

Lessons from the use of self-adjustment in a research setting – User Preference Fitting

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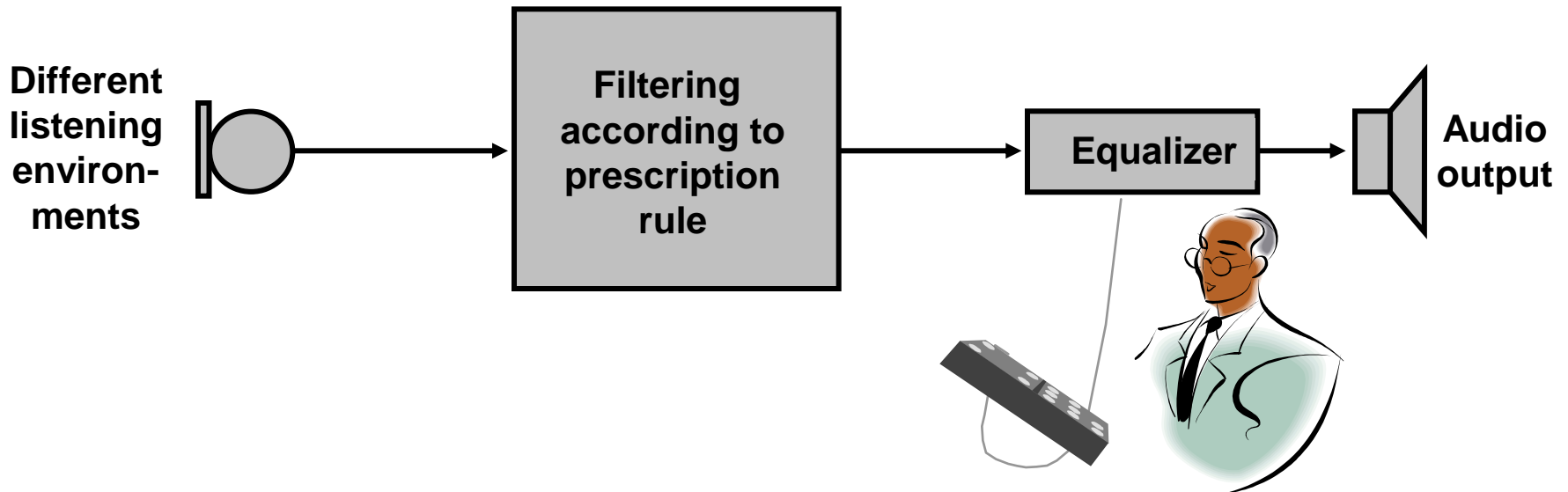
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Outline

- The Self-adjustment tool

Self-adjustment tool





options

Select a sound environment

**Two people talk with each other in
a sailboat in the yacht marina**

Accept

Cancel

*The instruction to the
subjects was:
“Adjust the sounds to
your own preference”*



