

Facilitator:
Nora Newcombe

Participants:
David Uttal
Richard Boehm
Scott Freunds Schuh
Susan Gallagher
Phil Gersmehl
Bob Bednarz
Charlie Fitzpatrick
Rick Bunch
Tim Shipley
Lynn Liben
Amy Lobben
Kristin Ratliff

Nora Newcombe: Introduced discussion.
Many expressed the need for a taxonomy for spatial thinking.

Discussion:

Lynn Liben: We need a clear accepted definition of what is space. We have pieces of taxonomy—we need formalization.

Nora Newcombe: I would love it too; we can get hammered by not having a taxonomy

Scott Freunds Schuh: There is a taxonomy

Lynn Liben: If you pick 20 terms dealing with spatial thinking, there will be 20 others in psychology. Take spatial concepts.

Scott Freunds Schuh: Isn't it with Piaget that there are more structures?

Lynn Liben: Would there be agreement that scale defines different dimensions?

Nora Newcombe: There are other dimensions.

David Uttal: Scale and process are sometimes very different, other times the meaning does not to depend on scale. We are discussing manipulation of space as if it was an option. Some studies make a transition from one to the other. We need a clearer understanding of what we have to offer.

Susan Gallagher: We know a lot about cognition and brain research over here [SILC] and geography and geography education here. Do I only process things in context because I am

trained this way? Do others do this? What do we know that is in the intersection? What is transferable? What can we do, say, or change about instructional strategies that we can do later on? Perception is a part. Understanding, visualizing, finding meaning out of these things is important. How do we change how people perceive and understand?

Nora Newcombe: Taxonomy... We need to know what to extend does your curriculum depend on typology? Could a study happen without typology? How was typology used with TAMU study?

Phil Gersmehl: This is a common route with R. Golledge; they expand it. I used neuroscience as the arbitrator of these things.

Nora Newcombe: Both typology from Golledge. ... A lot of curriculum work did not depend on typology.

Phil Gersmehl: But selling it did.

Lynn Liben: This is not a developmental, useful way of looking at a problem. To what extent is this falling on (examples: measuring system). Set up some abstract system to represent space could be something different just to focus on... What does any task problem need (no matter the domain)? What are the fundamental spatial parts? Geography seems like listing a lot of little things; we can do the same with projected geometry.

Nora Newcombe: The problem with Golledge is about something about which I am not about—which is process.

Lynn Liben: Golledge works for geographers, for maps, and geography maps are not for psychology.

Bob Bednarz: The process is working memory... not to me it is not. How a state changes from A to B.

Nora Newcombe: That is a problem you can sort out...

Tim Shipley: Should a cognitive scientist question the taxonomy of a different discipline?

Lynn Liben: Yes. The NRC cannot do that. We wanted to, but the committee did not say agreed on all spatial concepts the same way.

Bob Bednarz: In Golledge's book some of the primitive things are not so primitive. Location is important... seems like a fundamental. There is a difference between primitive and a fundamental. You cannot go from A to B without knowing where you are (fundamental idea).

Scott Freundschuh: Attributes of space does not define space itself.

Lynn Liben: What is space?

Scott Freundschuh: Is it only the space or the understanding of the space?

Tim Shipley: Space is external and internal. From a psychologist perspective we can say whether is primitive or fundamental. Density is seen independently... visual system does not do that.

Lynn Liben: How does one determine when something is primitive?

Tim Shipley: It is perception.

Lynn Liben: Density can be understood as an adult, for kids it is very difficult.

Scott Freundschuh: Density is a description of space, an attribute.

Nora Newcombe: Seeing density from an external point of view, developmental psychologist spent a lot of energy to look at sequential events, fine grained scaling.

Scott Freundschuh: Trying to find a common understanding of terms is what we are trying to get to.

Lynn Liben: We all have different perspectives. What is the real world?

Scott Freundschuh: Using the poverty map from Alec's speech, --if we try to do a point to point from any familiar map and poverty map, we cannot do that. (Well no, answer) It would be wildly distorted.

Lynn Liben: Not distorted by what they are trying to represent. You can tell what you are looking at.

Bob Bednarz: Some maps are just charts and graphs. For example: Graph by time to see how something changes overtime. A map can be plotted by the same way. One shows spatial variation and one shows temporal variation. If the NRC report has anything to give to spatial thinking strategies/processes maybe we should look for commonalities in one of those places. ... Perhaps visualization. --And leave the other places for later.

Nora Newcombe: Lynn, did the NRC not really solve that issue? Is it not really solvable or was it a time issue?

Lynn Liben: Not just a time issue, we could not all agree. We would have the same problem with cognitive scientists. Maybe we could agree on concepts and skills and how to measure. ... But to have total agreement of what we mean by it; I don't think we could do it.

Bob Bednarz: Replicability is certainly not perfect. Injeong just wanted find a spatial taxonomy way to judge questions.

Lynn Liben: I agree it was really hard.

Bob Bednarz: Geographical space would be a subset of psychological space. You are more all inclusive, geographers ...

Nora Newcombe: I do not agree that geographers would be subset. Seems to me also that geographers study things that psychologists don't study.

Lynn Liben: Taxonomy... should we have it or forget it?

David Uttal: Maybe forget it, I don't see it working.

Nora Newcombe: I don't know if is worth the time and effort to work out the same terms and when they change.

Amy Lobben: We may have to pull back and generalize so much that it would not be useful for the disciplines that use it.

Nora Newcombe: It is possible that we have not had the blinding of strong of insight.

Phil Gersmehl: It took a long time and large amount of people for the taxonomy for the periodic table. It may be time to think in terms of what is doable.... The NRC report basically had to be done by getting hints from neuroscience.

David Uttal: I do not think neuroscience is the answer.

