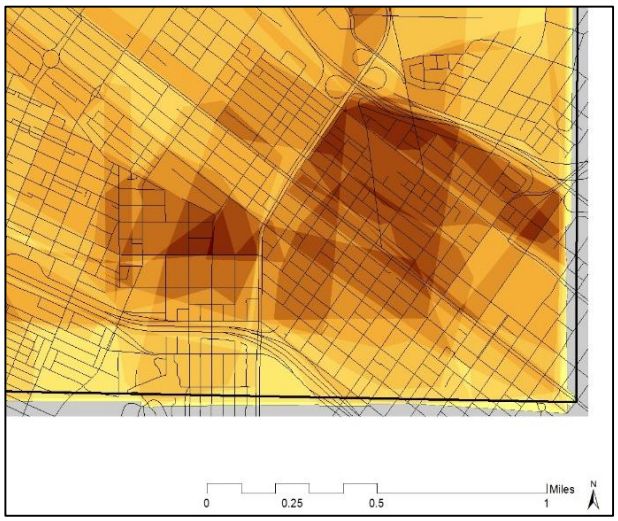
[52] Allesan, Fadel. "Groups Say Monroe Park Closure Could Devastate Richmond's Homeless." Commonwealth Times. December 17, 2015. http://www.commonwealthtimes.org/2015/12/17/park-closure-could-devastate-richmond-homeless/.

[53] The physical numbers are not available for view, but several organizations are quoted throughout these articles cited stating this.

participant stating them to be safe, unsafe, neutral or unknown. These areas of little overlap were also not explored in part three of the methods, as I was looking for the highest amount of consensus, not the least amount of consensus.

Perhaps here there is a simple absence of opinion. Instead of an area having a more definitive character, it is seen as an uninteresting, suburban area with little interesting features. These two maps below are showing the southeastern quadrant of the map for safe and unsafe categories. There is less of a consensus moving further eastward, though there are some hotspots for discomfort areas as well. On the margins of the map, perhaps, are the areas that are the least known, and perhaps people simply didn't consider them as important as the Fan District area.

This absence of safe or unsafe is interesting, and needs to be explored in the future. Perhaps in future research, the absence of polygonal overlap could be explored as a sort of white space to the safe and unsafe consensuses seen in the bulk of the research.



Section 5: Instrument, Identification, and Scale

In an abstract sense, I have discussed several directions future iterations of this research can go. However, to acknowledge and try to rectify the flaws and issues present within the survey instrument is the first and foremost task to accomplish. The instrument, a grayscale map with no identifying information and four points of reference marked for participants, is unlike any other survey instrument I came across in my literature review. Because I was not looking at demographics and instead looking at the environment, those elements that would be impactful to most research was something I acknowledged but did not want to explore in my instrument.

Further, to ask identifying information of a marginalized, or potentially at risk, group is something researchers have to weigh carefully. If those being surveyed refuse to participate due to worries of identifiable information being attached to them, then sources of information, people who know the area better than the researcher, will be lost. In the same vein, though, demographic, sexual orientation, and even age data would have provided a great deal more contextual clues in my own data-taking in a retrospective view.

This connects to the most important consideration for future research – that of scale. While the survey instrument was as close to a neighborhood scale as I could, I still feel the difference between the scale of the survey and the scale of the third part of the methods was too great. Conducting research in a particular neighborhood at a scale that is accessible not just to the researcher but also to the participants is one of the most difficult problems to overcome. One solution to this, perhaps, is to provide participants with a digital map equivalent, and implement something like Street View to help them visualize the area more clearly. Another might be to literally walk the streets with participants, take a walking tour of an area as part of the survey instrument, and then ask them, based on their walk and previous experiences, to participate.

Section 6: Future Research

Future research could go in many different directions. Staying within Richmond and working with VCU's Department of Multicultural Student Affairs and Diversity Richmond both, something I could not accomplish, to do a similar study might prove more effective than asking students who live a distance away from their hometown and have to recall areas from more distant memory. Further, perhaps asking male and female LGBT members at Diversity Richmond to participate would provide some interesting results as well. Though my research focuses on women and non-binary individuals exclusively, other researchers may find a (binary) gender gap between male and female members of Diversity Richmond.

