

Mental maps and narrative maps

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A commonly used tool for collecting data on the spatial perception of respondents are self-drawn maps. In the following text, I refer to these as *mental maps*. As a technique in visual social research, mental maps are used in many disciplines (especially visual ethnography, sociology, psychology). At the same time, they are highly relevant in the spatial and planning sciences, meaning geography, architecture, and urban planning. Nevertheless, research projects with mental maps can pose a major challenge, which is why numerous variants have been developed and they are often combined with other data collection methods. For our purposes, we are particularly interested in approaches that reconstruct both the individual mental representations of spatial knowledge and the subjective relevance of that knowledge. Therefore, in addition to referencing the approaches developed by Lynch (1960), who used mental maps to study the orientation of people in space, I will present the narrative mapping method, which was developed by educational scientists Behnken und Zinnecker (2010) in various research projects related to both contemporary and historical-biographical children's studies (e.g., Behnken/Zinnecker 1991). They combined the cartographic collection method with narrative interview techniques: "The narration establishes a connection between the drawn mental map and the biographical method. The choice of name—narrative map—is intended to reflect this duality." (Behnken/Zinnecker 2010: 3). This paper will illustrate that the technique is appropriate for reconstructing individual spatial experiences beyond the immediate vicinity by recounting and drawing on memories, both from a biographical perspective and as a snapshot. The latter represents the focus of this paper; with regard to the biographical perspective, please refer to authors Weidenhaus and Norkus, as well as Bentlin and Klepp, in this handbook. Because mental maps and narrative maps are traditionally, and currently still, used in research on children and youth (see Muchow/Muchow 2012 [orig. 1935]; Lynch 1977; more recent examples: Chawla 2002; Seggern et al. 2009; Curtis et al. 2014), their application will be illustrated based on this type of research. However, it should be noted that the use of the methods is not limited to a certain age group.

1 The basics of mental mapping and a methodological approach to narrative maps

Early and frequently cited basics of *mental mapping* can be found in the disciplines of cognitive psychology, geography, and urban planning. Examples include the urban planner Lynch (1960), human geographers such as Gould and White (1992 [orig. 1974]), Golledge (1992), Downs/Stea (2005 [orig. 1973]), and Kitchin (1994), and psychologists Kaplan and Kaplan (1989), to name a few, who used cognitive maps to study how people perceive the built and natural environment. Furthermore, numerous research projects are dedicated to exploring how this perception is influenced by variables such as age and gender (in reference to children, see Matthews 1987, 1992), class (an early example, Goodchild 1974), and physical-spatial surroundings (an early example, Lynch 1960; Evans 1980).

These different disciplines use diverse designations for cognitive maps (see Kitchin 1994: 5). Lynch (1960) uses the name “*environmental images*” and sporadically the term “*mental map*,” while Behnken and Zinnecker (2010) refer to “*subjective maps*” and associated haphazard drawings depicting subjective geographic realities. The term *cognitive maps* often serves as a generic term for a series of designations in other disciplines. It is important to note that the term *map* is subject to a wide range of definitions and interpretations in its application and in the different disciplines, where maps (a) explicitly denote a cartographic product, (b) describe an analogy, meaning a drawing similar to a cartographic map, (c) are used as a metaphor for any illustrative spatial concept, or (d) do not have any real connections with a cartographic map at all (for details, see Kitchin 1994). Thus, every research project potentially has to start by defining the term.

A glance at the research design—for example, the studies on children mentioned at the beginning—illustrates that mental maps are often combined with other methods. For the narrative mapping method presented below, the creation of a mental map is combined with a guided storytelling or narrative interview, which are carried out one after the other (Behnken/ Zinnecker 2010).

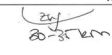
1.1 Step 1: Creating the mental map

First, the researchers explain the full procedure to the respondents. They then ask them to draw their spatial daily routine, their route to school or work, or their neighborhood in the form of a sketch and to chronicle what they are drawing at the same time. The formulation of this initial stimulus is important and must be adapted linguistically to the respondents. In addition, the respondents are encouraged to tell a story while they draw. The story is documented using a voice recorder. The researchers refrain from asking questions during this stage of the drawing process. Key words are noted for follow-up questions. The researchers record the order in which the elements are drawn, in a data entry form, for example (Fig. 1). (Behnken/Zinnecker 2010: 6–7)

