

**Multimodal Action**  
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**Conclusion**

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Multimodal Action

- Outline:**
- Introduction: Verbal and nonverbal information
  - Gestures
  - Posture
  - Gaze
  - Voice
  - Space
  - Turn taking
  - Emotion
  - *Social relationship*
  - Summary



Now we are coming to the last topics on non-verbal information in this case the multimodal action of users,

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Social relationship

- Example Agreement and social integration**
- Agreement and social integration is expressed with alignment in
    - Speech (wording, syntax)
    - Prosody (speech rate, pitch pattern, vowel space)
    - Gestures
    - Posture
- Example social dominance**
- Summary of results presented:
    - More interruption, more touch
    - About equal percentage of gazing during speaking and listening
    - Louder speech, fewer back-channeling
    - Uses more space, calm gestures



so social relationship is a topic that I have already addressed in the beginning of this week's lectures.

It is signaled multimodally as I repeatedly said but here is another example that I have not mentioned before and this is that quality of a relationship can be seen by the way how strongly people are entraining on each other and how much they mimic each other.

So for example in an intimate relationship or if they really like each other, typically people tend to mimic or entrain on each other. You all know this from speed dating for example that can be analyzed and if one person makes a certain gesture, the other sometimes unconsciously, sometimes consciously mimics this gesture.

Or if you are sitting in a lecture room or at dinner, people tend to lean on the table like this and after a while certain people will follow. This is not totally synchronous but after a while if the group belongs together or if a couple is engaged they will tend to have exhibit similar posture for example. This will change back again, so leaning back one people starts, others will follow.

And if we have a fast-forward of a video of people you can see this quite clearly. So there are other ways to entrain. For example even in speech this is observed. So the wording, the use of words, also syntactic structure tend to be repeated and gets more similar over time.

We know this also from non-verbal information, for example in voice that certain patterns of for example, of speech tempo will be more similar in a conversation than of people who are not in a conversation. Of course this is not a process that cannot be controlled.

For example if you really dislike a person, you will tend, for example to show your distance by not engaging in this kind of procedure or process.

Another example is social dominance. I already gave some examples how you can detect a social dominance in a peoples' interaction. For example people who have high social status and high dominance tend to interrupt others more frequently and they also tend to touch, although this might be not the real circumstance for doing that.

Also there is a pattern of people disrespecting the private space that I talked about if they have higher social status. This is not necessarily so but there are significant trends if you observe people engaged.

Also social dominance can be seen by or, is exhibited by louder speech, fewer back-channeling and I already talked about the case pattern distribution of people with same or different social status.

For example divergence from the pattern that listeners tend to gaze longer to the speaker whereas speakers do not gaze that much to the listeners.

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#### Summary

##### Systematization of social signals

- Three dimensions of nonverbal stimuli (Mehrabian 1969)
- General evaluation / Immediate (likeability, antipathy)
  - More gaze contact (but not staring), body and torso orientated towards the interlocutor, less spatial distance, more touch
- Social control / Relaxation (status)
  - Lateral body bending, crossed arms/legs, relaxed hand position signal control
- Activity (readiness of communication, signal of concentration)
  - Amount of gestures, movements of body parts, nodding, facial expressions, signaling friendliness with facial expressions and prosody



As a summary Mehrabian, one pioneer in this field identified three basic emotions, three basic dimensions of social signals.

So one is the overall evaluation whether the people are intimate, whether the people like each other. And I have already said that this mimicking or entrainment is a signal for positive evaluation. But also in general, more eye contact, closer distance, more touching and orientation of body and torso towards each other is a signal of a positive evaluation of the other.

And then there is relaxation which is related to status. So this is not about being totally relaxed in a very private situation but if you see signs of relaxation and if persons are not in a very close intimate or private situation this is often a signal or a sign that this person has a high social status and also is quite a self-assure, self-confident as well.

Then the last dimension is activity. And here I mean the attentiveness, the concentration of the other. And this is signaled, for example by tall or forward directed posture, movements of body parts, of course nodding, facial expressions and also the prosody which I talked about in voice.