Another research direction one could pursue, building off this data, is looking at James Madison and VCU in similar lights, comparing them by campus, for environmental factors that make individuals feel safe and unsafe. This is actually more in line with research factors that I used for my metric in part three of the methods – most of these studies focused on college campuses because they are finite areas with which students are familiar.

Personally, I would like to conduct further studies in this vein in graduate school. I will be attending University of Wyoming in the fall, and I would like to conduct a similar study at the end of my first year to compare how women in the LGBT community feel in the two major cities close by, Laramie and Cheyanne. Laramie is similar to Harrisonburg in that it existed before the university did, but a great deal of its business depends on the university in present-day. Cheyanne, in contrast, has experienced a satellite effect in relation to Denver, Colorado to the south, and while populations are growing slowly, the city itself is rapidly transforming into a different entity than its original function of state government. These two cities operate with different purposes and functions, and there are significant LGBT populations within both.

Chapter 6: Final Conclusions

This study has demonstrated that physical factors in the environment impact perceptions of safety for women in the LGBT+ community. It similarly demonstrates that GIS can work in tandem with two other fields of study – urban planning and social activism – successfully. One final aspect to address in closing, outside the study design itself, is the lack of scholarly research to draw on that incorporates multiple elements of geography.

In my own initial research, there was a significant disconnect in the literature between urban planning, human justice, and the use of geospatial technologies. The overlap between these areas of study is growing faster than ever as LGBT+ rights, particularly transgender rights, begin to take center stage in the ring of US politics, and begin to affect city design and development.[54]

To pursue the traditional narrow study of one particular issue or topic is no longer good enough. We must begin to look at disparate aspects of geography in, taking a page from feminist theory, an intersectional fashion. One of the many strengths of geography as a discipline is that it exhibits a remarkable balance between the humanities and harder sciences. I would certainly not argue that all research needs to have unrelated fields somehow incorporated to provide a seemingly more "well-rounded" sense to a study, but this balance the discipline has, as a whole, does not seem to be exhibited in studies that are so closely focused and delimited.

To only look at a single aspect of a much larger world is not how the discipline of geography works, so why should our research within it? The study in this work demonstrates that it is not just possible, but also beneficial, to incorporate and draw from many aspects of geographic study and research. To do this in the future is a large aspect to keeping this discipline relevant and progressive.

[54] "Bathroom legislation" is on the rise, as seen by legislation passed in North Carolina April of 2016 and a similar bill passed in Mississippi.

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Glossary

Aggregation: a mass composed of many different parts. Within the survey method, I use the term "aggregated" to refer to a single data file with every participant's information within it.

"Bathroom" legislation: a series of bills introduced in early 2016 to target people within the LGBT+ community, particularly transpeople. The "bathroom" refers to the law's requirements that one must use the bathroom that corresponds to biological sex, rather than gender. In this sense, a transwoman would be required to use a male bathroom, even if she presents as female.

Cisgender: literally "same-gender." This refers to a person whose biological sex assigned at birth matches his/her/their gender identity.

Crowdsourcing: usually referred to in the context of funding, but in the sense I use, it refers to a large group of people all contributing information to one source.

Feminism: a movement to enable and empower women to have the same rights, privileges, and responsibilities as men. Feminism has expanded to include LGBT+ issues in its advocacy, particularly that of lesbian and transgender women.

Gender: societally-constructed physiological and psychological expectations of "feminine" and "masculine" behaviors.

GIS: Geographic Information Systems. A technology that enables researchers to visualize data over space. Often used to mean proprietary ESRI products, but many open-source GIS exist.

Green space: an area, usually within a city, in which grasses, trees, or other vegetation are conserved and cared for.

LGBT+: an (incomplete) acronym; the letters stand for Lesbian, Gay, Bisexual and Transgender. This acronym refers to people who exist outside the societal norms of being cisgender and

heterosexual. The full acronym consists of many other identities and orientations, but for the sake of space LGBT+ is the preferred acronym for this researcher.

NeoGeography/Volunteered Geographic Information: a type of data-gathering, focusing on using information laypeople contribute to a GIS or an online organization. Often linked to open-source mapping projects.