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spatial knowledge of children and young people in planning



Documentation Sheet for Narrative Maps			
Lfd. Nr.	What? spatial aspect from narrative	Sketched? Where in the map? (make short sketches if necessary)	Demand / Explanations (Places, spaces, characteristics, spatial structures, activities, people, time structures, qualities)
1	zu Hause		? eigene Wohnung "Wohnung"? Wohn
2	„Pfortles zu Hause“		
3	Eltern: alles Banan Haus		
4	Hain für Verhalten auf Platz Kinner		
5	Stadt/Land	„Stadt“ „Land“	
6	Zug-Mobilität		? Urbane Stadt/Land
7	Stadt „Reitvel“		
8	meine Wohnort		

2. Blatt

First name participant:
Age participant:

Interviewer:
Date:

1

Fig. 1: Example of a data entry form documenting the order in which the elements are drawn by a student and notes for follow-up questions. | ©SFB 1265 Subproject Education

1.2 Step 2: Two-stage interview

After creating the mental map, a two-stage interview is carried out according to Schütze (1987), combining a narrative interview with a guided interview:

“This first involves clarifications and specifications, adding drawings to the sketch (if, for example, an establishment was only mentioned but not included in the drawing) and the caption. The final guided interview is intended to encourage supplementary information in areas that are significant for the defined research questions.” (Behnken/ Zinneker 2010: 7, own translation)

Subsequent drawing steps inspired by the interview are placed over the drawing and created on transparent paper or plastic wrap. The sequence of questions or the structure of the guide can then be treated flexibly when topics related to different points have already been mentioned by the respondents.

Both Lynch and Behnken and Zinnecker estimate that each step requires at least 90 minutes. In addition, Lynch (1977) recommends an interdisciplinary team made up of humanities scholars and urban scholars (sociologists, anthropologists, and psychologists, as well as urban planners, architects, and geographers) in order to pool their specific disciplinary skills in terms of qualitative methods for spatial research.

2 Studying the translocal and mediatized spatial knowledge of children and youth

In our research project, we investigate the spatial knowledge of children and youth in a comparative cultural study by using the narrative mapping method. In doing so, we¹ assume that spatial knowledge is also expressed beyond the immediate vicinity. In other words, translocal spatial knowledge, as well as effects of mediatization (television, Internet, and use of related tools) on spatial knowledge, can be found in the verbal narrations and drawings of the research subjects. This means that they mention people and events in remote places, as well as virtual experiential worlds, in the drawings and stories describing their present everyday routine and its spatial references.

2.1 Example of a stimulus: Drawing your daily routine as a map

The direct physical and perceptible social space of children and youth serves as the starting point for our stimulus:

With our research, we attempt to understand the spaces in which children and young people live today and how they think about and experience space. Therefore, I would like to ask you to depict your daily routine as a map. Think about what you do every day, and then please draw a map with the places that are important to you in your life.

It does not matter to us if the map is drawn correctly or if it is pretty; simply draw your own personal places and spaces. These could be in your neighborhood and in your city, but they could also include places that are farther away and that you do not visit very often. You know best which places are important to you in your everyday life.

While you are drawing, please explain to me what you are drawing and tell me what the places you are drawing remind you of: for example, what you do at those places, what the places look like, and why you like or do not like the places. Draw and tell me everything that occurs to you—there are no wrong answers.

Do you have any questions about the assignment, or would you like to get started?

We used the following stimuli as suggestions to help in the case of uncertainties:

- Maybe you can start with your home and then draw other places where you do anything else that is also important in your life.

¹ The method is used in the subproject *Education: The Spatial Knowledge of Children and Young Adults and its Application in Planning Contexts* in Collaborative Research Centre 1265 *Re-Figuration of Spaces*, research team: Angela Million (principal investigator), Ignacio Castillo Ulloa, Anna Juliane Heinrich, Jona Schwerer, Julian Kaiser.

- Think about what your life would look like as a map: Which places do you visit regularly because they are important to you and in your life? For example, because you do something there on a regular basis, your friends or relatives live there, etc.
- These could be both places in your neighborhood and places that are farther away, which you may not visit often but which are important to you personally.
- Think about what you like to do and what you usually do and in what places.
- We are interested in activities during the week (Monday to Friday) and on the weekend or during school breaks—just draw what is most important to you!

