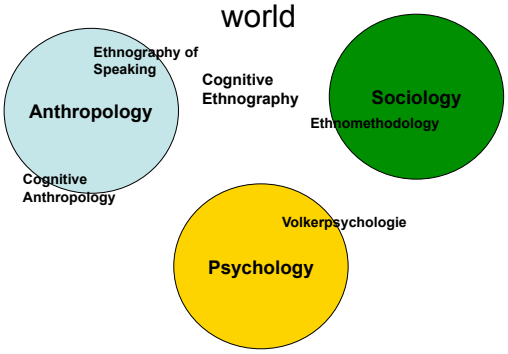
The original carving up of the social world



What is ethnography?

- Ethno = a people or social group
- Graphy = documentation
  - Documentation of the lifeworld of a people.
  - Ethnography is
  - A methodology. A set of activities
  - A stance toward human existence
  - A set theoretical assumptions, that human activity has meaning, it is not chaotic; that it is culturally organized.
  - Participant observation is a key method in the ethnographic methodology.

Bronislaw Malinowski, the father of modern ethnographic methods, in the Trobriand Islands (1916)

Malinowski's Ethnographies

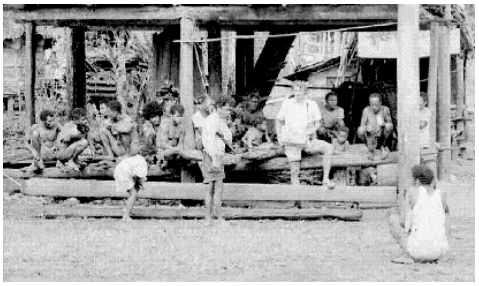
- *Argonauts of the Western Pacific* (1922)
- *Crime and custom in savage society* (1926)
- *Sex and repression in savage society* (1927)
- *The sexual lives of savages in N.W. Melanesia: An ethnographic account of courtship, marriage, and family life among the natives of the Trobriand Islands* (1929)
- *Coral gardens and their magic* (1935)

For cognitive anthropologists

- The job of an ethnographer is to document a particular aspect of the lifeworld: the systems of meaning.
- What are the meanings created and communicated by members of a society?
- What is the structure of cultural knowledge?
  - How is cultural knowledge organized?
  - What categories are recognized and how are those categories related to one another?
- What are the relations among language, culture, and thought.

Bronislaw Malinowski, the father of modern ethnographic methods, in the Trobriand Islands (1916)

Me, a child of ethnographic methods, in the Trobriand Islands (1976)



Tukwaukwa village fishing fleet

A Chief's yam house (*liku*)

Exchange Ritual

Cognitive Ethnography method

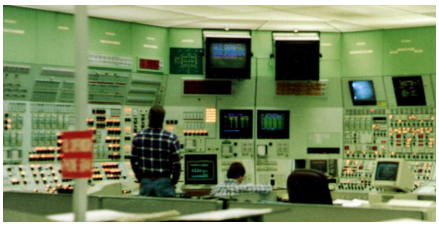
- Careful examination of the details of small events
- Grounded in and informed by rich ethnographic knowledge

Cognitive Ethnography of Land Litigation

Airline cockpit

Edwin Hutchins

Nuclear power plant control room



Kim Vicente

Swedish Fishing Fleet

Brian Hazlehurst

Kids at play in East LA

Charles and Marjorie Goodwin

Family dinner

Charles Goodwin

A Family Relaxing

Christine Johnson

Navigation bridge of a Navy Ship

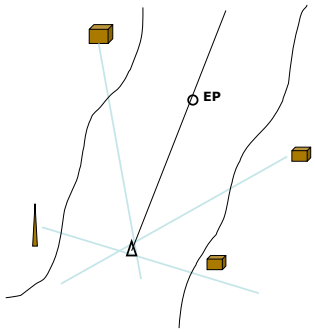
Edwin Hutchins

Five Contributions of Cognitive Ethnography

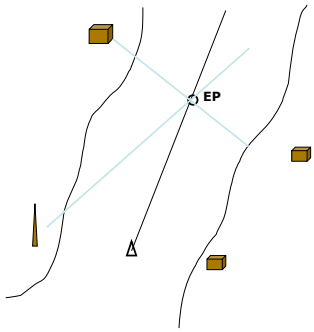
1. Understanding cognitive ecology
2. An improved functional specification for the human cognitive system
3. Documenting the distribution of cognitive processes across space, time, and society
4. Informing experimental studies
5. Informing design of human systems

