Bernstein Focus: Neurotechnology Berlin (BFNT-B) Applications to Quality and Usability Measurement

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Motivation
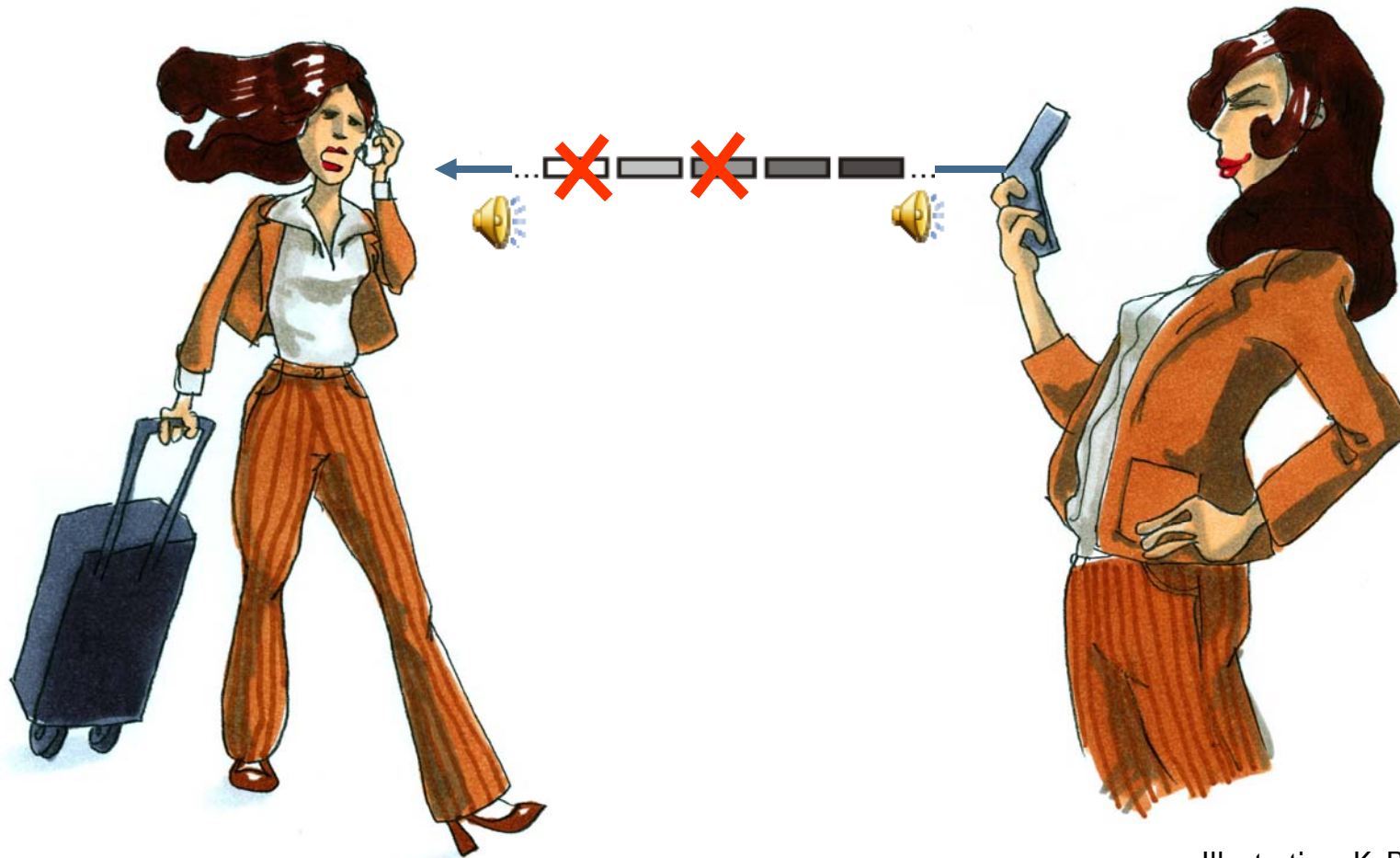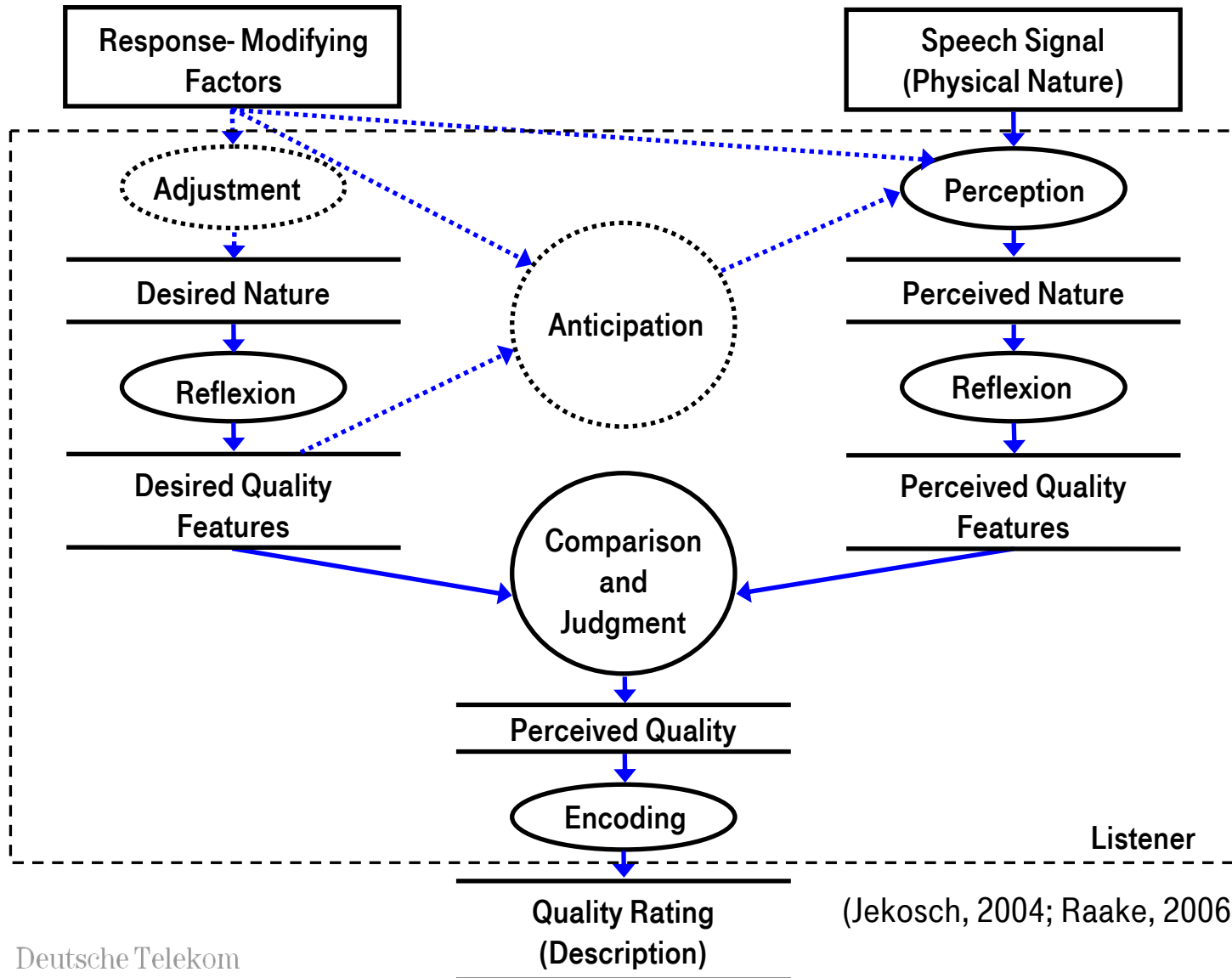Quality of transmitted speech and video.

