

Speech Likability and Personality-based Social Relations: A Round-Robin Analysis over Communication Channels


Laura Fernández Gallardo and Benjamin Weiss

Quality and Usability Lab, Technische Universität Berlin, Germany



1

Outline

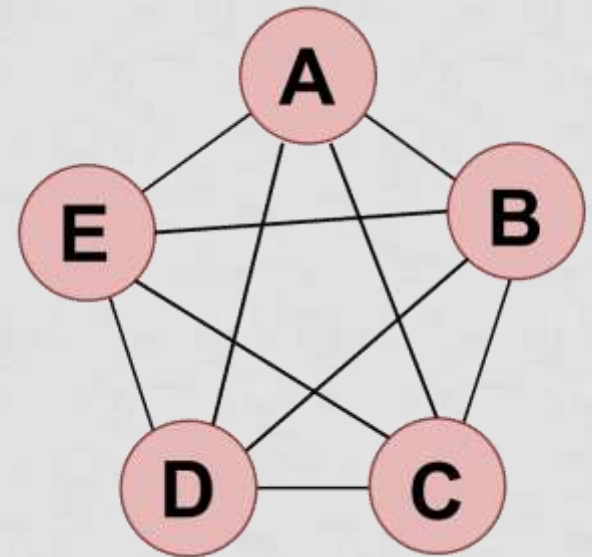
- Introduction 
- Round-robin design
 - Speech data collection
 - Listening test
- Analysis
 - A. Speaker personality and SRM variances
 - B. Effects of communication channels
 - C. Acoustic correlates of likability
- Conclusions

Introduction

- Recognition of speakers' characteristics needs further research
- This paper: human perceptions of speakers' personality and likability
 - 1. Examine speech-based interpersonal perceptions (SRM model)
 - 2. Effects of communication channels on likability ratings

Introduction

- 1. Examine speech-based interpersonal perceptions (SRM model) [4]
 - Social Relations Model (SRM)
 - Round robin design
 - 30 participants: 30 x 29 interpersonal perceptions
 - Personality and likability ratings from speech only (novel)
 - only zero acquaintance scenarios



[4] D. A. Kenny, "Interpersonal Perception: A Social Relations Analysis," New York, U. S.: Guilford Press, 1994.

Introduction

- 1. Examine speech-based interpersonal perceptions (SRM model) [4]

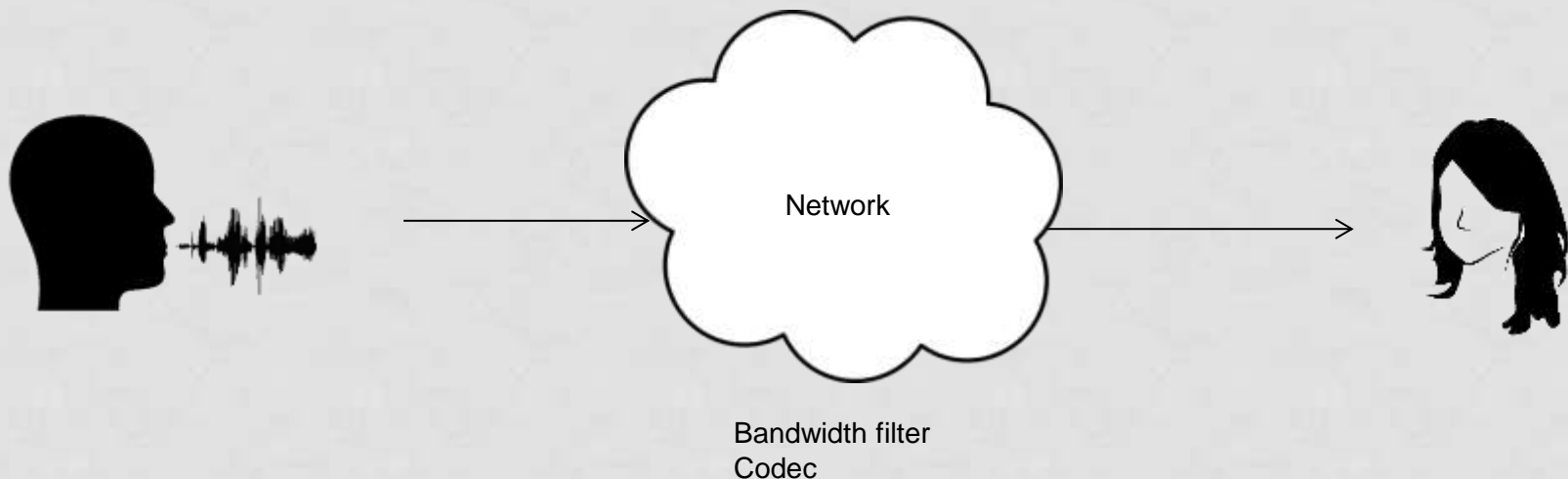
SRM sources of variance

- **perceiver variance** (introduced by the raters)
- **target variance** (within the persons being rated)
- **relationship variance** (variance in the person's behavior toward another individual in particular, considering all participants pairs)