Bass



Middle



Treble



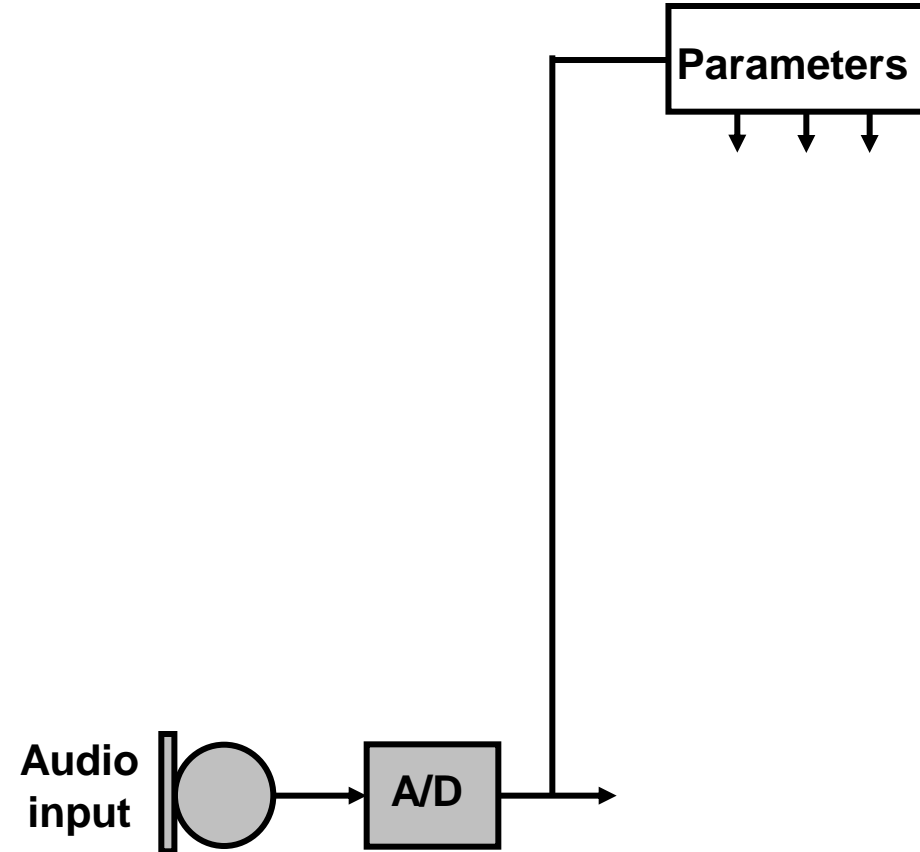
Listening Environments

Level SNR

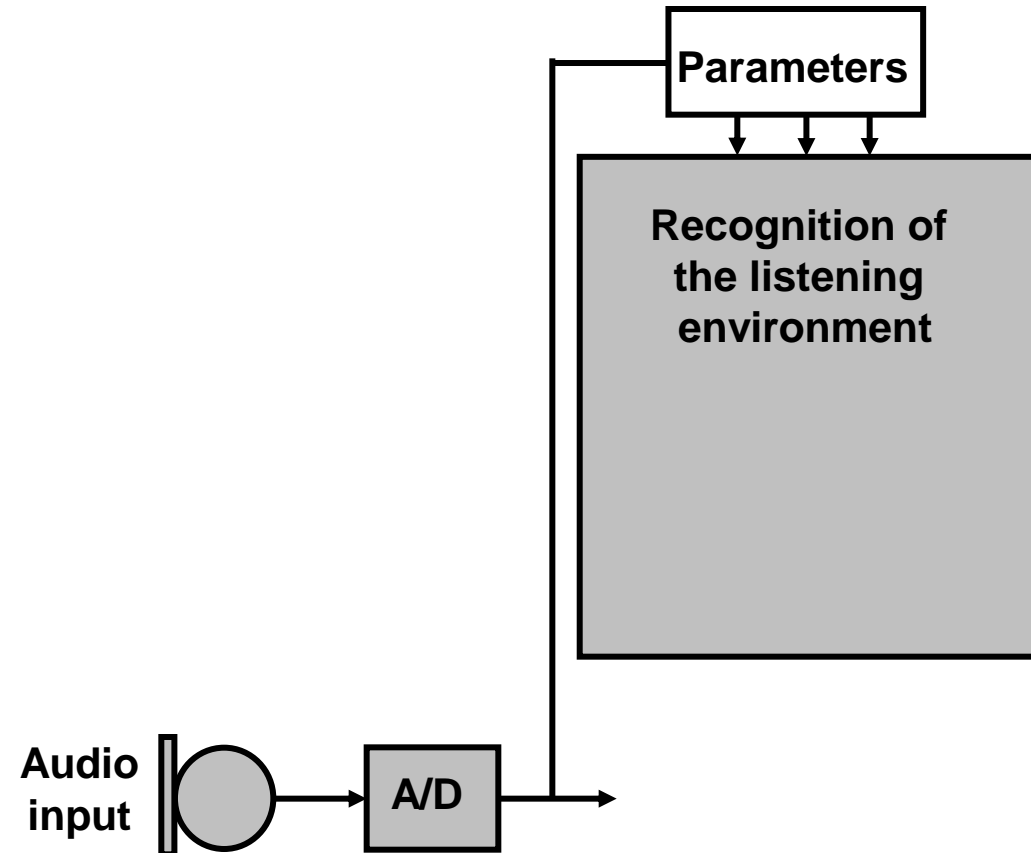
		Level	SNR
1	Library	50 dB	11 dB
2	Yacht Marina	54 dB	14 dB
3	Fireplace	59 dB	11 dB
4	Children	59 dB	10 dB
5	Post office	60 dB	7 dB
6	Pavement café	61 dB	6 dB
7	Train interior	64 dB	2 dB
8	Cafeteria	65 dB	0 dB
9	Airport check-in	67 dB	0 dB
10	City square	68 dB	0 dB
11	Bottling hall	75 dB	-2 dB