Passing: when a member of a (usually marginalized) group is accepted, at least in part, by a group within social power. Traditionally used in the context of race, this term is now used in the LGBT+ community to describe a person within the community who appears heterosexual, or a trans individual who appears their actual gender, rather than their gender assigned at birth.

Polygon: a type of data file used with a GIS. A polygon is bound by vertices and straight lines to create areas. While points refer to a location in space, points connected to lines create polygons.

Sketch maps: a type of mapping that was partially incorporated for this project. Participants sketch an area of a city based on certain prompting questions. In a similar way, I asked participants to sketch their emotional safety and discomfort within bounds I had already proscribed.

Transgender: sometimes simplified as "trans," this refers to a person whose biological sex does not match their gender identity.

Urban planning: a field of study within geography and overlapping with architecture exploring how to best design and develop cities to be sustainable and attractive to their inhabitants.

Appendix A: IRB Survey

James Madison University
Human Research Review Request

		FOR IRB USE ONLY:		
Exempt:	☐	**Protocol Number:**	**1st Review:**	**Reviewer:**
Expedited:	X	**IRB:** 16-0376	**2nd Review:**	**Reviewer:**
Full Board:	☐	**Received:** 01/21/16	**3rd Review:**	

Project Title:	Perceptions of Safety in an Urban Space: The Fan District, Richmond, VA		
Project Dates:	From: 01/22/16	To: 0320/16	
(Not to exceed 1 year minus 1 day)	MM/DD/YY	MM/DD/YY	
Responsible Researcher(s):	Lindy Westenhoff		
E-mail Address:	westenlc@jmu.edu		
Telephone:	571-355-1158		
Department:	Integrated Science and Technology, Geographic Science major		
Address (MSC):			
Please Select:	☐ Faculty	✓ **Undergraduate Student**	
	☐ Administrator/Staff Member	☐ Graduate Student	
(if Applicable):			
Research Advisor:	Dr. Henry Way		
E-mail Address:	wayha@jmu.edu		
Telephone:	540-568-8186		
Department:	Integrated Science and Technology, Geographic Science		
Address (MSC):	4302		
Minimum # of Participants:	30		
Maximum # of Participants:	100		
Funding:	**External Funding:**	**Yes:** ☐ **No:** ✓	**If yes, Sponsor:**
	Internal Funding:	**Yes:** ☐ **No:** ✓	**If yes, Sponsor:**
	Independently:	**Yes:** ☐ **No:** ✓	
Incentives:	**Will monetary incentives be offered? Yes:** ☐ **No:** ✓		
	If yes: How much per recipient? _____ In what form?		
Must follow JMU Financial Policy:	http://www.jmu.edu/financemanual/procedures/4205.shtml#.394IRBApprovedResearchSubjects		
Institutional Biosafety Committee Review/Approval:	**Use of recombinant DNA and synthetic nucleic acid molecule research:**		

	☐ Yes ✓No **If "Yes," approval received:** ☐ Yes ☐ No ☐ Pending **IBC Protocol Number(s):** **Biosafety Level(s):**
Will research be conducted outside of the United States?	☐ Yes ✓ No **If "Yes," please complete and submit the International Research Form along with this review application: http://www.jmu.edu/researchintegrity/irb/forms/irbinternationalresearch.docx.**
Certain vulnerable populations are afforded additional protections under the federal regulations. Do human participants who are involved in the proposed study include any of the following special populations?	☐ Minors ☐ Pregnant women *(Do not check unless you are specifically recruiting)* ☐ Prisoners ☐ Fetuses ✓ My research does not involve any of these populations
Some populations may be vulnerable to coercion or undue influence. Does your research involve any of the following populations?	☐ Elderly ☐ Diminished capacity/Impaired decision-making ability ☐ Economically disadvantaged ☐ Other protected or potentially vulnerable population *(e.g. homeless, HIV-positive participants, terminally or seriously ill, etc.)* ✓ My research does not involve any of these populations

Investigator: Please respond to the questions below. The IRB will utilize your responses to evaluate your protocol submission.

1. ✓**YES** ☐ **NO** Does the James Madison University Institutional Review Board define the project as ***research?***

The James Madison University IRB defines "research" as a "*systematic* investigation designed to develop or contribute to *generalizable knowledge*." All research involving human participants conducted by James Madison University faculty and staff and students is subject to IRB review.