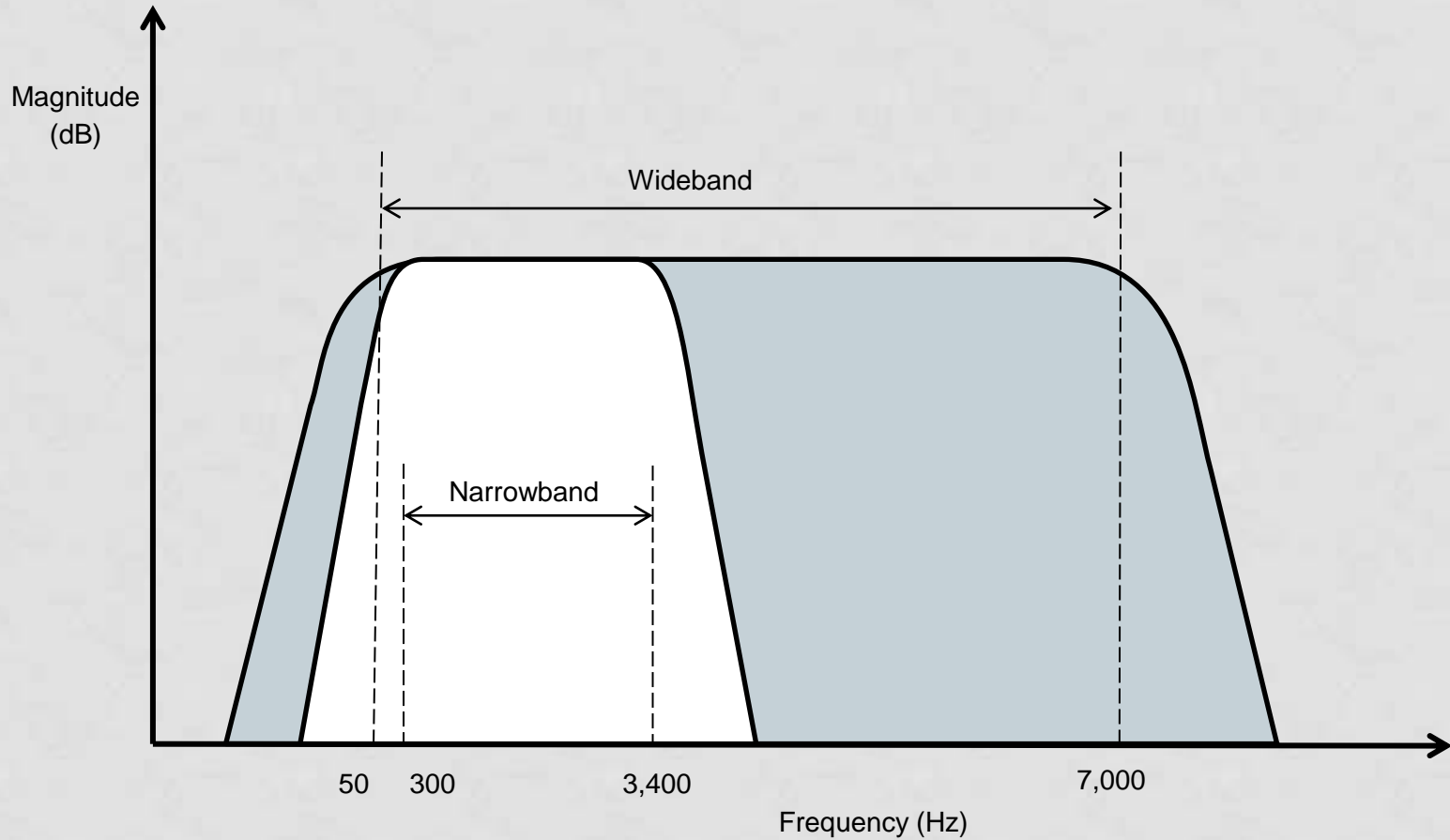
[4] D. A. Kenny, "Interpersonal Perception: A Social Relations Analysis," New York, U. S.: Guilford Press, 1994.

Introduction


- 2. Effects of communication channels on likability ratings
 - overlooked so far, have been treated as a “black box”
 - narrowband (NB, 300–3,400 Hz) vs. wideband (WB, 50–7,000 Hz)



Introduction



Outline

- Introduction
- Round-robin design
 - Speech data collection 
 - Listening test
- Analysis
 - A. Speaker personality and SRM variances
 - B. Effects of communication channels
 - C. Acoustic correlates of likability
- Conclusions

Speech data collection

- 30 participants (15f, 15m)
- mean age of 27.2 years (range: 20–34)
- German as mother tongue, no dialect



(In the position of a speaker is Laura Fernández Gallardo).