Choosing Landmarks

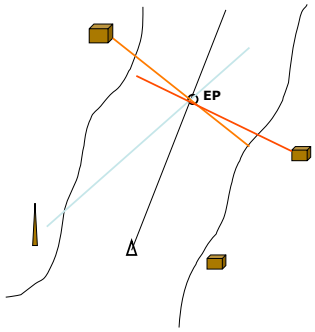
Position Fixing by Visual Bearings



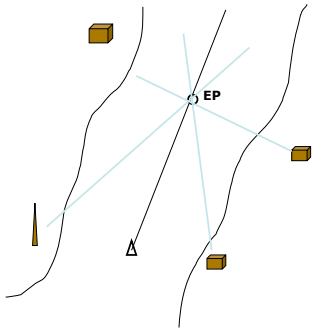
Position Fixing by Visual Bearings



Position Fixing by Visual Bearings



Position Fixing by Visual Bearings

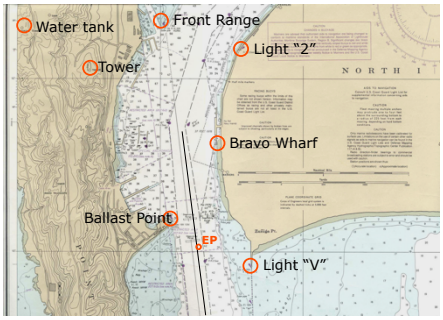


Interpreting events as instances of theoretical objects

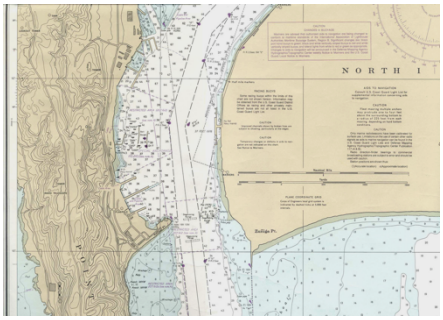
- Events
- Crew interaction
- Gestured virtual LOPs
- Angles of intersection

