Semiotics

- The meaning of signs
- Ferdinand de Saussure (1916), Charles Sanders Peirce (1932)
- Humans make meanings through our creation and interpretation of ’signs’
- A linguistic sign is not a link between a thing and a name, but between a concept and a sound pattern
- see: http://www.aber.ac.uk/media/Documents/S4B/sem02.html Semiotics for Beginners by Daniel Chandler
Saussure

A dyadic model of the sign, being composed of:
- a 'signifier' (signifiant) – the form which the sign takes; and
- the 'signified' (signifié) - the concept it represents.

The sign is the whole that results from the association of the signifier with the signified.

Relationship between the signifier and the signified: 'signification' (arros in the diagram)
Example

Word ’Open’ (when it is invested with meaning by someone who encounters it on a shop doorway)
is a sign consisting of:
  - a signifier: the word open;
  - a signified concept: that the shop is open for business
Pierce

triadic model:
- The Representamen: the form which the sign takes (not necessarily material); (cf. signifier)
- An Interpretant: not an interpreter but rather the sense made of the sign; (cf. signified, but itself a sign – in the mind of the interpreter)
- An Object: to which the sign refers. (not in Saussure’s model, also called referent)

The semiotic triangle:
- Sign vehicle: the form of the sign;
- Sense: the sense made of the sign;
- Referent: what the sign ‘stands for’.
Semiotic Triangle

- **sense**
- **SIGN**
- **referent**
- **sign vehicle**

Diagram showing the semiotic triangle with labeled parts A, B, and C.
Sign/Referent Relationships

Symbol/symbolic: signifier does not resemble signified; fundamentally arbitrary or purely conventional (relationship must be learnt)
e.g. language in general (plus specific languages, alphabetical letters, punctuation marks, words, phrases and sentences), numbers, morse code, traffic lights, national flags;

Icon/iconic: signifier is perceived as resembling or imitating the signified (recognizably looking, sounding, feeling, tasting or smelling like it) - being similar in possessing some of its qualities;
e.g. a portrait, a cartoon, a scale-model, onomatopoeia, metaphors, 'realistic' sounds in 'programme music', sound effects in radio drama, a dubbed film soundtrack, imitative gestures;
Index/indexical: signifier is not arbitrary but is directly connected in some way (physically or causally) to the signified – this link can be observed or inferred:

e.g. 'natural signs' (smoke, thunder, footprints, echoes, non-synthetic odours and flavours), medical symptoms (pain, a rash, pulse-rate), measuring instruments (weathercock, thermometer, clock, spirit-level), 'signals' (a knock on a door, a phone ringing), pointers (a pointing 'index' finger, a directional signpost), recordings (a photograph, a film, video or television shot, an audio-recorded voice), personal 'trademarks' (handwriting, catchphrase) and indexical words ('that', 'this', 'here', 'there').
## Misleading Icons

1994 Design of SunWeb - Sun Microsystems’ Intranet  
By Jakob Nielsen and Darrel Sano

<table>
<thead>
<tr>
<th>Intended Meaning</th>
<th>Test Users' Interpretations</th>
</tr>
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<tbody>
<tr>
<td>Geographic view of the company (branch offices in different locations).</td>
<td>World, global view, planet, the world, Earth.</td>
</tr>
<tr>
<td>Benefits.</td>
<td>Health field, money, health care is expensive, Clinton's health plan, hospital, don't know, benefits.</td>
</tr>
<tr>
<td>Public relations (TV with commercial).</td>
<td>TV set, video, TV, TV, TV.</td>
</tr>
<tr>
<td>Specialized tools (toolbox).</td>
<td>Briefcase, personal info, briefcase, toolbox, briefcase.</td>
</tr>
<tr>
<td>What's new (bulletin board).</td>
<td>Bulletin board, bulletin board, bulletin board, laundry.</td>
</tr>
<tr>
<td>World Wide Web.</td>
<td>Networking on a world scale, map, location, dimensions of the planet, networking around the world, geography, global.</td>
</tr>
</tbody>
</table>