2. ✓ **YES** ☐ **NO** Are the human participants in your study ***living*** individuals?

"Individuals whose physiologic or behavioral characteristics and responses are the object of study in a research project. Under the federal regulations, human subjects are defined as: living individual(s) about whom an investigator conducting research obtains:
(1) data through intervention or interaction with the individual; or (2) identifiable private information."

3. ✓ **YES** ☐ **NO** Will you obtain data through ***intervention*** or ***interaction*** with these individuals?

"Intervention" includes both physical procedures by which data are gathered (*e.g.*, measurement of heart rate or venipuncture) and manipulations of the participant or the participant's environment that are performed for research purposes. "Interaction" includes communication or interpersonal contact between the investigator and participant (*e.g.*, surveying or interviewing).

4. ☐ **YES** ✓ **NO** Will you obtain ***identifiable private information*** about these individuals?

"Private information" includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, or information provided for specific purposes which the individual can reasonably expect will not be made public (*e.g.*, a medical record or student record). "Identifiable" means that the identity of the participant may be ascertained by the investigator or associated with the information (*e.g.*, by name, code number, pattern of answers, etc.).

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5. ☐ **YES** ✓ **NO** Does the study present ***more than minimal risk*** to the participants?

"Minimal risk" means that the risks of harm or discomfort anticipated in the proposed research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during performance of routine physical or psychological examinations or tests. Note that the concept of risk goes beyond physical risk and includes psychological, emotional, or behavioral risk as well as risks to employability, economic well being, social standing, and risks of civil and criminal liability.

CERTIFICATIONS:

For James Madison University to obtain a Federal Wide Assurance (FWA) with the Office of Human Research Protection (OHRP), U.S. Department of Health & Human Services, **all** research staff working with human participants must sign this form and receive training in ethical guidelines and regulations. "Research staff" is defined as persons who have direct and substantive involvement in proposing, performing, reviewing, or reporting research and includes students fulfilling these roles as well as their faculty advisors. The Office of Research Integrity maintains a roster of all researchers who have completed training within the past three years.

Test module **at ORI website**
http://www.jmu.edu/researchintegrity/irb/irbtraining.shtml

Name of Researcher(s) and Research Advisor	Training Completion Date
Lindy Westenhoff	January 3, 2016
Dr. Henry Way	July 7, 2013

For additional training interests, or to access a Spanish version, visit the National Institutes of Health Protecting Human Research Participants (PHRP) Course at: http://phrp.nihtraining.com/users/login.php.

By signing below, the Responsible Researcher(s), and the Faculty Advisor (if applicable), certifies that he/she is familiar with the ethical guidelines and regulations regarding the protection of human research participants from research risks. In addition, he/she agrees to abide by all sponsor and university policies and procedures in conducting the research. He/she further certifies that he/she has completed training regarding human participant research ethics within the last three years.

_____ _____

Principal Investigator Signature Date

_____ _____

Principal Investigator Signature Date

_____ _____

Principal Investigator Signature Date

_____ _____

Faculty Advisor Signature Date

Submit an electronic version (in a Word document) of your **ENTIRE** protocol to researchintegrity@jmu.edu.

Provide a **SIGNED** hard copy of the Research Review Request Form to:
Office of Research Integrity, MSC 5738, 601 University Boulevard, Blue Ridge Hall, Third Floor, Room # 342

Purpose and Objectives

Please provide a lay summary of the study. Include the purpose, research questions, and hypotheses to be evaluated. (Limit to one page)

The purpose of this study is to determine if there are similarities across individual queer women in which areas of a city are identified as being safer and more comfortable.

Research questions:

1. In Richmond's Fan District, what areas are potentially perceived as safe by female populations within the LGBTQ+ umbrella?

a. How can spatial data be used to make an approximation of these "safe" spaces?

b. How can a IRB-approved survey/interview supplying personal experiences supplement this spatial assessment?

The hypothesis of this study is that there are commonalities in certain parts of a city that cause women in the LGBTQ+ community to perceive the area as more or less safe, and these commonalities in other parts of the city or across other cities can point to areas that will have the same perception by women in the LGBTQ+ community.