- Theory
- choice process
- representations
- choice criteria

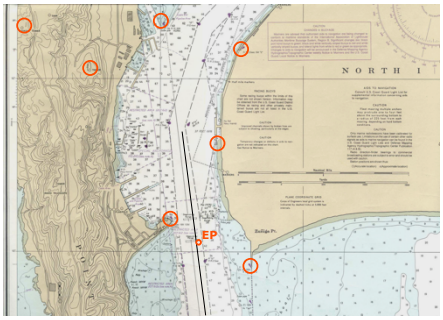
Seeing the EP and landmarks



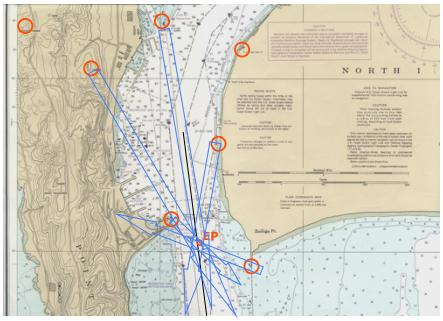
San Diego Harbor Chart



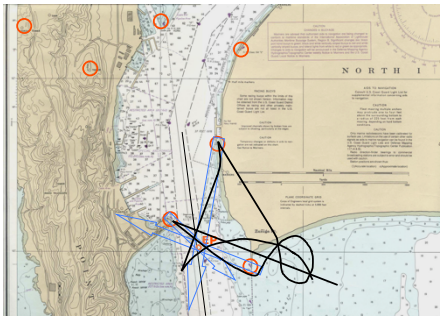
Estimated position and nearby landmarks



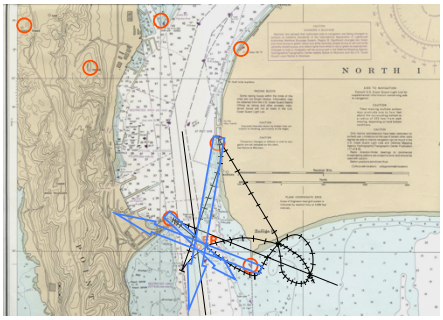
Potential lines of position



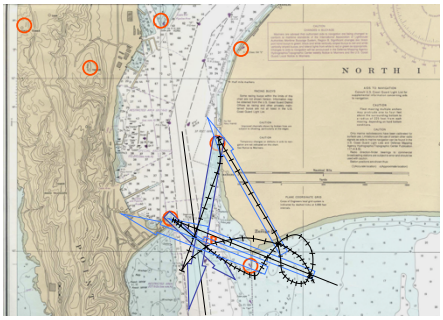
The trajectory of BR's gesture



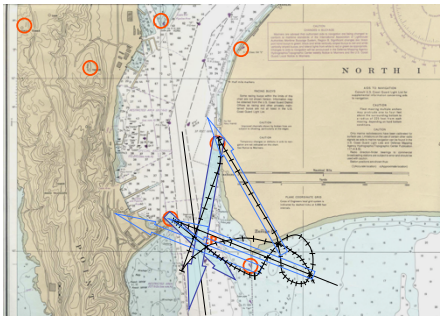
Velocity profile of the gesture



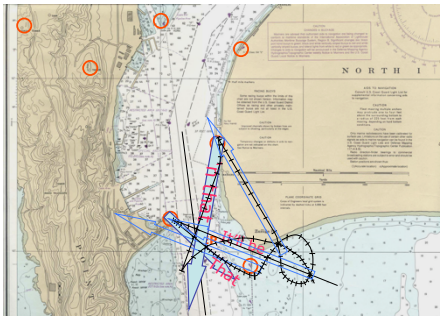
Linear segments of gesture



Altitude of gesture above the chart surface



Co-gesture speech



Representations in the brain when locating objects

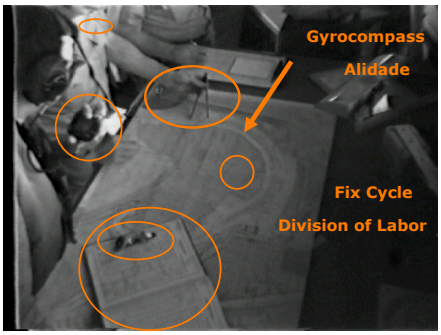
- Memory for LMs
- Visual
  - Retino-centric
  - Head-centric
  - Body-centric

Representations in the brain when gesturing on the objects

- Memory for LMs
- Visual
  - location
    - Retino-centric
    - Head-centric
    - Body-centric
  - Motion
  - Velocity
  - Direction
    - Retino-centric
    - Head-centric
    - Body-centric

- Motor system
  - Location
  - Velocity
  - Direction
- Somatosensory
  - Location
  - Velocity
  - Direction

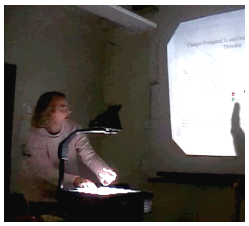
The social and material ecology of real-world cognition



Contributions of Cognitive Ethnography

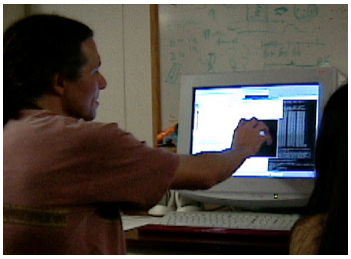
- Understanding cognitive ecology
  - The brain is in the mind
- An improved functional specification for the human cognitive system
- Documenting the distribution of cognitive processes across space, time, and society
- Informing experimental studies
- Informing design of human systems

Using gesture over static graphics to create virtual objects that can be manipulated:
1. The Thrombin Hand



Amaya Becvar

Using gesture over static graphics to create virtual objects that can be manipulated: 2. Rotating a brain



Morana Alac

Functional specification

- Multi-modal reasoning and communicating
- Segmenting the gesture stream
- Seeing and manipulating imaginary objects
- Assigning meaning to space
- Adapting to unexpected events
- High-level cognition in action in the social and material world

Contributions of Cognitive Ethnography

- Understanding cognitive ecology
  - The brain is in the mind
- An improved functional specification for the human cognitive system
  - High-level processes are embedded in the social and material world
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The distribution of cognitive processes across space, time, and society.