2.2 Example of structuring the interview into thematic blocks

After the sketching stage, follow-up questions were asked about the individual places (and geographical references) and connections between the places. In terms of geographical references, we were interested in attributions of meaning, but we also inquired about places we had expected to see in the drawings. Additionally, we asked about the description of virtual places (Internet, chats, online games). Furthermore, we wanted to know how children and youth moved between places.

The guided interview then continued with the following thematic blocks:

- Places in the sphere of action of the young people (significance, characteristics of the places)
- Movement and orientation (How do they navigate places they are not very familiar with? What tools do they use?)
- Social network and its spatial distribution (location of friends and relatives, meeting points)
- Virtual spaces, mediatization, and physical-material space (role of media, types and place of use)
- Concepts of scale (home, neighborhood, Germany/Peru/Colombia, Europe/ Latin America, world, virtual space)²
- Future (question about additions or changes to the map in ten years)

The last two thematic blocks were intended explicitly to collect translocal perceptions of space as well: In what way do the children and youth make interregional, national, or global references? We asked about the spatial scales as a game, adapted to the cultural context:

Now I would like to play a game with you: I am going to say several words and I would like you to tell me the first thing that comes to mind when you hear them and how they are important for your life personally.

2 The survey was carried out at schools and at a neighborhood center in Hanover/Germany, Lima/Peru, and Bogotá/Colombia.

- Home
- Neighborhood
- Germany/Peru/Colombia
- Europe/Latin America
- World
- Virtual space

3 Challenges when using this method

In practice, researchers must always respond flexibly to the local and temporal conditions of the survey and to the needs of the respondents. Therefore, the preparation of both the stimuli and the type of base maps must be well thought out.

3.1 Collecting data in diverse setting

The narrative mapping approach described by Behnken and Zinnecker (2010) is based on a two-person conversation in a quiet environment. However, depending on the access to the field, this ideal setting may not be possible. For example, we interviewed some of the children at schools and at a neighborhood center. In some of the schools, we were only able to work with the entire class. We arranged tables with groups of up to four children, who were then supervised and interviewed by one person. For logistical reasons, the sequence in which the motifs were drawn was not documented by our research team in this case. After creating the mental maps, group interviews were conducted in addition to individual interviews, depending on the situation, all of which were recorded. One additional challenge we faced during the survey at the neighborhood center was the unexpectedly wide range of ages among the participating children, from five to twelve years, as well as the walk-in/walk-out atmosphere of the setting.

Settings for inventory surveys (including sitting together with friends or siblings) can be recorded in photos, drawings, or writing. The fact that the children influence each other's responses (and drawings) should be taken into account when interpreting the data. In comparative cultural studies, it is important to involve scholars or experts who are familiar with the local context in the collection and analysis of the data and to integrate them into the survey process once they have been briefed (Lynch 1977: 82).

In many settings, there is generally much less than 90 minutes available for drawing and interviewing. Therefore, the questions should be understood as a set of dimensions to be asked about rather than a strict sequence to be followed. The interest and attention span of younger children in particular, as well as the time budget of many adults, call for a significantly more concise survey. In general, we recommend carrying out a pretest and adjusting the questionnaire and procedure accordingly, although it is only possible to simulate the settings describe above beforehand to a limited extent.

3.2 Selecting the base maps and formulating the stimulus

Based on studies by Pocock (1976), Evans (1980), and Blades (1990), we know that both the materials and base maps used for the drawing stage, the instructions given by the researchers, and the characteristics of the respondents (age, gender, etc.) can influence the maps. However, there are no studies to date on how the design of the base maps influences where and how the respondents draw their perceptions on the map (Curtis et al. 2014: 266). Both the selection of the stimulus and the decision to carry out the survey with or without a base map depend on the object of investigation and on the capabilities of the respondents. Matthews (1992) provides guidance regarding the *mapping abilities* of children and presents a number of potential stimuli.

In our case, the selected stimulus worked well in the age range from five to 17 years and in the different cultural contexts. Furthermore, using a blank white sheet of paper (DIN A3) in the drawing stage proved effective as this allowed the respondents to draw translocal spatial references as well right from the start. Individual respondents used several DIN A3 pages for their mental map (Fig. 2).