Illustration: K. Bredies

Quality
Involved perception and judgment processes.

(Jekosch, 2004; Raake, 2006)

Quality
Auditory speech transmission quality measurement.

Overall quality judgment:

Quality of the speech:

excellent	good	fair	poor	bad
5	4	3	2	1
			✘	

Detectability threshold:

Degradation:

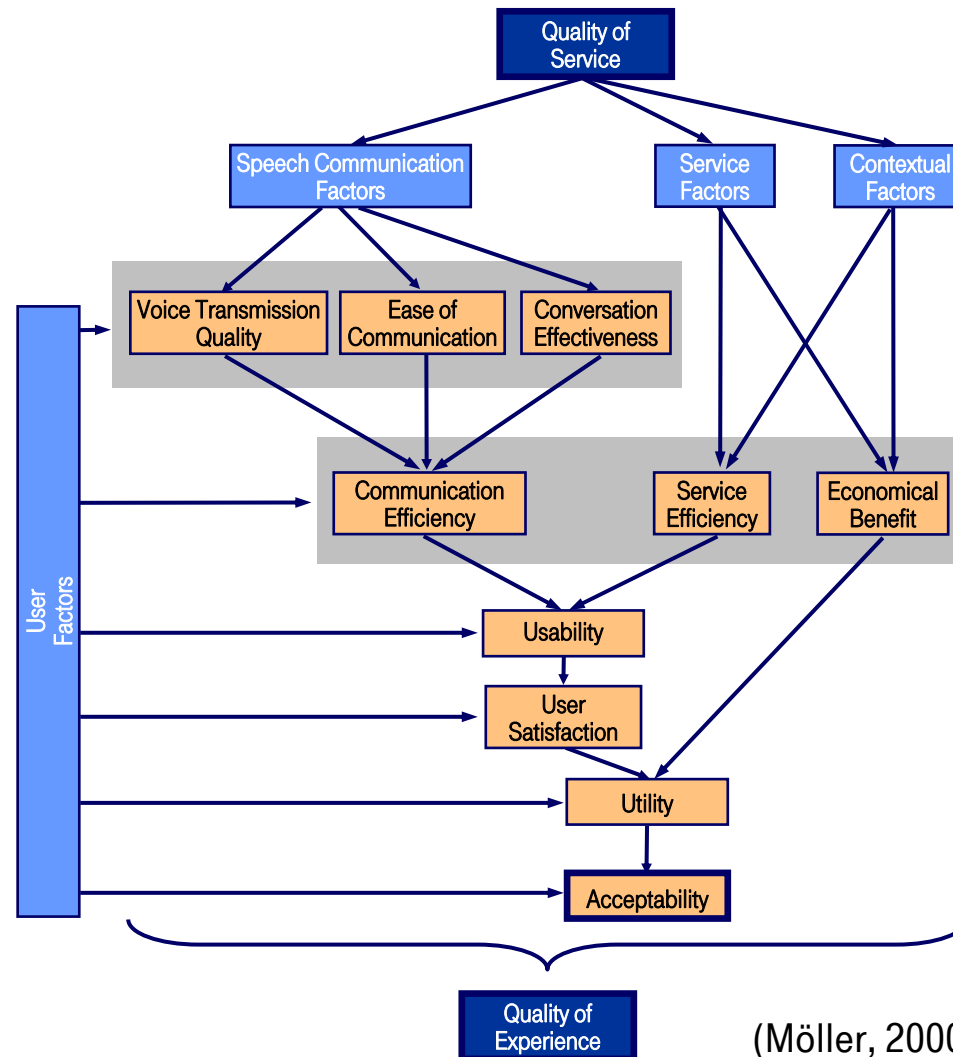| degradation is inaudible	degradation is audible but not annoying	degradation is slightly annoying	degradation is annoying	degradation is very annoying
5	4	3	2	1
			✘	

(ITU-T Rec. P.800, 1996)

Quality
Taxonomy of quality aspects.

Example 1:

Quality aspects of a telephone service.

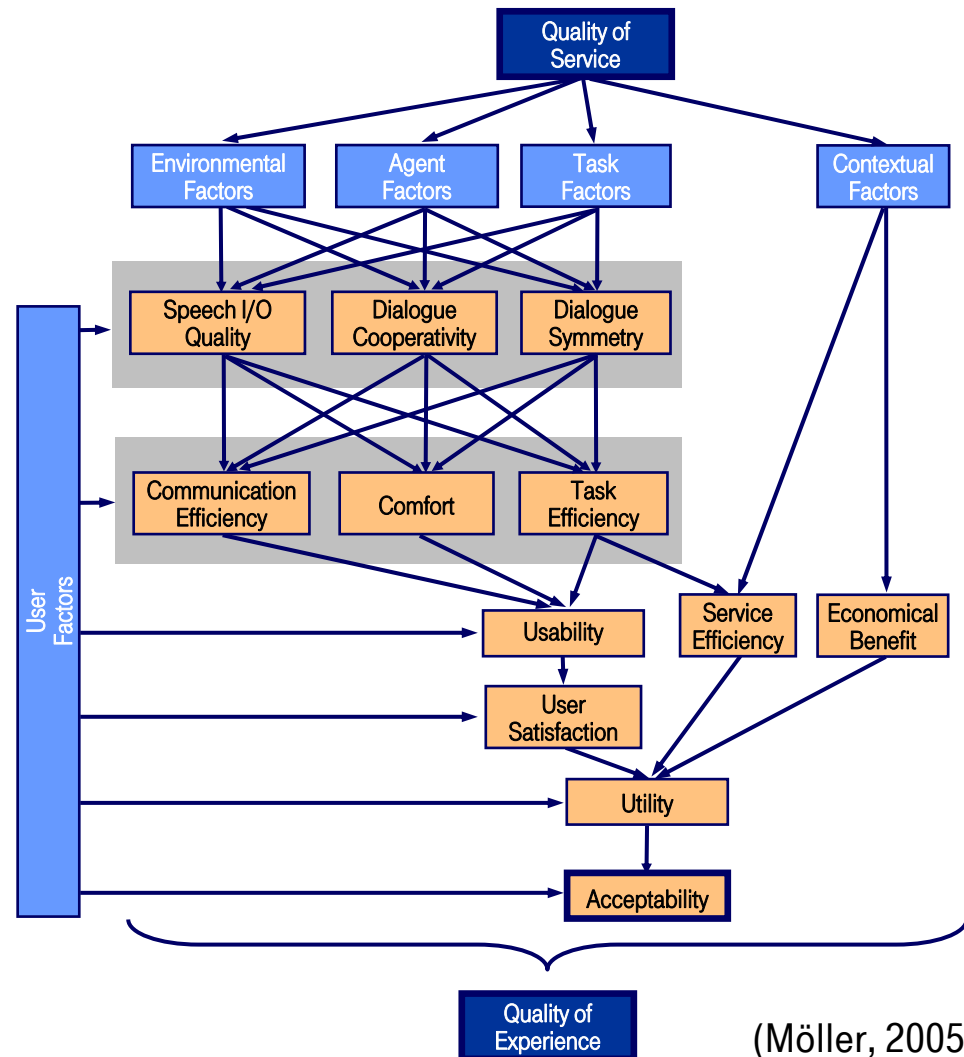
(Möller, 2000)