Contributions of Cognitive Ethnography

- Understanding cognitive ecology
  - The brain is in the mind
- An improved functional specification for the human cognitive system
  - High-level processes are embedded in the social and material world
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  - We are guessing
- Informing experimental studies
- Informing design of human systems

The relation of cognitive ethnography to laboratory studies

Was Neisser too grumpy?

Inform Experimental Studies

- Spawn questions and hypotheses for experimental study
- Guide the design of stimulus materials
- Establish the ecological validity of experimental studies

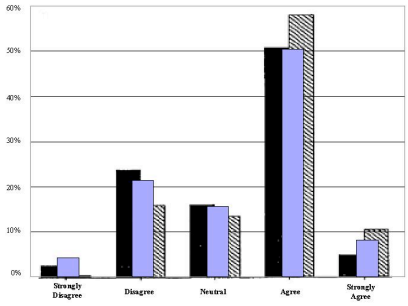
When Enacting Lines of Position

- What is the relationship of eye motion to hand motion when constructing imaginary lines of position?
- What sorts of perturbations disrupt the judgements?
- Where in the brain are the processes that do this?
- What is the relationship among the processes in different brain areas?

Constructing appropriate stimulus materials

"What's it doing now?"

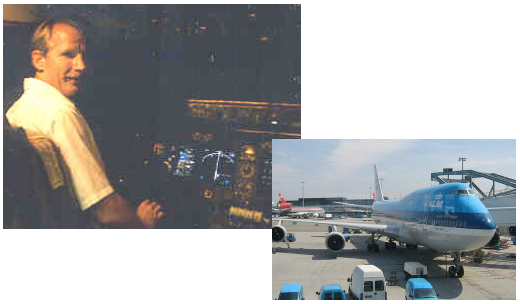
In the automation of my current aircraft, there are still things that happen that surprise me.



The Problem

- Design a flight scenario for a high-fidelity simulator that will reliably lead experienced flight crews to encounter mode confusions and to make autoflight mode-management errors.

Participant Observation in the world of aviation



Scenario excerpt

(After crew calls)

BAY DEP: NASA8001 BAY DEPARTURE, RADAR CONTACT. MAINTAIN 6,000

(When cab's heading is 200)

BAY DEP: NASA8001, TURN ~~RIGHT TO 230~~ *LEFT TO 180* FOR SPACING

(After 30 seconds)

BAY DEP: NASA8001, TURN ~~LEFT~~ *RIGHT* TO xxx, INTERCEPT AND RESUME THE PORTE 9 DEPARTURE

(As cab approaches ~~6,000~~ *3,500*)

BAY DEP: NASA8001, ~~CROSS PORTE AT OR BELOW 11,000~~, CLIMB *UNRESTRICTED* AND MAINTAIN 15,000

(As cab approaches 10,000)

BAY DEP: NASA8001, CONTACT OAK CENTER ON 125.45

Establish ecological validity of experimental conditions

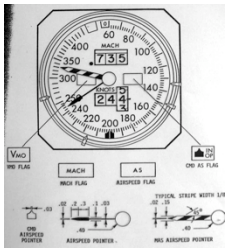
- What is the cognitive ecology?
- Introspection and speculation are not suitable methods for discovering the structure of the everyday cognitive ecology.

Contributions of Cognitive Ethnography

- Understanding cognitive ecology
  - The brain is in the mind
- An improved functional specification for the human cognitive system
  - High-level processes are embedded in the social and material world
- Documenting the distribution of cognitive processes across space, time, and society
  - We are guessing
- Informing experimental studies
  - A complementary relationship
- Informing design of human systems

Inform Design of Artifacts

767 Airspeed Indicator



A Design Principle

User Understanding of the Task — User Interface to the Task

Salient conceptual relations ⟷ Salient perceptual properties

Conceptual processes can be enacted in fast, robust perceptual processes. Operators can "see" the solution.