General assumptions include the following: women in the LGBTQ+ community generally perceive certain areas of a city as less or more comfortable. Women in the LGBTQ+ community will accurately report where areas of comfort and discomfort lie.

Procedures/Research Design/Methodology/Timeframe

Describe your participants. From where and how will potential participants be identified (e.g. class list, JMU bulk email request, etc.)?

Potential participants are women involved in Diversity Richmond who identify as part of the LGBTQ+ community. I will reach out to these participants by attending meetings these women host and asking for voluntary participation.

How will subjects be recruited once they are identified (e.g., mail, phone, classroom presentation)? Include copies of recruitment letters, flyers, or advertisements.

I have contacted LGBTQ organizations in Richmond, and they have responded that if I present at group meetings, those members interested in my study will participate. I have a PowerPoint presentation that I have included as a supplemental document that is informative and detailed, and answers question that participants may have about security of data.

Describe the design and methodology, including all statistics, IN DETAIL. What exactly will be done to the subjects? If applicable, please describe what will happen if a subject declines to be audio or video-taped.

I will ask participants to use different colors of markers to outline streets they consider comfortable (green), less comfortable (yellow), neutral (blue), and unknown (orange) on a printed copy of the Fan District roads. I will not be audio or video taping participants. Upon completion of the outlining, I will have participants place their maps in a manila envelope. This envelope will be sealed and will not leave my backpack until I can deposit it in a locked file cabinet in his office.

Emphasize possible risks and protection of subjects.

There is no more than minimal risk associated with involvement in this study (that is, no risks beyond the risks associated with everyday life). There is no identifying data attached to the perception maps.

What are the potential benefits to participation and the research as a whole?

The benefits to participation include participants having a better confidence in Richmond as a whole as problem areas are documented, participants' confidence in research being done for the benefit of the LGBTQ+ community, and satisfaction in aiding a LGBTQ+ undergraduate in completing a major project. Benefits to the field of research as a whole include exploring perception-based geography in a city environment, not commonly done. Also, perhaps this research will provide a model for other researchers who are interested in city-based perception studies in conjunction with minority populations.

Where will research be conducted? (Be specific; if research is being conducted off of JMU's campus a site letter of permission will be needed)

Research will be conducted at Diversity Richmond, Richmond's LGBTQ+ advocacy and community center. A site letter of permission will be acquired if determined to be necessary.

Will deception be used? If yes, provide the rationale for the deception. Also, please provide an explanation of how you plan to debrief the subjects regarding the deception at the end of the study.

No deception will be used.

What is the time frame of the study? (List the dates you plan on collecting data. This cannot be more than a year, and you cannot start conducting research until you get IRB approval)

Pending IRB approval, data will be collected on weekends and the principal weekend will be February 5-7. Other dates will be reserved in case of poor weather - January 29-31, February 12-14, and February 19-21.

Data Analysis

For more information on data security, please see:
http://www.jmu.edu/researchintegrity/irb/irbdatasecurity.shtml.

How will data be analyzed?

The participants' maps will be digitized, then aggregated. This data will be input into a kernel density function to look at the frequency of particular locations.

How will you capture or create data? Physical (ex: paper or tape recording)? Electronic (ex: computer, mobile device, digital recording)?

The data will be collected by participants using different colors of markers to outline streets they consider comfortable (green), less comfortable (yellow), neutral (blue), and unknown (orange) on a printed copy of the Fan District roads. This data will then be digitized.

Do you anticipate transferring your data from a physical/analog format to a digital format? If so, how? (e.g. paper that is scanned, data inputted into the computer from paper, digital photos of physical/analog data, digitizing audio or video recording?)

Yes. These colored maps will be scanned and georeferenced, then digitized by hand. The paper copies will be held in case of corrupted data needing to be re-digitized, but will be destroyed at the end of the study.

How and where will data be secured/stored? (e.g. a single computer or laptop; across multiple computers; or computing devices of JMU faculty, staff or students; across multiple computers both at JMU and outside of JMU?) If subjects are being audio and/or video-taped, file encryption is highly recommended. If signed consent forms will be obtained, please describe how these forms will be stored separately and securely from study data.