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Quality
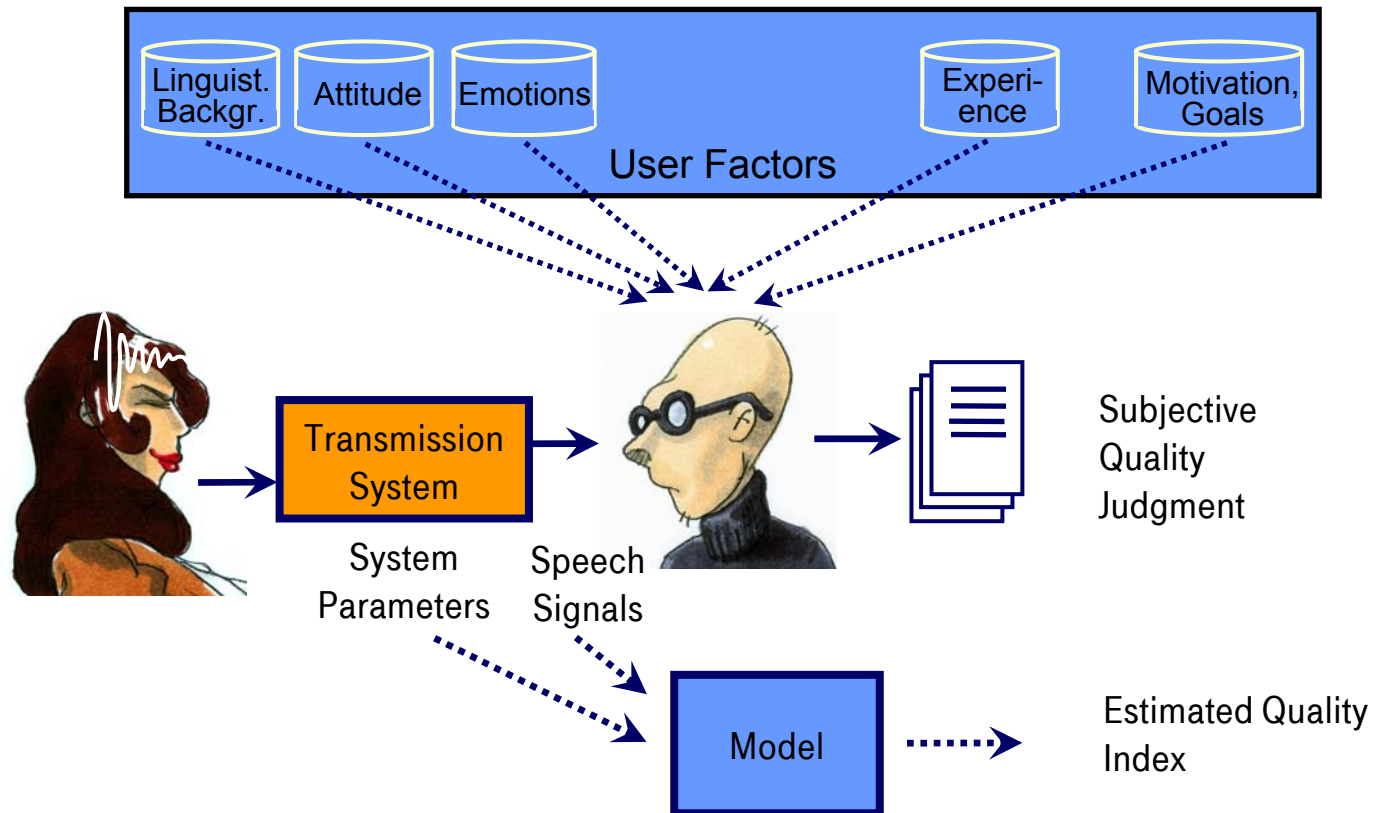## Taxonomy of quality aspects.

