

Understanding and Utilizing Participatory Mapping Research Methods

Introduction

“Typically, maps are thought of, and used, as a directional tool, a graphic means of representing places that are held to particular conventions of scale, scope, symbol, and legend. But [today] mapping as a methodological tool has taken many forms, pushing past its uses as an orientation device.” (Powell 2010, p. 539).

Mapping and geography are studies that have been instituted for centuries. As modern humans, most of us who grew up in developed countries have undoubtedly been exposed to maps most of our lives. Our conscious mind may not always be aware of these maps, and many people never think to study geography as a discipline, but throughout our lives each of us is constantly learning new geographic information and adding it to our personal, mental database (Golledge and Stimson 1997; Lynch 1960; Tuan 1975). In the 1960s, geography was paired with computer technology to create Geographic Information Systems (GIS) software (Ceccato and Snickars 2000). Since then cartographic mapping has gained more attention from academics, professionals, and a few computer geeks. In the decades that followed the explosion of computer GIS, academics and political activists began to critique GIS for exploiting data to serve political agendas that yielded negative results for many populations (Ceccato and Snickars 2000). In response, a new sub-discipline of GIS and Geography was born—the Participatory method.

Scholars have increasingly argued that locally-targeted policies ought to incorporate the knowledge and participation of local residents (Ahlborg and Nightingale 2012; Ceccato and Snickars 2000; Raymond et al. 2009). Additionally, government entities in cities globally have moved toward more civic participation in public policy formation (Taylor 2007; Daly 2003). How to best facilitate participation and achieve optimum results is a subject of great debate. Participatory mapping is one suggested method of increasing citizen participation in politics. Historical geographic knowledge can also be extracted from individuals to inform policy (Isaac et al. 2009) or to simply preserve traditional knowledge (Tsai and Lo 2013).

Aside from politics, academia has worked to understand how people process, store, and exercise their own geographic knowledge as well. Methods of participatory mapping have been utilized in research on physical geography, socio-economic aspects of life, and spatial relationships. More

recent participatory mapping studies have been done to evaluate issues surrounding one's perception of a place, ranging from issues of neighborhood identity (Ginsberg 1985), to boundaries (Coulton et al. 2013), to neighborhood safety (Lopez and Lukinbeal 2010). Participatory methods have also been called upon for mapping community values, assets, and perception of resources.

With growing demand for planning to include local participation, Participatory Mapping (PMAP) is a useful method to do so, but it lacks any standards to be implemented mainstream. There are several ways to conduct participatory mapping, each of which entails its own procedure for collecting and analyzing data. There is no standard for interpreting the maps which runs the risk of bias, and often a non-directed, open-answer study can take research in a different direction than what's being investigated. In this essay I discuss the value of PMAP through several research methods. First, I will compare the most utilized PMAP methods, outline their results, and discuss each method's strengths and weaknesses. Next I will present literature on the philosophy of participatory mapping. I will then briefly discuss the need for PMAP to include other complementary qualitative research methods, which links to a discussion of the limitations of PMAP. Finally, I will conclude with a reflection on the current state of knowledge on PMAP as presented in this essay, and set an agenda for future research.

Comparing Different Participatory Mapping Methods

In researching mental map methods in geography I have found different definitions used for a wide array of techniques. In this essay "Participatory Mapping", which I refer to as "PMAP", is a blanket term for any method that asks participants to use and create maps for a study. I have attempted to sort several empirical studies under a consistent category based on the actual procedure, yet there are still variations in the definitions of "mental map", "sketch map", and "cognitive map". Here I use "mental map" as a category for studies that ask participants to draw maps on a blank piece of paper, and "sketch map" for studies that ask participants to draw or mark on already-created maps. Despite the term "mapping" which implies geographical analysis, it's still been applied to many studies that explore cognitive thinking in many fields.

Mental Maps

For the purposes of this literature review, "mental maps" are hand-drawn maps, which represent how a place is perceived and lived through the imagination and common knowledge (Gould & White 2009). Mental maps reflect how one navigates through a place because the process of "wayfinding"

contributes to building one's mental image of an environment (Lynch 1960; Golledge and Stimson 1997). They are valuable representations of an individual's personal geography(ies) (Beneker et al. 2010), experience, and the complex reality of the producer as they move through space. Useful knowledge and detailed information of a neighborhood can also be collected from residents' drawings (Gillespie 2010).