Digital data will be stored on a 1TB hard drive, encrypted with the IRB-recommended Windows EFS. The paper maps will be kept in an isolated folder, unless being scanned, in a locked filing cabinet in my advisor's office. Highlighted maps will be kept in one manila envelope, isolated from any other work, and be given as soon as possible to my advisor.

Who will have access to data? (e.g. just me; me and other JMU researchers (faculty, staff, or students); or me and other non-JMU researchers?)

Only the researchers (myself and Dr. Way) will have access to the data.

If others will have access to data, how will data be securely shared?

Others will not have access to this data, unless Diversity Richmond wishes for a copy of the aggregate data, in which case an encrypted flash drive will be given to their technology consultant.

Will you keep data after the project ends? (i.e. yes, all data; yes, but only de-identified data; or no) If data is being destroyed, when will it be destroyed, and how? Who will destroy the data?

The paper and digital maps will be destroyed after the project ends.

Reporting Procedures

Who is the audience to be reached in the report of the study?

The audience is interested geographers.

How will you present the results of the research? (If submitting as exempt, research cannot be published or publicly presented outside of the classroom. Also, the researcher cannot collect any identifiable information from the subjects to qualify as exempt.)

This research will be presented as a poster at the Association of American Geographers Annual Meeting conference March 29 to April 2.

How will feedback be provided to subjects?

A thank-you letter will be written to Diversity Richmond, but my email will be on the cover letter to be handed out to each participant, in case of questions or needing clarification.

Experience of the Researcher (and advisor, *if student)*:

Please provide a paragraph describing the prior relevant experience of the researcher, advisor (if applicable), and/or consultants. If you are a student researcher, please state if this is your first study. Also, please confirm that your research advisor will be guiding you through this study.

This is my first study. My research advisor will be guiding me through this study. Dr. Way has experience with urban geography and GIS, and has been helpful in guiding my research throughout the process by providing relevant articles and information.

Appendix B: Cover Letter

Project Title: Perceptions of Safety in an Urban Space: The Fan District, Richmond, VA

Cover Letter

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Lindy Westenhoff from James Madison University. The purpose of this study is to determine aggregated safe and less safe areas of Richmond for women in the LGBTQ+ community that can then be applied to other cities in a model. This study will contribute to the researcher's completion of her senior thesis.

Research Procedures

This study consists of a map that will be administered to individual participants at Diversity Richmond. You will be asked to provide information on a printed map through highlighting according to a color-coded system.

Time Required

Participation in this study will require 10 to 30 minutes of your time.

Risks

The investigator does not perceive more than minimal risks from your involvement in this study (that is, no risks beyond the risks associated with everyday life).

Benefits

Potential benefits from participation in this study include a better sense of safety and confidence in Richmond for LGBTQ+ women, as well as providing a basis for further research into common city aspects that inspire feelings of comfort or discomfort.

Confidentiality

The results of this research will be presented at the Association of American Geographers conference in San Francisco, March 29-April 2. While individual responses are obtained and recorded anonymously and kept in the strictest confidence, aggregate data will be presented representing averages or generalizations about the responses as a whole. No identifiable information will be collected from the participant and no identifiable responses will be presented in the final form of this study. All data will be stored in a secure location accessible only to the researcher. At the end of the study, all records will be destroyed.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind. However, once your responses have been submitted and anonymously recorded you will not be able to withdraw from the study.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Lindy Westenhoff
Geographic Science
James Madison University
westenlc@jmu.edu

Dr. Henry Way (advisor)
Geographic Science
James Madison University
Telephone: (540) 568-8186
wayha@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board

James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have read this cover letter and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. I certify that I am at least 18 years of age.

_____

Name of Researcher (Printed)

_____ _____

Name of Researcher (Signed) Date

This study has been approved by the IRB, protocol # 16-0376.

Appendix C: Site Letter of Permission

February 5, 2016

Institutional Review Board
James Madison University
MSC 5738
601 University Boulevard
Harrisonburg, VA 22807

Dear Institutional Review Board,

I hereby agree to allow Lindy Westenhoff, from James Madison University, to conduct her research at Diversity Richmond in Richmond, VA. I understand that the purpose of the study is to determine aggregated safe and less safe areas of Richmond for female-identified members of the LGBT+ community, whose aggregate maps can be applied to other cities as a model.