**Table 1.** Results of icon intuitiveness study with four users (some users gave more than one interpretation of some icons).
Bühler’s Organon (cf. Plato): Sprache ist ein Werkzeug (Organum) mit dem “Einer dem anderen etwas mitteilt über die Dinge” (1932)
Modes of Communication

Different channels:
- Auditory: spoken language, music, ...
- Visual: written language, gestures, ...
- Haptic: Braille
- Olfactoric: scent marks

direct (face-to-face) vs. indirect (phone)

Computer-mediated communication
- Synchronous: video phone, instant messaging, chatrooms
- Asynchronous: email, newsgroups
Communication System

- Animals have communication: using signs to denote objects and events which are relevant for performing actions (e.g. sign language of bees)
- Only humans can use signs which refer to other signs, meta-language, speaking about language
- Schematic model of a communication system

sentiment  

sender  

Intention  

Encoding  

receiver  

Decoding  

Interpretation  

common language  

transmission of signs  

physical medium  

motor production  

sensory registration  

Message
Information Transmission

- Information Theory (e.g. Shannon; see “KogSysII”)
- Human language is redundant: safety of communication not maximal exploitation of capacity
- Physical characteristics of spoken language: sound waves with different frequencies (pitch) and amplitudes (loadness)
- Experiments by French and Steinberg (1947): using different high-pass filters and low-pass filters: e.g., transmitting only waves over 1000 Hz: 85% of meaningless syllables are recognized; only waves over 3000 Hz: 35%; intersection of both curves at about 1900 Hz: regardless whether high or low frequencies are filtered out, if enough bandwidth is left, speech remains understandable
The Importance of Consonants

OOAE–I–IIE–A–OAE
The Importance of Consonants

KNSNNTN–SND–WCHTGR–LS–VKL
The Importance of Consonants

- Experiments by Licklider and Miller (1951): distortion of waves by amplitude selection: clipping of peaks has no effect (only vowels have high intensity), cutting out the middle band makes speech ununderstandable (consonants)
- cf. arabic written languages
Speech Perception and Noise

- Distortion of signals vs. accumulation of signals
- e.g., communication over phone, video conference
- Masking experiments using signal plus white noise: As lower the signal-to-noise-ratio (intensity of signal divided by intensity of noise) as smaller the amount of differences which can be perceived in the signal, that is, as smaller the amount of information which can be transmitted
- Broadbent’s filter theory and dichotic hearing experiments (see last lecture)
Zipf’s Law

- George Kingsley Zipf (1902-1950)
- frequency of the $k$th most common word in a text is roughly proportional to $\frac{1}{k}$
- common words are shorter than seldomly used words
- Web use also follows a Zipf distribution
  [Link](http://www.useit.com/alertbox/zipf.html)
Language, Thought, Reality

- Words a arbitrary signs (must be learned)
- natural similarity between sound of words and appearance of things (see Köhler study)
- Whorf’s thesis of linguistic determinism: language governs thinking
- Whorf’s thesis of linguistic relativism: language implies a certain view of the world
- Intercultural studies (Hopi, Eskimo)
- Evidence against Whorf: color coding experiments
Speech as Action

- Language as essential part of cooperative work
- Speech Acts (see KogSysI)
- Austin, Searle,
- Winograd and Flores (1986): Conversation for Action Framework

used in a commercial software product (The Coordinator), which failed because people found it overly restrictive
Philosopher John Searle (1969)

Identified properties that must hold for a speech act to succeed

E.g.: Speaker requests that hearer performs action

- Normal I/O conditions: Hearer must be able to hear the request (not deaf, etc.), act must be performed in normal circumstances (not in a movie etc.)

- Preparatory conditions: what must be true in the world that speaker correctly chooses the speech act (hearer must be able to perform action, speaker must believe that hearer is able to perform action, hearer does not do the action without request)

- Sincerity conditions: e.g., speaker must really want the action to be performed
**Video vs. face-to-face**

- Study by Kraut et al. (1990)
- many interactions undistinguishable from fact-to-face
- Exception: persons speak a bit louder, constantly talk about the video system
- People in the same room tend to talk more with each other than with the video-linked people
- Usability problems: tendency of people to move closer to the picture window to strike up a conversation (opposite effect: moving head out of picture); inability to monitor how one is seen or heard by the others