3.3 Quality of the sketches

Anxiety about their ability to draw the sketches and very different conceptions of maps and haphazard drawings among the respondents can be challenging for both the data collection and the analysis stage:

“Adherence to conventional geographic mapping conventions varies widely. [...] The narrative mapping method can tolerate such variations as long as additional verbal explanations can clarify what is meant.” (Behnken/Zinnecker 2010: 9, own translation)

In addition to map-like drawings, our surveys also produced pictures of an ideal park or playground (Fig. 3), as well as drawings with a list of places that more closely resembled mind maps (Fig. 4). The accompanying conversation and interview, along with the abundant information on the mental maps, were what made it possible to categorize these drawings and interpret them in relation to mediatized and translocal spatial knowledge.

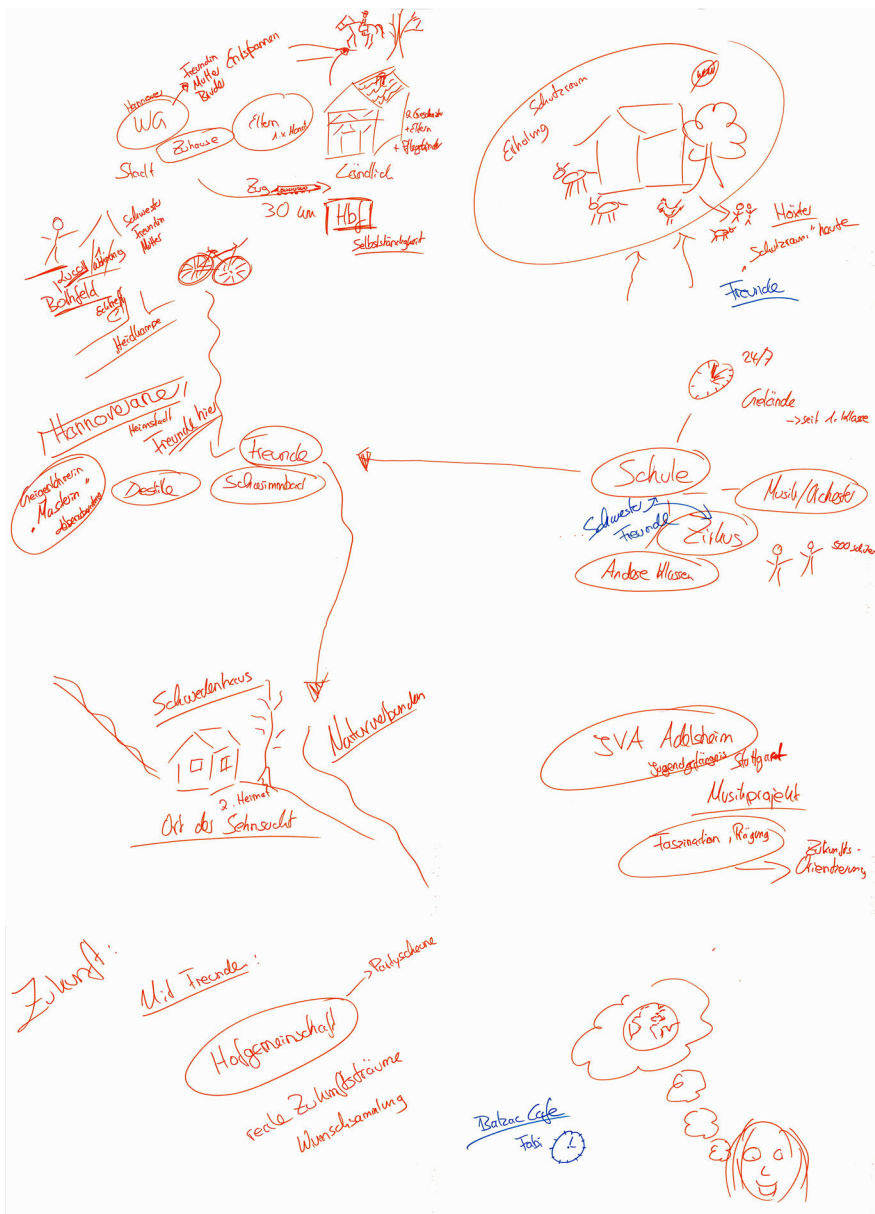


Fig. 2: Mental map drawn by a twelfth-grade student on a total of eight pages (merged here into one overall image) describing various temporal dimensions and scales of space in a structured manner. | ©SFB 1265 Learning Spaces subproject