Lynch is perhaps the most cited author for mental maps. His flagship book *The Image of the City* (1960) establishes comprehensive instructions for conducting a mental map study that includes an interview of the participant as they are drawing. Lynch uses this method to study mental maps of residents in Los Angeles, Boston, and Jersey City. In the interview the researcher asks questions that progress toward the participant creating a more detailed map. The purpose of mental mapping in this study is to discover experiential spatial knowledge that is not fully understood by urban planners and designers. The process is intended as a way for citizens to visualize their urban environment, and the results are intended to help evaluate urban design. In analysis of the maps, Lynch categorizes objects in each map into paths, edges, districts, nodes, and landmarks (Lynch 1960). Each object is interpreted to represent how people learn to navigate the city. Drawn maps then reflect the history, socialization, and comprehension processes people subconsciously use when they interact with the urban environment. A foundational component to Lynch's work is that people's image of the city is influenced by both the physical environment and other non-physical factors that affect place-relations.

Similarly, Beneker et al. (2010) found that mental maps are valuable representations of an individual's personal geography(ies). However, they warn that "straightforward interpretations" (p. 127) of drawings can lead to reductive generalizations, and that a more holistic approach should be taken in coding drawings. Their research asked youths in urban schools of four countries (US, The Netherlands, United Kingdom, and Finland) to draw the urban environment in order to see how youths represent their respective city. In coding the drawings they went through a very cautious classification process of looking at drawings individually, then all together, then verified the themes they found with themes that came out of additional surveys and questionnaires from the same participants. Beneker et al. (2010) concluded that how youths comprehend and represent urban space results from processing the city through their own lived experiences and "indirectly through mediated images" (p. 124). While other research supports hypotheses of mental maps resulting from subconscious interactions (see Tuan 1975), other research has approached emotional geographies through PMAP.

In comparing mental maps of Amish and non-Amish children, Gillespie (2010) argued that culture shapes an individual's perception of the environment, as evident in mental maps. Gillespie worked with youth populations of a neighborhood in rural Pennsylvania and asked them to simply draw

their home. In comparing each population's maps she found that non-Amish maps were detailed with home being at the neighborhood scale, and they included neighbors' names and houses, facilities, and landmarks of importance to them. Conversely, Amish drew their homes at the individual scale and closed-in from the 'outside world' (non-Amish world). With follow-up interviews she discerned that although the map image seemed individual, the Amish children actually depicted a wider sense of community that is shared among with their neighbors, which explains why they did not identify names and houses of neighbors. Gillespie (2010) argues that the difference in each group's drawings reflects the cultural norms and values of Amish and non-Amish culture.

Altogether mental maps can reveal spatial ability, social activity, and cultural processes. den Besten (2010) also found that such processes affected the form of mental maps drawn by children in other countries. In a study of youth immigrants in Paris and Berlin, den Besten had children draw maps of their new city space and mark spaces they liked and disliked with emoticons. The resulting maps showed spaces of importance to the children, and their answers to the questionnaire revealed that nearly all objects depicted a site of socialization processes. For example, children in Paris lived in neighborhoods that were stigmatized and viewed as unsafe, "ghetto", dirty, cramped, and run-down, but these neighborhoods appeared on their mental maps as places very important to them. den Besten says that these spaces are important because they are sites of social activity that help form immigrant children's new identities (2010). Many objects on a mental map relate to places of social activity, even those that exclude the subject, and they relate to an individual's personal geography with emotion and identity-formation attached to it.