Speech data collection



[28] L. Fernández Gallardo, "Recording a High-Quality German Speech Database for the Study of Speaker Personality and Likability," accepted in 12. Tagung Phonetik und Phonologie im deutschsprachigen Raum, 2016.

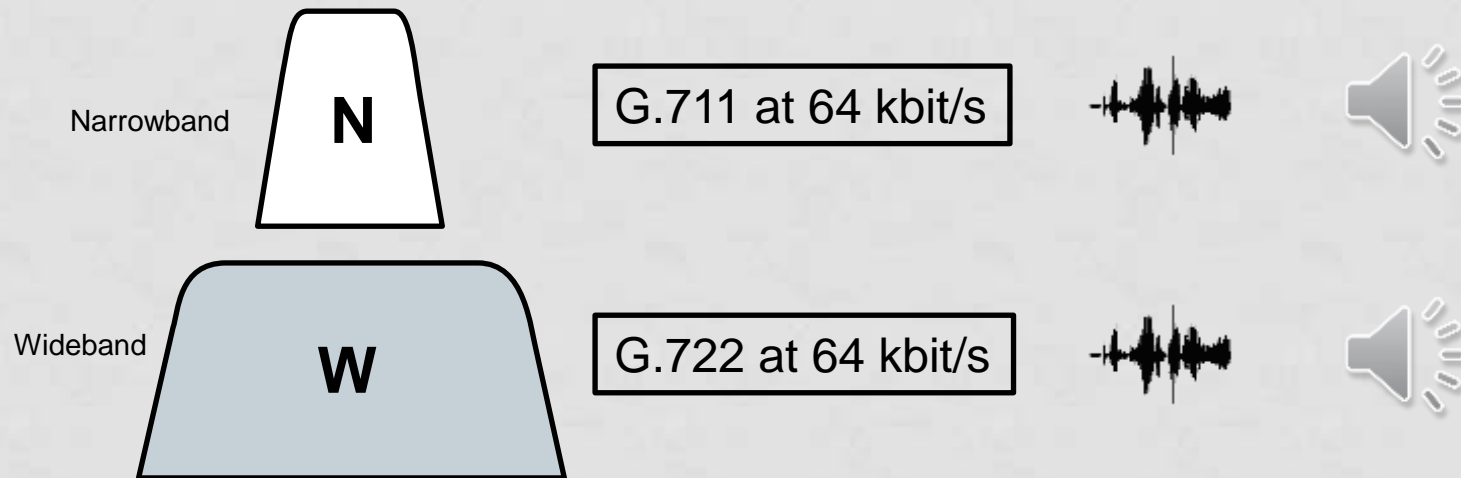
Preparation of the speech stimuli

- Selected for likability ratings (prescribed):



"Ich würde auf die SMS gern verzichten und meine Frei-Minuten dafür erhöhen"
(In English: "I would like to give up the SMS and increase my free minutes in return")

- Transmitted through communication channels



Preparation of the speech stimuli

- Selected for likability + personality ratings (spontaneous):

Example:

Schönen guten Tag, Clemens mein Name, ich hätte gern eine große Pizza.



(...)




Eine vegetarische Pizza am besten für zwei Personen.

(...)

- Not transmitted

Outline

- Introduction
- Round-robin design
 - Speech data collection
 - Listening test 
- Analysis
 - A. Speaker personality and SRM variances
 - B. Effects of communication channels
 - C. Acoustic correlates of likability
- Conclusions

Listening test

- The 30 participants rated each other
- Three parts
 - BFI-10 questionnaire (own personality)
 - Likability ratings from prescribed text (SMS sentence), narrowband and wideband
 - Likability and Personality ratings via BFI-10 questionnaire from the spontaneous text (Pizza dialog), clean speech.
- Male speech section / female speech section
- All stimuli randomized within a section

Listening test

- Likability ratings


Wie sympathisch findest Du diese Stimme am Telefon?



Unsympathisch

Sympathisch

Outline

- Introduction
- Round-robin design
 - Speech data collection
 - Listening test
- Analysis
 - A. Speaker personality and SRM variances 
 - B. Effects of communication channels
 - C. Acoustic correlates of likability
- Conclusions

(Reminder)

- 1. Examine speech-based interpersonal perceptions (SRM model) [4]

SRM sources of variance

- **perceiver variance** (introduced by the raters)
- **target variance** (within the persons being rated)
- **relationship variance** (variance in the person's behavior toward another individual in particular, considering all participants pairs)

[4] D. A. Kenny, "Interpersonal Perception: A Social Relations Analysis," New York, U. S.: Guilford Press, 1994.