Example 2:

Quality aspects of an interactive speech-based service.

(Möller, 2005)

Quality
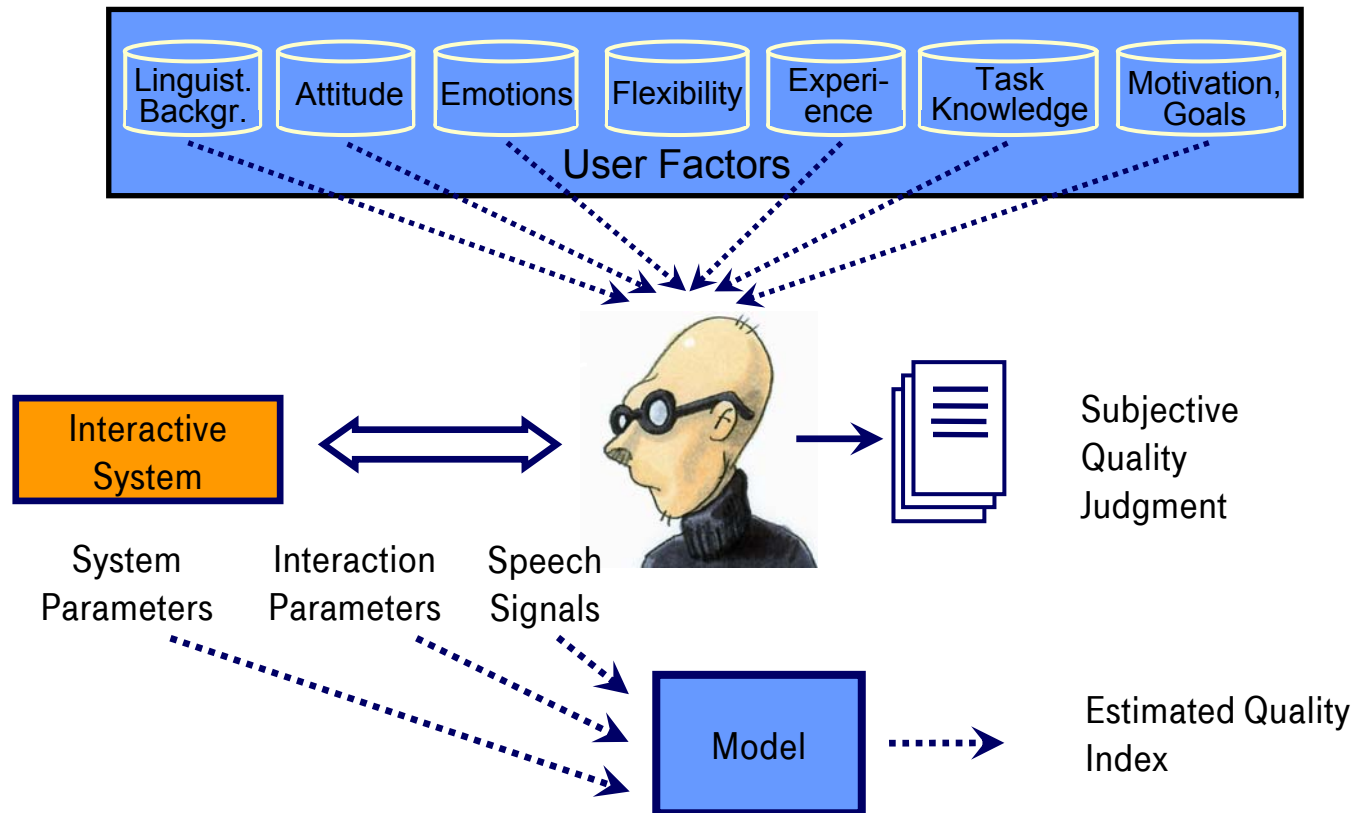## Measuring and predicting speech transmission quality.