By signing this letter of permission, I am agreeing to the following:

JMU researcher(s) have permission to be on the Diversity Richmond premise.

JMU researcher(s) have access to the data collected to perform the data analysis both for presentation to Diversity Richmond and/or for publication purposes.

Sincerely,

Bill Harrison, President and Executive Director
Diversity Richmond

Perceptions of Safety in Urban Spaces

GIS Analysis and the Fan District, Richmond, Virginia

Lindy Westenhoff, Advisor: Henry Way, Ph.D.

Context

The aim of this project is to bring together GIS and urban geographical research to understand safe space design in contemporary cities.

As topics of research in geography, women's safety and LGBT safety do not often overlap, especially when approached using geospatial technologies. Further, urban planners often do not take minority needs into account when designing areas. To approach the concept in an integrated fashion, this study works with four interconnecting areas: geographic theory, social activism issues, VGI and geographic information systems, and urban planning. The result is a pilot study design, implemented to focus specifically on women within the LGBT community of Richmond, Virginia.

An important contextual note is Richmond's size and the scale at which the study was conducted. As a mid-size city of more than 200,000 people, but focused on the downtown Fan District, this research at the neighborhood scale is attempting to reach the women in this study at places with which they are familiar. Further, with the factors identified as particular street-level indicators of senses of safety or danger, these factors can hopefully be applied to other cities within this mid-sized range.

Methods and Processes

Part 1: Survey Creation and Data Collection

- "Pre-sketched" map – survey instrument
- Participants highlight on map of study area using different colors
  - Green = safe
  - Yellow = unsafe
  - Blue = neutral
  - Orange = unknown

Greyscale survey map

Participant's survey map

Part 2: GIS Applications - Aggregation and Polygon Count

- Collect maps from participants
- Scan and import to ArcMap; georeference
- Digitize by color
- Aggregate results via Merge or Append
- Apply Count Overlapping Polygons geoprocessing tool
- Highest count = most consensus

Digitizing process screenshot

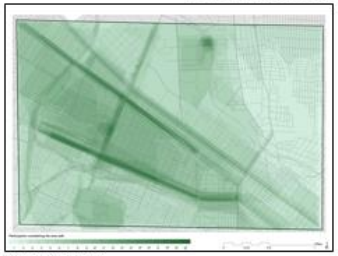
Safe Factors	Unsafe Factors
Interesting/adequate line of sight	Impeded/boring line of sight
Sidewalk/pedestrian lighting	No lighting or only street lighting
Sizeable green spaces	Mid height bushes (concealment)
Presence of people	Few or "undesirable" people
Enclosure=H:W ratio	Wide or too small spaces
Sidewalk connectivity	Unconnected or poor sidewalk
Bicycling infrastructure	Graffiti
Other (explain)	Other (explain)

Table of environmental assessment factors[1]

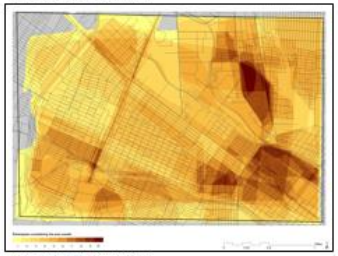
Part 3: Environmental Factors Assessment

- Take two or more photographs per intersection
  - West Cary Street/South Boulevard
  - West Cary Street/South Colonial Ave
  - West Main Street/Laurel Street
  - North First Street/East Broad Street
  - Idlewood Avenue/South Boulevard
  - West Leigh Street/Smith Street
  - Brook Road/School Street
  - Stadd Street/Roberts Street
- Use a checklist built from other, previous studies to assess environmental factors that could impact feelings of safety and/or discomfort