Political information can also be extracted from mental map studies. Mapping interviews with farmers in Ghana have uncovered local knowledge of boundaries and practices that contrast data used by government offices (Isaac et al. 2009). Mental mapping has also been useful in finding traditional knowledge of boundaries, territory, and practices that is only known by indigenous peoples (Tsai and Lo 2013). The mental map method can both reveal and preserve knowledge that is not found in any official documentation or quantitative data source. Interviews with mental maps also reveal deep-rooted, site-specific issues of importance to the drawers. One justification for mm's above other PMAP methods is that providing subjects with a structured map of any sort, even the most minimally labeled, can reveal hierarchies through size, naming, and colors used on the map (Corner 2011). Nonetheless, sketch mapping is a well-established PMAP method that has been used for many successful studies.

Sketch Maps

Sketch mapping has been primarily used for studying issues at the community level. Sketch maps have proved useful in informing planning policy, identifying needs and assets, and locating perceived “good” and “bad” areas of a neighborhood. The results of sketch maps are much easier to interpret than mental maps because sketches are done over GIS-created maps of a place that are standardized in scale, boundaries, etc. However, the responses sketch maps have been showed to vary between populations of different background and socioeconomic status (SES) (Chorus and Timmermans 2010; Fahy and O’Cinneide 2009). When sketch maps participants were asked to identify well-known landmarks and match names of neighborhoods to their location on a sketch map, the results paired with participant SES data found that those in higher SES had more detailed, accurate maps (Chorus and Timmermans 2010). Fahy and O’Cinneide (2009) also found that groups of different SES discussed different issues of importance during sketch map workshops. Along those same lines, sketch map results have also yielded perceptions of fear in a city that were linked to differing levels of exposure to television and news media (Matei and Ball-Rokeach 2005).

In Fahy and O’Cinneide’s research, they deliberately integrated residents from different SES into groups to discuss community sustainable development (2009). PMAP is useful for planning and policy discussion because each method gathers data on issues of importance to the community. And although general topics of importance are determined from sketch map groups, residents still have a chance to express whatever issues are important to them. For example, during workshops older citizens discussed the value of churches more than any other citizens, meanwhile youth were discussing issues of accessibility to places for older citizens (Fahy and O’Cinneide 2009). Sketch maps can display community values, social awareness, and a shared sense of community (Fahy and O’Cinneide 2009; Raymond et al. 2009).

Sketch mapping is also a popular method for community asset-mapping (Raymond et al. 2009). For the purposes of informing environmental conservation policy, sketch maps are useful ways to find out what neighborhood aspects are considered valuable, threatened, and important resources (Raymond et al. 2009). When the government was looking to change environmental policies in Australia, Raymond et al. (2009) utilized PMAP to measure environmental value of natural assets in communities. Residents were asked to assign different-colored dots to locations of positive/valuable assets, and negative/threatened assets. Follow-up interview were then done to shed light on what was mapped and why. The study results displayed a geography of environmental value that could be disseminated to policy-makers. The results of the sketch-map had “intensity” of threat and value

attached to it, and that intensity was preserved in the final product. Raymond et al. (2009) also found that resident perception of environmental value had little to do with monetary value, and also that the intensity of values and threats were different based on where participants resided.

Participatory GIS

Participatory Geographic Information Systems (PGIS) is along the same lines as sketch maps in that GIS is used. However, PGIS entails participants contributing information to a GIS that is stored, viewable and usable by participants. GIS is a valuable tool for storing and visualizing the kind of qualitative data obtained from PMAP studies (Ceccato and Snickars 2000). Like other PMAP results, PGIS is useful to informing policies of what areas to target for different needs. In their study of urban renewal in a neighborhood of Jordbro in Sweden, Ceccato and Snickars (2000) put resident responses to a survey questionnaire into a GIS and found patterns of segregation, differentiation in neighborhood boundaries, social networks, and perceptions of crime. PGIS used for perceptions of crime yield quite interesting results: In Sweden residents elaborated on crime data that pinpointed specific areas, and by doing so they revealed a more complex understanding of what times of the day were more vulnerable for crime (Ceccato and Snickars 2000). In another study of crime in a neighborhood in Phoenix, residents and local police pinpointed two different areas they perceived as the highest crime (Lopez and Lukinbeal 2010). Using GIS, Lopez and Lukinbeal (2010) found that the area of highest crime that police pinpointed was related to crime statistics. However, through interviews with residents they found that the areas perceived as highest crime were related to their experiences of crime happening there with virtually no police intervention (Lopez and Lukinbeal 2010). PGIS is a useful method for analyzing how residents feel about a place, but there are issues of overrepresentation (Lopez and Lukinbeal 2010).