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Summary

Cultural dependencies

- E.g.: metaphoric gesture: "OK", "zero", "money", vulgar (cf. Aronson, 2009)



I often said that all these signals, these non-verbal signals and their meaning is culturally dependent. This is especially true for iconic

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Summary

Cultural dependencies

- E.g.: metaphoric gesture: "OK", "zero", "money", vulgar (cf. Aronson, 2009)

Taken from Knapp & Hall, 2010



gestures like these index gestures which we have learnt. For example this one that I just display here. This could be just a normal one but it could also be interpreted as highly vulgar.

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#### Summary

##### Cultural dependencies

- E.g.: metaphorical gesture: "OK", "zero", "money", vulgar (cf. Aronson, 2009)

- Cultural restrictions on displaying nonverbal behavior is systematized for:
  - High-contact vs. low contact
  - Less personal space, frequent contact (e.g. South America, South Europe)
  - Collectivism vs. individualism
  - Gaze and voice signals of confidence vs. routines and politeness signals
  - High-context vs. low context
  - More indirect speech acts accompanied with nonverbal messages
- Power distance
  - Differences in power signaling (India vs. Denmark)
- "Masculine" vs. "Feminine" cultures
  - Emphasize e.g. success compared to life quality (Germany vs. Sweden)



As a summary there is a kind of taxonomy of dimensions to several different cultures from each other. I will go these 5 dimensions one by one and give an example. So for example there are high contact versus low contact cultures.

And this means people touch each other more, have a smaller personal space and smaller distances. And this is for example true for Southern European cultures compared to Northern European cultures.

Then we have collectivism versus individualism. So this is more about showing politeness and keeping the group, face of each person intact for the more collectivism cultures and compared as opposed to showing your personal characteristics and aspects.

And for example we have here the, the example of certain Asian cultures or Central European cultures.

Then we have a language related dimension. This is high context versus low context cultures. This means that context, this means that the speech is actually referring to certain social context. For example low context would, high context would mean that there are more indirect speech acts.

And here again we have Germany as a low context culture compared for example to France, French cultures and Arabic cultures.

Then there is the fourth one, there is the power distance. So showing your own power or showing not your social power and here we have Denmark for example as a culture where this display of power is not that common versus India or some Indian cultures.

And the last one is in all the textbooks called masculine versus feminine cultures, that is not up-to-date anymore because this is highly stereotypical. Actually this is about favoring and showing success versus favoring and showing that you have a good life and a good, for example, work life balance.

I want to give the example of

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### Summary

#### Cultural dependencies

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Sweden compared to Germany. If you like, for example Swedish criminal stories, the detective typically is a nice guy and this is illustrated by him or her having a nice house, wooden house at a lake or where he or she can rest. This is not that typical for the German policeman or detectives.

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## Summary

### Why bother at all?

- Relying on human experience in interaction/communication
- Using verbal and non-verbal information to
  - Increase bandwidth (e.g. turn-taking)
  - Make interaction more "natural", but not bother users (remind that using wrong/inadequate signals effects emotional evaluation)
  - Make systems more intelligent
    - Use multiple dimensions of human information channels
      - React to signals of uncertainty, wait before sending a no-input, interpret gestures etc. (affective computing)
    - Coordinate multi-party interaction (e.g. travel agency)
  - Use Social Effects for evaluation of virtual environments, virtual humans, or robots
  - → realistic implementation of social signals / behaviour at least as important as human-likeness, e.g. photo-realistic faces (Blascovich et al., 2002)



So why bother at all? All these non-verbal signals are multimodal and they are used for, engaged for people who are engaged in any kind of interaction. And if you want to build social actors like social robots or social companions that are involved and integrated in our daily social life, then we might make use of these social signals that I talked about.

Would be nice to have such an intelligence, intelligent system that is able to actually detect if a user is putting his or her attention towards the system or not. And also to even display or synthesize these kind of systems, these kind of signals as well.

So for example turn-taking might be nice for a conversation in this, in speech or if it is a multi-party system that can deal with groups because it offers information, for example, then it should know which, when people are engaged in conversation with themselves or when they are addressing the system.

The last point that I have here is about using these kind of effects to see whether people are responding appropriately to such social actors or social systems. So if they show normal or typical behavior they would also show and engage in a human-human conversation or interaction then you would have clear indication that the system is treated as a social actor.

May be not as a human but as a social actor and if this was your development goal then you have a positive feedback on that.



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