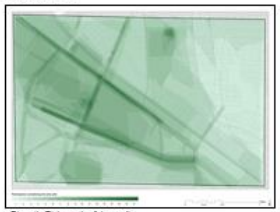
Geospatial Images and Analysis



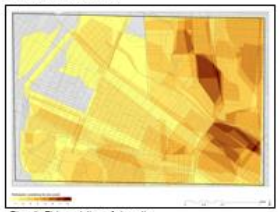
Aggregate safety results



Aggregate sense of discomfort results

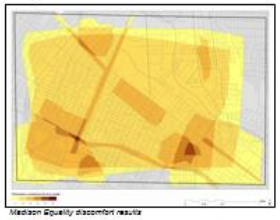


Diversity Richmond safety results



Diversity Richmond discomfort results

Madison Equality safety results



Madison Equality discomfort results

Intersection of West Cary Street and South Colonial Avenue

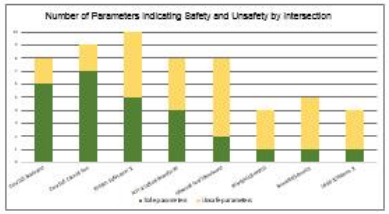
Line of sight	X	Green space	X	Enclosure=H:W ratio	X	Bicycling infrastructure	X
Lighting	X	Presence of people	X	Sidewalk connectivity	X	Other	
Bad line of sight		Bushes/trees to conceal	X	Wide/too small spaces		Graffiti	X
No sidewalk lighting		Few/"undesirable" people		Bad/unconnected sidewalk		Other	

Intersection of West Main and Laurel Streets

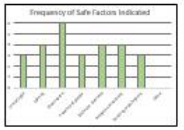
Line of sight		Green space	X	Enclosure=H:W ratio	X	Bicycling infrastructure	X
Lighting	X	Presence of people		Sidewalk connectivity	X	Other	
Bad line of sight		Bushes/trees to conceal	X	Wide/too small spaces	X	Graffiti	
No sidewalk lighting		Few/"undesirable" people	X	Bad/unconnected sidewalk	X	Other – parking garage*	X

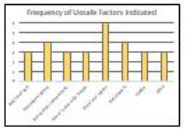
Conclusions and Future Work

With seven street intersections surveyed and applying the 16-factor metric, the two sites considered safe had high instances of "safe" factors (with two "unsafe" factors each as well.) The remaining intersections, considered the least safe by participants, provided surprising amounts of safe factors on two intersections of West Main and Laurel Streets and North First and East Broad Streets, meeting five and four safety criteria. This suggests further refinement of the safe/unsafe metric for future work.



Many people can agree on what they consider "safe," but there are often disagreements or many elements that make an area "unsafe."[2] Some participants felt industrial-looking areas were more unsafe than the local downtown, but others indicated they felt very uncomfortable near the college end of Cary Street, though it is considered one of the more high-rent areas of Richmond.





Two initial conclusions from this study can be reached. First, tangible environmental factors are consistent parts of making people feel more and less safe in urban areas. Additionally, there is a consistent consensus on where women in the LGBT community feel safe. Of 58 results, there was a 33% consensus on safe areas. However, it is less clear where women in the LGBT community feel *less* safe based on this study. Scale may be the reason for this, and subsequent case studies should focus on smaller areas, looking at individual neighborhoods, and specifying participants answer as if they were walking the area.

In a larger view, it is difficult to demonstrate that these results are specifically relevant to LGBT women versus women in general. In the future, perhaps a more extended interview portion might help, getting more context in terms of what participants feel are particular elements of safety and unsafety rather than just looking at environmental elements in the abstract.

Overall, this project has demonstrated that there is a fine-grained geography to perceptions of safety in smaller urban areas, in which further research needs to be conducted. It has also introduced a way of applying geospatial analysis to a problem of social justice (and urban planning) in a potentially revealing and impactful way for local communities.

1 Ekblaw, Linda. "Perceived Danger in Urban Public Space: The Impacts of Physical Features and Personal Factors." Environment and Behavior 37. 1 (2005): 123-35.
Nasar, Jack L., and Kim M. Jones. "Landscapes of Fear and Stress." Environment and Behavior 29. no. 3 (May 1997): 291-323.
Whyte, William Hollingsworth. The Social Life of Small Urban Spaces. Washington, D.C.: Conservation Foundation, 1980.
2 Rahimi, Saumitra. "Visualizing Geographies of Perceived Safety: An Exploration of Vitalm Carmen's Experiences in Public Spaces [Master's Thesis]." University of Missouri-Columbia. 2014.
3 Nasar and James. Stamps, A. E. "Fearfulness and Safety in Urbanscapes." Environment and Behavior 27. no. 1 (2005): 133-53.