Other "Mapping"

There are other studies outside of geography that used PMAP in experimental new ways. Baumgartner et al. (2012) used a method of "eco-mapping" the support system of pre-school children, as expressed by children, teachers, and parents. Using data from interviews, the authors created a new way to visualize the support networks of children in a geographic way. This method revealed more nuanced data that identified socialization, resources, and the overall complex system of children's needs. Like geographic PMAP methods, the data from parents and children revealed different issues of importance

to support for each group. For example, children identified more support in terms of physical needs, such as food and transportation to school, and emotional support from inanimate toys and dolls.

Ginsberg (1985) also used an experimental mapping method to see how residents of Tel Aviv ranked all of the neighborhoods from “best to worst”. Names of neighborhoods were written on flashcards where participants then organized them in hierarchical fashion. While there is no traditionally geographic map associated with this method, the study does support the use of participatory methods of collecting data. Especially because the data obtained were in reference to perception of place and perception of neighborhood. Ginsberg also makes a strong case that social networks are related to neighborhood satisfaction, and that participatory methods can shed light on local issues, assets, and ranking of a place (Ginsberg 1985).

One final study worth discussion is Powell’s mixed-media approach to PMAP. Her research entailed interviews, quantitative data, and experimental visualizations. She conducted participatory methods with residents of a stigmatized neighborhood in Panama City in order to gather data that paints a picture different from the identity the media has inscribed. The representation of the results focused on narrative and bringing to life the stories she heard. Powell (2010) argues that maps are useful data that reveal the experience and complex realities of individuals, and their connections to other people, places, and ideas.

Interviewing – The Common Link

The research presented above all have a common method: interviewing. Interviewing is a well-established qualitative method for researching an individual’s experience, and when paired with participatory mapping techniques, both can reveal valuable spatial knowledge. This is especially true in the field of children’s studies (Beneker et. al. 2010; Besten 2010; Gillespie 2010). Many mental map studies have utilized interviews, informal conversations during the mapping, and workshops (Fahy and O’Cinneide 2009). Interviews done with a visual map are highly important because the drawing is a tool for participants to form their own narrative. Additionally, interviewing is extremely helpful in understanding why a participant has mapped something (Raymond et al. 2009). Interviewing is of high value with PMAP because it can help avoid, or at least reduce, bias of the research when interpreting the subjective data.

Philosophy of PMAP

It is fairly obvious that PMAP is essential to understanding complex, unique understandings of place. Yet it is also important to gather data at the micro scale in order to understand how individuals comprehend and navigate space, called “spatial abilities” (Golledge and Stimson 1997). One’s spatial aptitude can be measured by their performance in PMAP studies: if one can locate an object on a map and describe the who, what, when, where, and how, this signifies high spatial ability. It is possible to analyze spatial abilities through a participant’s visualization and place-learning, both of which are visualized in mental maps. Golledge and Stimson (1997) say that an individual learns a place through routes, landmarks, nodes, and anchors, which all relate to their image of the environment. Each type of PMAP method discussed in this essay was found to yield different results that highlight one’s spatial abilities in different ways. These literature point to mental maps as a way of not only following one’s movement through space, but how one comprehends and internally quantifies resources that are important to them.

However, an assent to PMAP is raised by Yi-Fu Tuan, a very prolific academic of Geography. Tuan (1975) discusses mental maps and imagery from the perspective of internal navigating & mapmaking human process. Here Tuan argues that the terms “image” and “mental map” are overused when applied one’s representation of their reality. He states that PMAP and any other research that tries to extract spatial knowledge need their own specific vocabulary. Tuan argues that poorly-defined terms and assumptions made about how one draws a place can lead to wrong conclusions. He illustrates meaning lost in the example of “wayfinding” (Lynch 1960; Golledge and Stimson 1997); a participant’s movement through space is dissected to find out why they’re made, but Tuan argues that moving through a space is often thoughtless and undeliberate. Tuan’s assent of PMAP is that most maps constructed by participants take the form of already-established maps they are exposed to in the mainstream. Understanding one’s reality is a very complex notion, and one’s mental map can only be understood by another if they share “a similar map in mind” (p. 210). His assent to PMAP is important to address in any study that examines mental maps to answer any specific research question.

