basic concepts

- coding & transcription
  - full transcription of speech
  - identification of gesture phases
  - type (classification)
- form
  - hand (which hand; handshape; palm-finger orientation; place in gesture space)
  - motion (shape, trajectory; place; direction; speed)
- meaning
  - hand (what does the hand represent?; viewpoint)
  - motion (what does motion represent?; viewpoint)
  - body (representing anything different from hand?)
  - space (any meaning?)

(From McNeill 1992)

gesture continua

(1) relationship to speech

- gesticulation
  - obligatorily present
- emblems
  - optional presence
- pantomime
  - obligatorily absent
- sign language
  - obligatorily absent

(2) relationship to linguistic properties

- gesticulation
  - obligatory presence
- emblems
  - mandatory presence
- pantomime
  - some linguistic properties present
- sign language
  - all linguistic properties present

(3) relationship to conventions

- gesticulation
  - not conventionalized
- panomime
  - partly conventionalized
- emblems
  - fully conventionalized
- sign language
  - fully conventionalized

(4) character of semiosis

- gesticulation
  - global and synthetic
- pantomime
  - global and analytic
- emblems
  - segmented and synthetic
- sign language
  - segmented and analytic

why did it take so long?

- Gestures? Why gestures?
  - some excellent reasons

- meaning (semantics) back to linguistics
  - cognitive linguistics
  - theoretical and technological developments in neuropsychology (e.g., fMRI)
- the embodied mind taken (very!) seriously
  - neuroscience (Varela, Freeman, Damasio, Edelman, ...)
  - cognitive semantics (Lakoff, Talmy, Rauschecker, Langacker, ...)
  - philosophy of mind/language (Johnson, Clark)
  - cognitive robotics (Pfeifer, Steels)
  - role of morphology
  - psychology (Thelen, Smith)
- access to relatively cheap
  - digital audio-video technology
  - motion capture technology
- speech-accompanying gesture is universal
  - it provides a remarkable "back door" to linguistic real-time cognition (McNeill, 1992; Kita & Essegbey, 2001; Iverson & Thelen 1999)
- less monitored than speech; largely unconscious
  - speakers are often unaware that they are gesturing at all (McNeill, 1992)
- astonishing synchronicity with speech
  - millisecond-precise gesture-to-speech synchronicity, in patterns which are specific to a given language.
- coupled with environment and real-world context
  - highly sensitive to environmental settings (Goodwin, Labaron, Speech)

now is the right (and exciting!) moment

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gestures? why gestures?  
... some excellent reasons

- gesture production doesn't need the presence of an interlocutor
- phone conversations, monologues, conversations among congenitally blind (Iverson & Goldin-Meadow, 1998)
- co-processed with speech
- stutterers stutter in gesture too, impeding hand gestures interrupts speech production (Mayberry & Jaques 2000)
- affected by similar neurological damage as speech
- dysfluent aphasics are dysfluent in gesture as well as in speech (Mohanty & Pedelty), research with signers show similar results (Hickok et al., 1998)

why did it take so long?

- Gesture: the forgotten dimension of thought and language
  - experimental psychology?
  - linguistics?
  - cognitive science?
  - philosophy of mind/language?

why did it take so long?

- experimental/cognitive psychology
  - getting into the black box
  - emphasis on "mental calculations" and algorithms underlying abstract "information processing"
  - the (truth-conditional) symbolic logic of the mind
  - the body is largely ignored

why did it take so long?

- development
  - gesture and speech develop closely linked (Iverson & Thelen 1999; Bates et al, 2001)
  - provide complementary content to speech content
  - speakers synthesize and subsequently cannot distinguish information taken from the two channels (Kendon, 2000)
  - co-produced with abstract metaphorical thinking

why did it take so long?

- experimental psychology
  - behaviorism?

  S → ? → R

  - spontaneous phenomenon
  - very hard to operationalize
  - overemphasis on written language

why did it take so long?

- linguistics
  - Structuralism (searching for abstract structures...)
  - the (over)emphasis on logic and formalisms
  - chomskian linguistics: syntax, combinatorics, formal properties
  - meaning and semantics are out
  - language completely body-less
  - overemphasis on written language
why did it take so long?

- cognitive science
  - born out of body-less computer-based theories
  - zeitgeist: overemphasis on
    - symbolic logic
    - algorithms
    - formalisms
    - computable phenomena
    - bodily phenomena seen as "hardware" related (at best) ... a matter of implementation
    - little or no interest in real-time phenomena (too hard)
    - fundamental general abstract rules first ... everyday cognition is secondary at best

- philosophy of mind/language
  - meaning is the monopoly of analytic philosophy
  - zeitgeist, once again: overemphasis on
    - symbolic logic
    - formalisms
    - truth-conditional requirements
    - no interest in real-time phenomena (too hard)
    - absence of experiential body
    - written expressions
  - this philosophical approach matches extremely well the early AI enterprise, as well as chomskian linguistics