Idea:

Quality
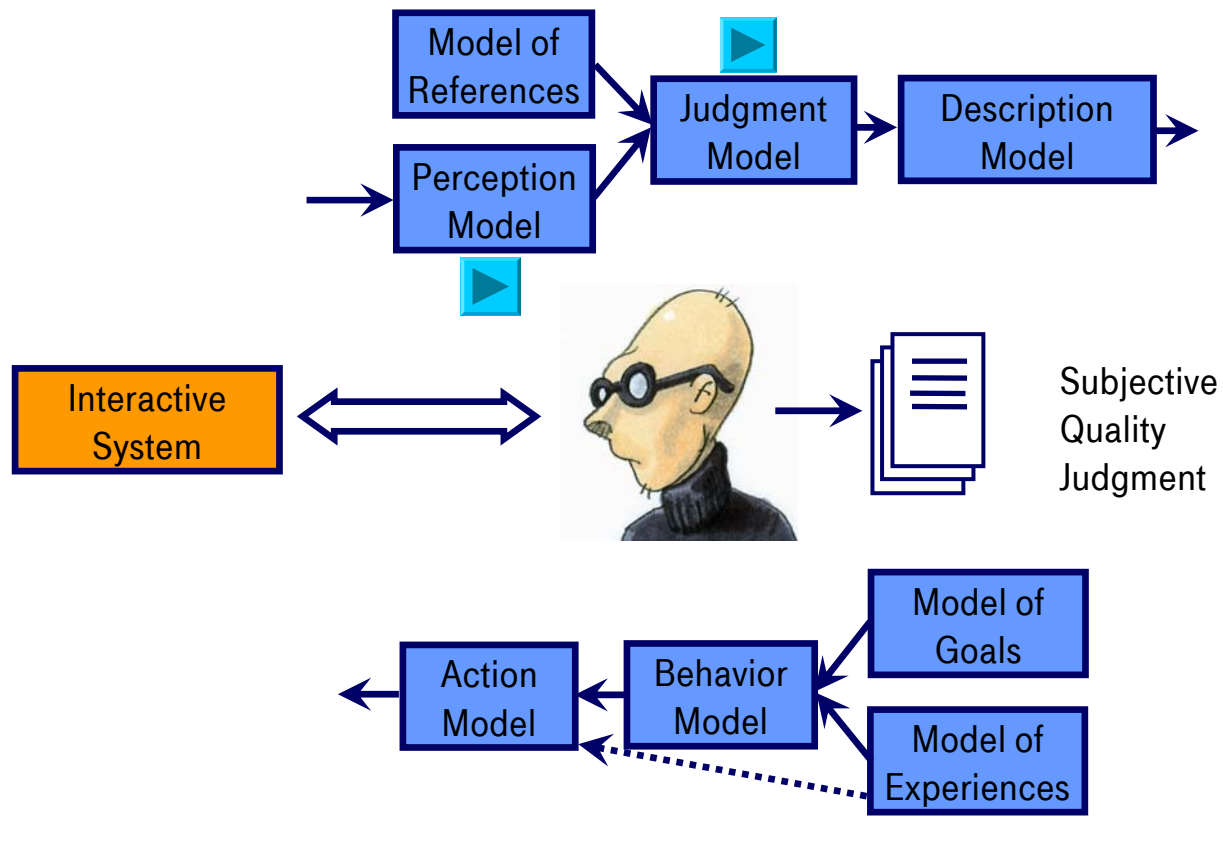## Measuring and predicting interactive system usability.
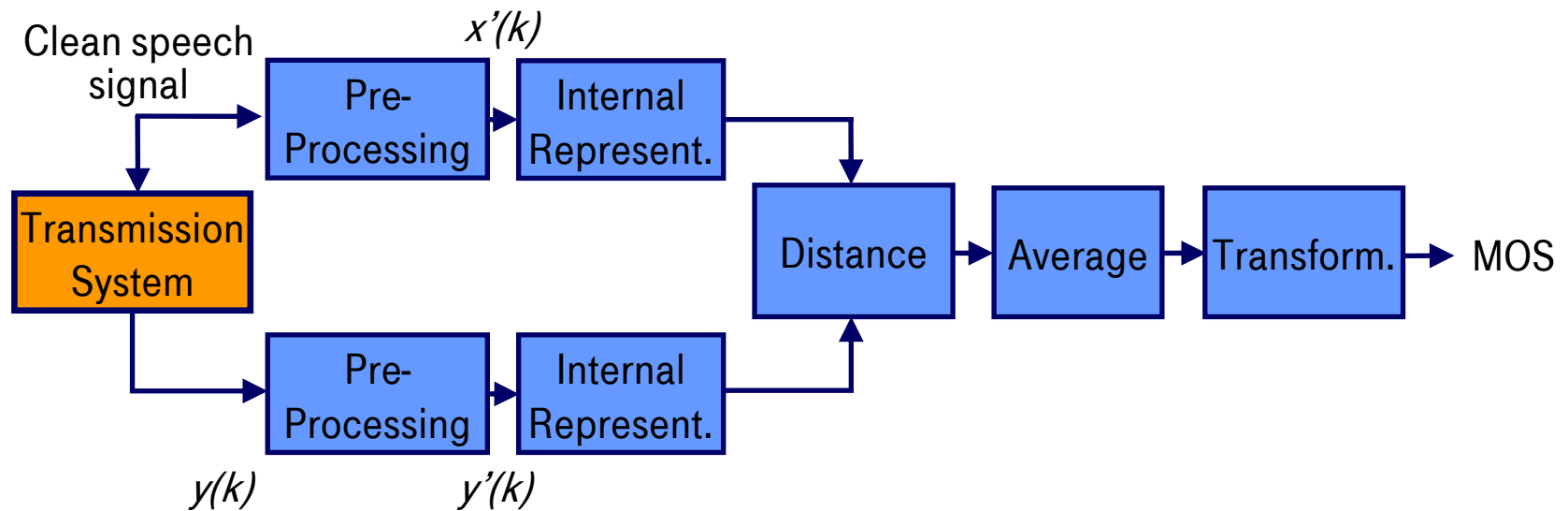
Idea:

Quality and Usability Prediction
Approach.

Potential model components:

Quality and Usability Prediction
Speech transmission quality.
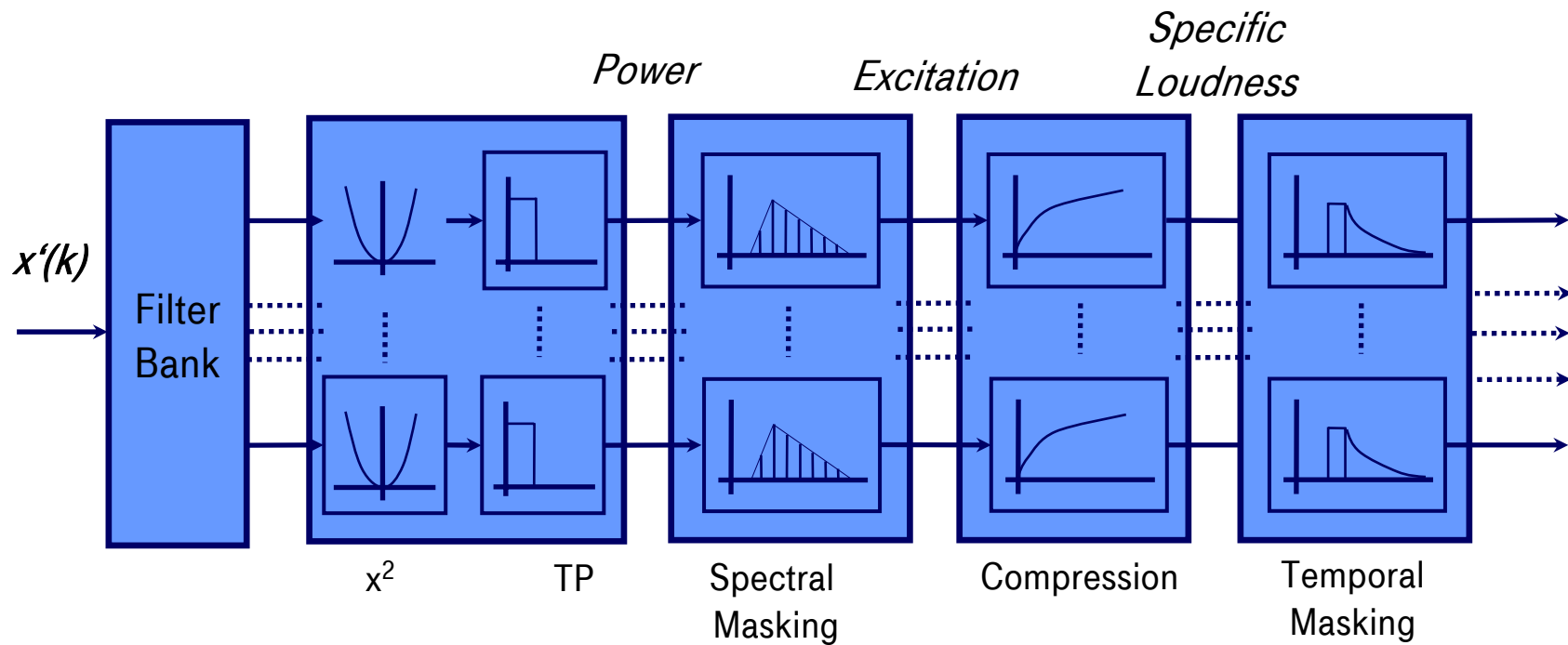
Signal-based model:

(e.g. ITU-T Rec. P.862, 2001; Hauenstein, 1997; Hansen, 1998)

Quality and Usability Prediction
Speech transmission quality.