A. Speaker personality and SRM variances

- Table 2: Relative variance components of liking (clean speech)

Variance component	standardized	t.value
Perceiver	.148	3.384**
Target	.150	3.389**
Relationship	.702	20.043***

- The R package TripleR was employed for the computation of the SRM variance components.

[20] F. D. Schönbrodt, M. D. Back, and S. C. Schmukle, "TripleR: An R Package for Social Relations Analyses Based on Round Robin Designs," Behavior Research Methods, vol. 44, no. 2, pp. 455–470, 2012.

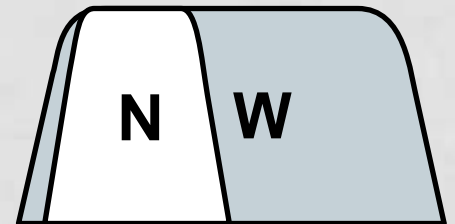
A. Speaker personality and SRM variances

- Table 3: Personality effects on the SRM components

Trait	Perceiver	Target	Relationship
Extroversion	.042	.419*	.012
Agreeableness	.309	.512**	.124***
Conscientiousness	.110	.002	.067.
Neuroticism	.243	-.193	.152***
Openness	-.065	.325	-.163***

B. Effects of communication channels

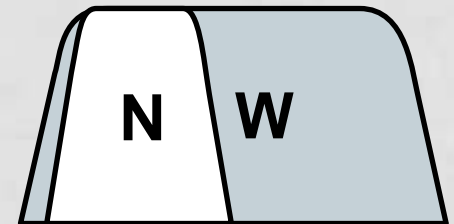
- Average ratings in NB: 45.47
- Average rating in WB: 53.30
- Significantly different



B. Effects of communication channels

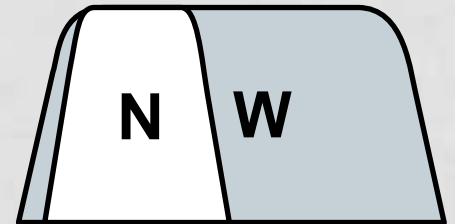
- Table 4: Relative standardized variance components of liking.

Variance component	Narrowband	Wideband
Perceiver	.215***	.143**
Target	.087**	.160***
Relationship	.698***	.697***



C. Acoustic correlates of likability

- z-normalized speech features
- Linear regression models (gender as a factor variable)
- NB model: $R^2 = .468$; $p = .742$
- WB model: $R^2 = .726$; $p = .084$ (greater number of significant predictors)



C. Acoustic correlates of likability


- Table 5: Regression models for target likability in NB and in WB with acoustic predictors

NB model: $R^2 = .468$; $p = .742$

WB model: $R^2 = .726$; $p = .084$

Coefficients	Estimate	Estimate
females:Intensity-median	-0.23	0.665
males:Intensity-median	-0.183	0.22
females:Intensity-range	-0.038	.512*
males:Intensity-range	0.052	0.01
females:F0-median	0.44	-0.023
males:F0-median	-0.384	0.581
females:F0-range	-0.268	-0.248
males:F0-range	-0.213	-1.139.
females:duration	-0.514	-0.343
males:duration	0.289	1.067*
females:HNR	-0.261	-0.66
males:HNR	-0.138	-0.716
females:CoG	0.052	0.306
males:CoG	-0.602	-1.618**
females:alpha ratio	0.324	-0.301
males:alpha ratio	0.646	1.211**

Outline

- Introduction
- Round-robin design
 - Speech data collection
 - Listening test
- Analysis
 - A. Speaker personality and SRM variances
 - B. Effects of communication channels
 - C. Acoustic correlates of likability
- Conclusions 

Conclusions

- 1. Examine speech-based interpersonal perceptions (SRM model)
 - persons perceived as extroverted and agreeable are also rated with higher likability
 - people similar in agreeableness and neuroticism tend to rate each other's voice likability more positively
- 2. Effects of communication channels on likability ratings
 - WB voices, with respect to NB:
 - significantly more likable on average
 - lower variance among perceivers' rating tendencies
 - allow to better distinguish between non-likable and likable speech
 - ratings can be better described in WB than in NB using our reduced set of features

Conclusions

- Would this generalize to a greater set of speakers and speech features?
- Our ongoing research
 - recording a greater number (~300) of speakers: $f_s = 48$ kHz
 - rating personality and likability from speech
 - study the effects of bandwidth and codecs on the automatic prediction of these speaker characteristics

Thank you for your attention!

Laura Fernández Gallardo, Ph.D.
laura.fernandezgallardo@tu-berlin.de

Questions?



*Laura Fernández Gallardo, Ph.D.
laura.fernandezgallardo@tu-berlin.de*