Contributions of Cognitive Ethnography

- Understanding cognitive ecology
  - The brain is in the mind
- An improved functional specification for the human cognitive system
  - High-level processes are embedded in the social and material world
- Documenting the distribution of cognitive processes across space, time, and society
  - We are guessing
- Informing experimental studies
  - A complementary relationship
- Informing design of human systems
  - A necessary element

Summary of Cognitive Ethnography Method

- Examine the fine-scale details of real-world activity…
- As interaction among brain, body, and material and social world…
- In a local cognitive ecology…
- Informed by our developing knowledge of cognitive processes…
- And by ethnographic knowledge.

Huge Opportunities Provided by New Ways of Seeing

Project 2:Cognitive Diary and Everyday Task Description

- **Due January 21, 2010**
- To see some part of your own life through the cognitoscope.

Project 2 Step 1

- Keep a "cognitive diary" for an entire day. Whenever you do a task that requires thinking or remembering, try to notice it and jot it down (or dictate to tape recorder). This will give you some idea of the cognitive texture of everyday life, and give you a collection of cognitive activities to choose from. You are not required to turn in the diary itself. But **DO** record one.

Project 2 Step 2

- Choose an everyday cognitive activity from your diary to describe in detail. Keep it small and simple. It may be part of your job, or part of a recreational activity, or part of your everyday routine. It should be something that you would have done even if you were not taking this class. DO NOT ATTEMPT TO DESCRIBE A PERSONAL RELATIONSHIP, OR A PRIVATE ACTIVITY, OR YOUR REASONING ABOUT IT. Do NOT attempt to design an "experiment". DON'T WORRY ABOUT HOW REPRESENTATIVE THE ACTIVITY IS.

Project 2 Step 3

- Describe the cognitive activity as carefully as you can.
- Begin by describing ONLY those things that could be captured on video.
- What is "cognitive" about the activity? That is, how does it accomplish a cognitive function such as planning, problem solving, decision making, understanding, control of action, etc.

- Some of the questions you might be able to answer include the following:
  - How does the activity take advantage of or interact with structure in the environment?
  - If the activity is engaged in frequently, is there evidence that it has become "routine " in the sense described by Lave and her colleagues?
  - Are there cognitive shortcuts - ways of making a complicated computation into a simple on?.
- You may speculate on the nature of the psychological processes involved ONLY IF you can show relations to established results in psychology OR if you can link the processes to observable phenomena. For example, you might be able to speculate on the knowledge required to engage in the activity if you can link it to observable aspects of the activity.

Write it up

- **Format**: Your name. Project 2. Cognitive Diary and Everyday Task Description
- **The Activity:** What is the activity being described?
- **Description**: Your careful and detailed description of the activity.
- **Maximum 800 words of text**. Additional figures, sketches, images and so on, e.g. structure that was used in the environment, are not included in the page count.
- *Your job is to produce a document that makes it easy for us to see that you did the reading, thought about the issues, and did some real research. Work on making it concise. Please proofread your papers. Use a dictionary!.*

Basis of your grade

- 20 points for clarity of presentation, writing, formatting of material;
- 20 for relevance to the readings;
- 60 for quality of research, concept for research, and execution.
- 100 points total.

Tips for doing Project 2

- Describe something that **actually happened**. **NOT** what usually happens.
- Pick an activity in which actions are observable.
- Pick an interesting activity.
- Be sure to BOTH document an activity AND examine cognitive aspects.
- Dig below the surface of things, examine details, imagine how things could be different. (What if the supermarket had random organization?)
- Be a Martian.
- Do not invent a story to account for observations. Stay close to the data.

More Project 2 tips

- Establish links to the readings.
  - Using the past to meet the present and the future.
  - Problems as snags in on-going activity.
  - How the larger culture organizes arenas for cognitive activity.
  - Using the environment to aid computation.
  - Rationalizations (ideologically motivated beliefs or actions).
  - The dialectical relationship between setting and activity.

More Project 2 tips

- Make your paper easy to read.
  - Backup claims with evidence.
  - Organize the presentation or argument. Use paragraph and/or section headers.
  - Be concise. Think about what needs to be said. Know what your point is.
  - Proof read! Check spelling, syntax, word choice. Get someone else to read your paper before you make the final draft.
  - Use graphics, diagrams.
  - Format cleanly.