Signal comparison: Internal Representation

(Hauenstein, 1997)

Quality and Usability Evaluation
## Current work involving neurotechnology.

First steps:

- Determine the **detectability threshold** of typical **degradations** of **speech samples** using **neurotechnology**

- **Compare** thresholds to the ones obtained in **absolute category scaling** and **degradation category rating**

- **Compare thresholds** for different **types of degradations** (noise, interruptions, sound quality) and **speech samples of different length and complexity**

Future plans:

- Compare **different neurotechnological tools** (EEG, fMRI, NIRS, etc.)

- Extend to **video transmission quality**

- Extend to **interactive and/or multimodal services**

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Quality and Usability Evaluation
Open issues for neurotechnology.

(Möller et al., 2009)

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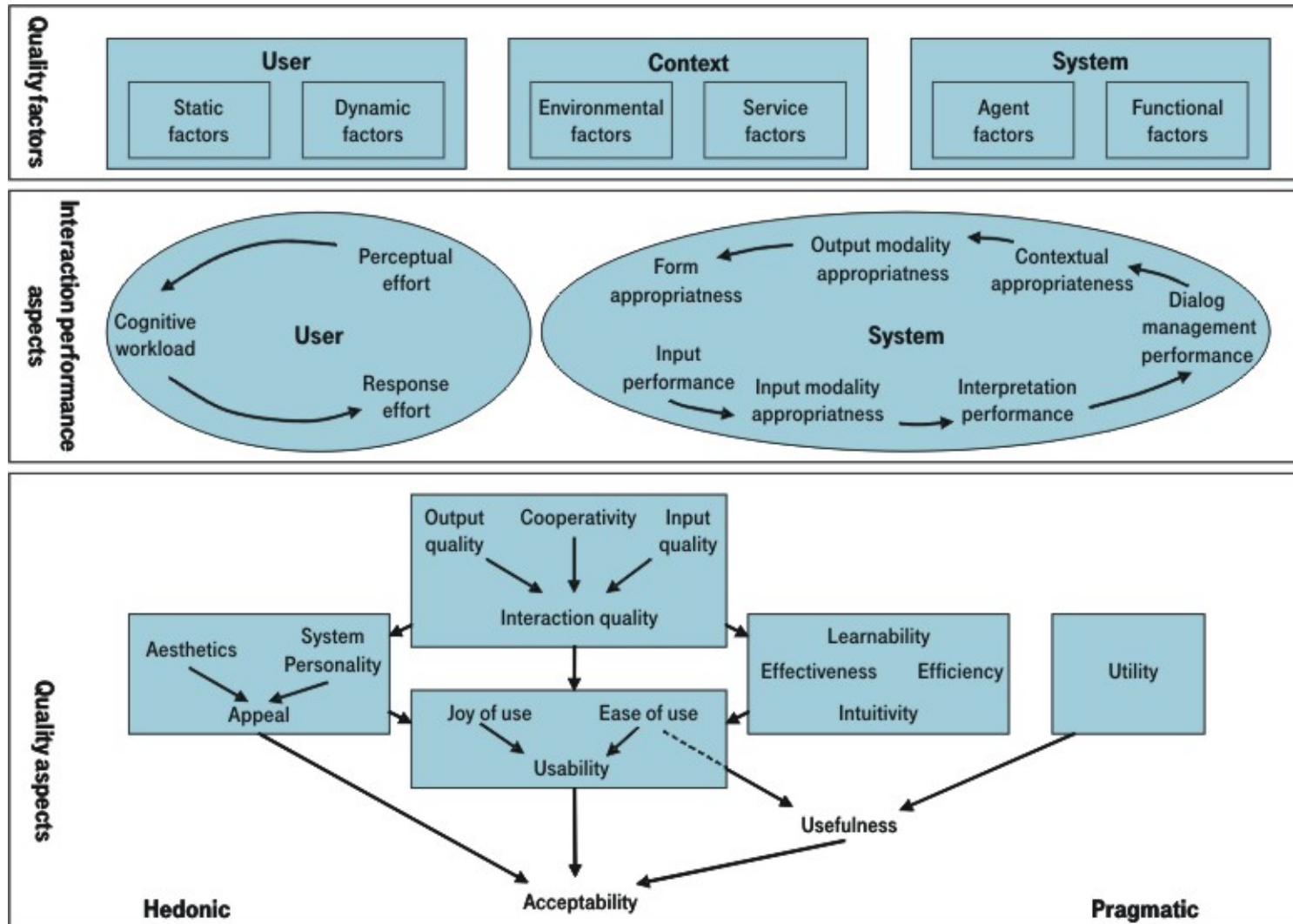
Thank you for your attention.

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