Limitations

Another key component to mental map methodology is coding and analyzing the drawings. The studies presented in this essay all work from the foundation Lynch presented in his establishing work (1960), but in each study the authors have extended Lynch’s procedure for conducting the participatory

study and analyzing the resulting data. The maps produced by each participant are often very different and hard to interpret against each other. Additionally, nearly every PMAP study discussed above has had to employ interviewing in order to better-understand what participants were trying to express. This does not make a strong case for relying on PMAP methods alone to answer specific research questions. Another risk of interviews is that an open discussion can enable participants to discuss issues that are more important to them than the issue being researched. For example, in studying environmental issues in Australia participants expressed issues relating to citizen services, which detracted from the topic of conservation management (Raymond et al. 2009).

Another limitation of PMAP methods is having access to participants (Beneker et al. 2010). Often the research cannot be conducted until willing participants are found, but sometimes time constraints require researchers to form their protocol before locating participants. Completing one of these tasks before the other can result in having to later change the research proposal, especially if the method is mental maps. In the studies cited above, mental maps participants are consistently youth populations; sketch maps and PGIS were used more with adults. Finally, in regard to sketch maps, although PMAP is meant to facilitate open expression and discussion, the sketch map can constrict responses because the maps they work with are already set to a specific scale, boundary, and image of the city.

Conclusion

PMAP is a useful practice in gathering data to inform and evaluate policy, unearth identity, and capture spatial knowledge on many levels. Mapping can reveal how a community collectively views their identity, assets, and issues of importance (Raymond et al. 2009). Many mental map studies have found data on emotional geographies, personal identity, neighborhood identity, social issues, community values, and community awareness (Beneker et al. 2010; Ceccato and Snickars 2000; Fahy and O’Cinneide 2009; Raymond et al. 2009). PMAP methods can also give voice to marginalized and under-represented groups of people (Fahy and O’Cinneide 2009; Matei and Ball-Rokeach 2005). Such inclusion is valuable to community advocating, empowerment, and fostering participation in politics that can inform and challenge the current political agenda(s).

The studies cited in this essay reveal data relating to the effects of policy, the built environment, access to resources, inventory of assets, and social relationships of residents of a neighborhood. PMAP has also been employed to study Quality of Life (Ceccato and Snickars 2000) and to have participants essentially ‘take inventory’ of assets and resources of a community (Raymond et al. 2009).

Clearly mental maps can be used in a wide range of studies. This is because the maps contain place-specific data that can explain many aspects of a place. But PMAP is not a very clear method with clear answers, thus PMAP methods cannot alone be used to answer a specific research question. Because PMAP is a qualitative method the data is naturally interpretive and subjective. The more free-form the method, the more subjective the maps are. This is very valuable, rich data, but arguing that it answers specific questions and fits into rigid, tightly focused studies may defeat the purpose of PMAP as a qualitative method. Personally, nonetheless I think it's a very fascinating, valuable, and useful way of gathering unknown, personal data from marginalized groups in a way that's not aggressive and can potentially get new populations to participate in politics without experiencing any of the negative effects associated with politics. But interpretation is tricky. Interpreting data from PMAP must entail reflexivity as a researcher, or even the participant. While PMAP results can inform policy and give the "whole picture" of an issue by bringing the public's perception to the table, there is no "whole picture" without data from other research methods (i.e. quantitative demographics or crime data, interviews, surveys, questionnaires).

Participatory mapping methods are not developed enough to be implemented mainstream because there is no standard for interpreting the maps which runs the risk of bias. Therefore, researchers need to focus attention on developing participatory mapping into methods that can be utilized to evaluate specific topics, and must do so in a way that still preserves the qualitative nature of participatory research and allows participants to express themselves and respond openly to research questions.

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