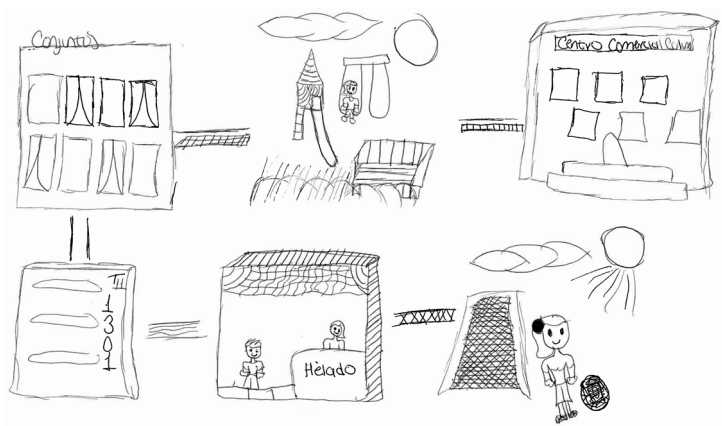


Fig. 3: Mental map with idealized intersections and depiction of paths between places and their materiality (girl, 8 years old). | ©SFB 1265 Learning Spaces subproject



Fig. 4: Mental map as a list of drawings and without virtually any intersections (boy, 7 years old). | ©SFB 1265 Learning Spaces subproject

4 Analysis with an optional focus on the spatial and procedural aspects of the study

Behnken and Zinnecker (2010: 16–23) refer to four analysis options. According to them, mental maps can be analyzed alone as such or with a focus on the creation process. For the latter, good documentation of the creation process (Fig. 1) is essential. In a single case study and/or comparative analysis, it is possible to analyze and/or systematically compare individual cases (e.g., by creating comparison groups). Synthesizing analysis methods are particularly interesting (triangulation according to Flick 2014), in which the spatial and procedural levels of the study are merged. The selection of the analysis method—in addition to the research question—also depends on the last available empirical material and the abilities of the research team with regard to making and analyzing maps.

4.1 Analyzing mental maps by means of comparison, transposition, translation, and superimposition

Challenging survey settings—such as those described in Section 3—can make it advisable to focus the analysis on the mental map and to ignore the process of creating the drawing. Focus is placed on the spatial visual information “while disregarding all temporal references to personal living spaces” (Behnken/Zinnecker 2010: 16, own translation). This analysis is fitting even if the study has a strong focus on action along the lines of a classic inventory approach, which is intended to draw conclusions about the physical transformation or restructuring of neighborhoods within the context of planning and building processes. For this purpose, it is possible to evaluate characteristic elements of the space (places, objects, borders, barriers, people, everyday actions, biographical experiences, etc.) and their frequency of occurrence. Furthermore, spatial elements can be analyzed with regard to their nature and representation (e.g., size of depiction, details) and their position in the overall drawing (cluster, distance, proximity).

“[This] analysis of the spatial qualities of subjective maps hinges on the plausibility of a central postulate, which claims that there is a striking similarity between the space drawn on paper and the psychological or ‘inner’ space of the draftsman. So if a house, the family home or a friend’s house, is large, detailed, and drawn in the middle of the page, then we can conclude that the illustrated centrality most likely corresponds to the psychological centrality of the house in the lifeworld.” (Behnken/Zinnecker 2010: 17, own translation)

This assumption is often criticized (see Pocock 1976, Evans 1980, and Blades 1990; or comprehensively in reference to Lynch, see Seifert 2011), for example, because the piece of paper itself represents a physical frame and the placement of further information on the paper becomes more limited with each element drawn.

A potential validation tool, for example, is comparing the mental maps with objective professional maps (for further details, see Behnken/Zinnecker 2010: 17 below). This comparison focuses on the subjective features of the drawing. It is possible to identify sub-

jective particularities of the lifeworld and “distortions”: “These can involve the position of the spatial elements in relation to one another being changed in the personal drawings, the linear dimensions deviating from the official maps, certain spatial elements being left out or others being added.” (ibid.: 18, own translation) For this purpose, the mental maps are transposed, in whole or in part, into objective maps to allow for an in-the-moment analysis of the subjective perspective of the respondents regarding their lifeworld.

