gesture

an introduction to the scientific study of gestures
some facts …

- the very first conference …
- the very first journal …
why did it take so long?
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 psychology
  - behaviorism?

- spontaneous phenomenon
- very hard to operationalize
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
  - comprehension vs. Production
  - written language as paradigm; the body is largely ignored
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 not essential
  - language completely body-less
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
why did it take so long?

- 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
  - this philosophical approach matches extremely well the early AI enterprise, as well as chomskian linguistics
now is the right (and exciting!) moment

- **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, Fauconnier, 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 caption technology
gestures? why gestures? … some excellent reasons

- 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, Lebaron, Streeck)
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 (McNeill & Pedelty). research with signers show similar results (Hickok et al., 1998)
gestures? why gestures?  
... some excellent reasons

- 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
  - linguistic metaphorical mappings are paralleled systematically in gesture (Cienki, 1998; Sweetser, 1998; Núñez & Sweetser, 2001, Núñez, in press).
basic concepts (1)

- handshapes

(from McNeill 1992)
basic concepts (2)

- gesture space

(from McNeill 1992)
basic concepts (3)

- gesture unit (period of time between successive rests of the limbs) (Kendon, 1980)
- gesture phrase (occurs within a gesture unit, several may occur; it has three phases)
- phases
  - preparation
  - stroke (obligatory; identified in semantic and kinetic terms)
    - distinct acceleration-de-acceleration pattern
  - retraction
  - (pre- and post holds)