Bob Bednarz: This will much more difficult than soil taxonomy.

Lynn Liben: Psychologists gets offered from geography concepts/topics to be taught and to be understood—real life situations, policy, and laboratories for cognitive psychologist. What types of process are involved and how does one teach that process? Offer specific problems that we can offer our psychology. As a cognitive psychologist I can offer what I know about development and cognition that is important to a situation. The teachers can be informed how to teach in a more meaningful way. Maybe a content offering. --Real problems and real theoretical test for someone who knows the component of tests and makes predictions.

Nora Newcombe: Geography and geography education offer test bed for real world problems, a yard stick –this contribution as well. We need to offer them a bag of tricks based on research to anticipate/over come obstacles. Another thing: Geography offers to psychology is that no map is vertical. No map is a correct map.

Bob Bednarz: Geography can get you interested in questions that you may never have found yourself. The Quantitative Revolution... we need people to look at maps. Get past rotation and visualization; maps and wayfinding another place for help.

Lynn Liben: Visualization. Psychologists think in terms of numbers and in terms how we collect data and deal with data. Geography offers a much heavier way of dealing with/analyzing data. Visualize the data—spatialization of data. Psychologists think differently about data and geographers offer a different way.

Nora Newcombe: More figures and fewer graphs in psychology.

Bob Bednarz: Geography is more navigational/wayfinding.

Tim Shipley: Geographers are experts in spatial visualization. As a practice they know where divergence takes place because we may not know there is a spatial skill there.

Susan Gallagher: Cognitive scientists help us inform. We tend to ask a question –the same question in a different way. We should spin the question to understand the different ways to look at the information. The desire is for a broad base group to ask questions. Maybe we need a gap analysis to better inform us. We need a transformative layer, to look a different group, and to bring together people to produce something of the next steps like NRC need documentation to send us off in the right way.

Nora Newcombe: What is next step?

Susan Gallagher: Question—ask it in different way to inform what need to do next.

Scott Freundsuh: What is an example of a question to address this?

Susan Gallagher: How students can interpret layering...

Scott Freundsuh: We can list all terms in GIS spatial terms and see where the overlap.

Lynn Liben: Geo-science—the science and geography idea is state of the art in the interconnection. I suggest for a research and education agenda, one questions --at what level do you do this? For this example group 4 topics for one person from the cognitive science group with a geo-scientist (geologist). A day in the life in a geoscientist....keep a journal... where is the cognition in each step. There is a great deal of cognition for one little task. We must make connections one at a time. We cannot say we want to teach geography and where is the cognitive science.

Bob Bednarz: We need to really narrow this down.

Nora Newcombe: A laboratory problem as the contribution to teaching is seemingly little.

Tim Shipley: When you go into classroom you have moments this is really important and got to get this across but kids not getting. That is a good place for the psychologist to come in. The problem is when the teacher is in object mode and kids in scene mode.

Susan Gallagher: Is the problem illuminating?

Lynn Liben: Psychologists can warn people that what they may not think is hard but is really hard mentally.

Tim Shipley: Psychology is getting traction making tools to get certain material across.

Susan Gallagher: Geoscientist initiative? How many know? No one.

Lynn Liben: This has been going only a year. Just a white paper. These are two groups that need to be talking to each other. A synthesis needs to be made... not new research.

Susan Gallagher: The value in the synthesis is translated into value and actions.

Danny Edelson: Group summary

There is a lot of excitement and interest from SILC and the representation seen here. We had a lot of discussion on the diversity of cartographic representation, symbology, and aligning maps in different ways. There was consensus around a political agenda –we all share helping the unenlightened of spatial thinking and its role. So much of education system relies on it and nothing has been done to bring it out. Geography: We see more research to guide geo-education. Geography educators feel the scarcity of research ...of what to build on.

Nora Newcombe: Group summary

We discussed whether or not there is an agreement on spatial taxonomy. We agreed not to recommend a great move for that because Lynn Liben shared that the NRC report tried and found it quite difficult. If it had been the sole thing, they might not do it. There is a non-accidental overlap in research. It is not as if you wandered into the wrong conference. All typology seems to be generative. Grouping of terms can be done. Is it worth our time, to do that. We have much to offer to one another. It cannot really be at a very high level. It can be in a particular question, level, and use. Cognitive scientists can warn that there is reason to think some are getting it and others not. Find ways to make content and thinking clearer and transparent.

Danny Edelson:

We discussed the taxonomy value yesterday in our break-out session. We agreed that we are not ready to try to reach consensus. We need a taxonomy across disciplines. The degree in which we are using words and do not know that we use different meaning is important. For example “process” –physical process—change of state from A to B. Cognitively—it is the way you think about something. *What other meetings of the mind/clarity are there that we can take away?*

- Mike Goodchild: The domain of human geography offers some areas of research.
- Nora Newcombe: Scott –Geography should be part of STEM.
- Scott Freundsuh: Strategy ... Make your request so that it can be coded/covered as STEM.
- Kim Kastens: NSF covers geography and that lies in science...
- Scott Freundsuh: Interaction is now beginning.
- Danny Edelson: NSF has a history funding GIS related materials.
- Scott Freundsuh: Supplements are easier because rigor not as high.
- Danny Edelson: Methodology –I’m surprised it did not come up more... everyone went smoothly from one to the other.
- Lynn Liben: Spatialization and graphic presenting and thinking are about data.
- Dedre Gentner: I’m totally surprised how much bandwidth there was, knowledgeable and cohesion. Geographers have follow-up communication,
- Danny Edelson: There is common ground in the nature of the methodology in that social science and geo-science have observational, qualitative/quantitative role in the academy.
- Dedre Gentner: We need to listen to many disciplines.