In addition, verbal information can also be translated into maps and condensed to draw relevant conclusions. In his study *The Image of the City* (2007: 167–174), Lynch also generated maps from the verbal descriptions of the respondents and superimposed individual sketches to form collective maps. These maps were compared with the inventory surveys of the researchers who were trained in cartography. Technically, today this type of mapmaking can also be done using digital image editing programs, which can superimpose computerized, scanned sketches and drawings, show or hide those sketches and drawings individually as layers, or use them as a basis for professional maps. These professional maps, in turn, are created in computer-aided design programs (CAD) or geographic information systems (GIS).

4.2 Synthesizing analysis: Triangulation

In a synthesizing analysis, the mental map, the supplementary drawing on transparent paper, the documentation of the drawing process by the researchers (if available), the audio recordings of the explanations related to the drawing process, and the interview are merged as data sources (Behnken/Zinnecker 2010: 20). Any supplementary material that was collected is also added, such as the field notes of the researchers. At the same time, information about the context is helpful and can complement the survey: this includes information about the neighborhood (photos, a map of the neighborhood, aerial images, or even historical map material or official planning documents to retrace changes) and about the broader cultural context in which the respondents live. The information mentioned above, provided it is of a cartographic nature, can be digitized and combined with subjective or collective maps in geographic information systems (GIS) (see previous section) and overlaid with other data (e.g., crime monitoring surveys).³

This synthesizing approach has a compensating and explanatory effect as it makes it possible to read and interpret unclear and even omitted information reliably from mental maps or interview statements: “In general, the triangulation method reduces the greater ambiguity of visual expressions compared to verbal expressions.” (Behnken/Zinnecker 2010: 21, own translation)

Additionally, data sessions with local experts who are familiar with the field of investigation and the cultural context are helpful (see Fig. 4). Here we collaborate with local planning offices and scholars from the local universities.⁴

3 For the current state of research, an overview of studies, and the technical limitations of the method, see Curtis et al. 2014.

4 For challenges and guidance regarding comparative cultural research and interpretation using data sessions, see Reichertz 2021.



Fig. 5: Data session with a colleague from Bogotá: Interpretation of narrative maps (drawing and interview statements) using areal images, Google Street View, and online material. | ©SFB 1265 Learning Spaces subproject

With regard to the spatial knowledge of children and youth, we look at spheres of action as a whole and individual spaces inside and outside of those spheres. We assume that mediatization not only results in an equal “expansion” of spatial knowledge but also that access to media, media consumption, media coverage, and travel opportunities have an influence in this regard. In a subsequent step, prototypical examples are chosen from the multitude of narrative maps in the different case studies and compared according to the “*structural similarities*” principle (Katz 2004).

When interpreting mental maps in general and using synthesizing approaches to analyze narrative maps in particular, it is important to make the symbiotic operations of comparing, cutting, and embedding empirical material transparent for other researchers. Behnken und Zinnecker (2010: 21) recommend an interim report to document advances in knowledge discovery, which should also include interim cartographic products created by comparing, transposing, translating, and superimposing maps. In addition to methodological decisions during the research process, the “results of syntheses [are recorded] based on the structure of developed and used categories (topics, definitions, relationships) [and] findings (interpretations and conclusions)” (for details, see Flick 2014: 421).

5 Methods with high interdisciplinary integration and potential for further development

Despite all of the methodological challenges, the advantages of combining mental maps and interviews are plain to see: Respondents can choose between two forms of expression depending on the situation and their personal preference. With regard to difficult or taboo topics, drawing methods seem to facilitate conversations with respondents (Søndergaard/Reventlow 2019). Thus, the use of both approaches is relatively straightforward, potentially promoting communication in intercultural settings and breaking down power asymmetries in interview situations. Furthermore, the technique can be adapted to the respective situation and object of investigation (Behnken/Zinnecker 2010: 23).

However, since there are many different ways to collect and analyze data, the procedure must be described in detail in a research report (Flick 2014). Decisions made in every step of the process influence the final product. Especially when working with mental maps, the transparency and replicability of the results are essential and further development is required in terms of both the survey and analysis methods (see lists in Curtis et al. 2014: 267). This development work is rewarding because working with mental maps has proven to have high interdisciplinary integration potential, bringing together scholars from various disciplines to carry out not only basic research but also applied research. Therefore, it represents a methodological bridge between action-oriented disciplines and planning practice.

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