- Real world sound environments
- Played back while two persons are having a conversation
- Correct vocal effort, i.e. listener able to deduce intended reproduction level

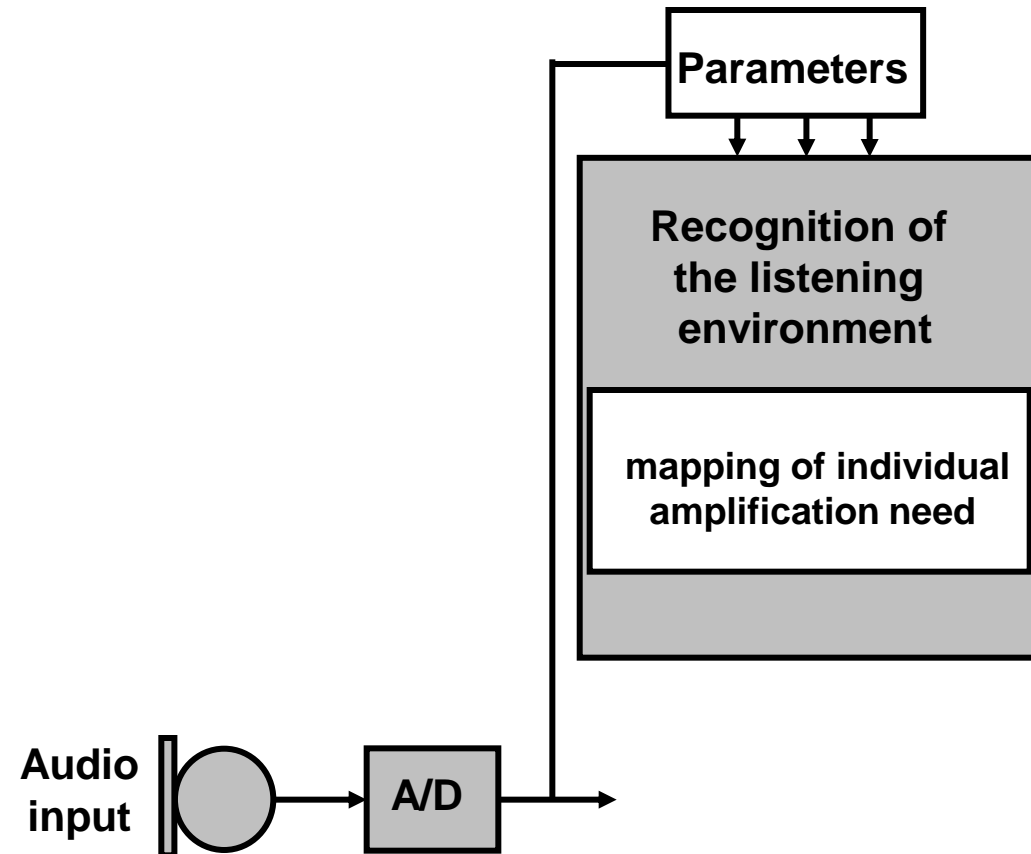
Evaluation software



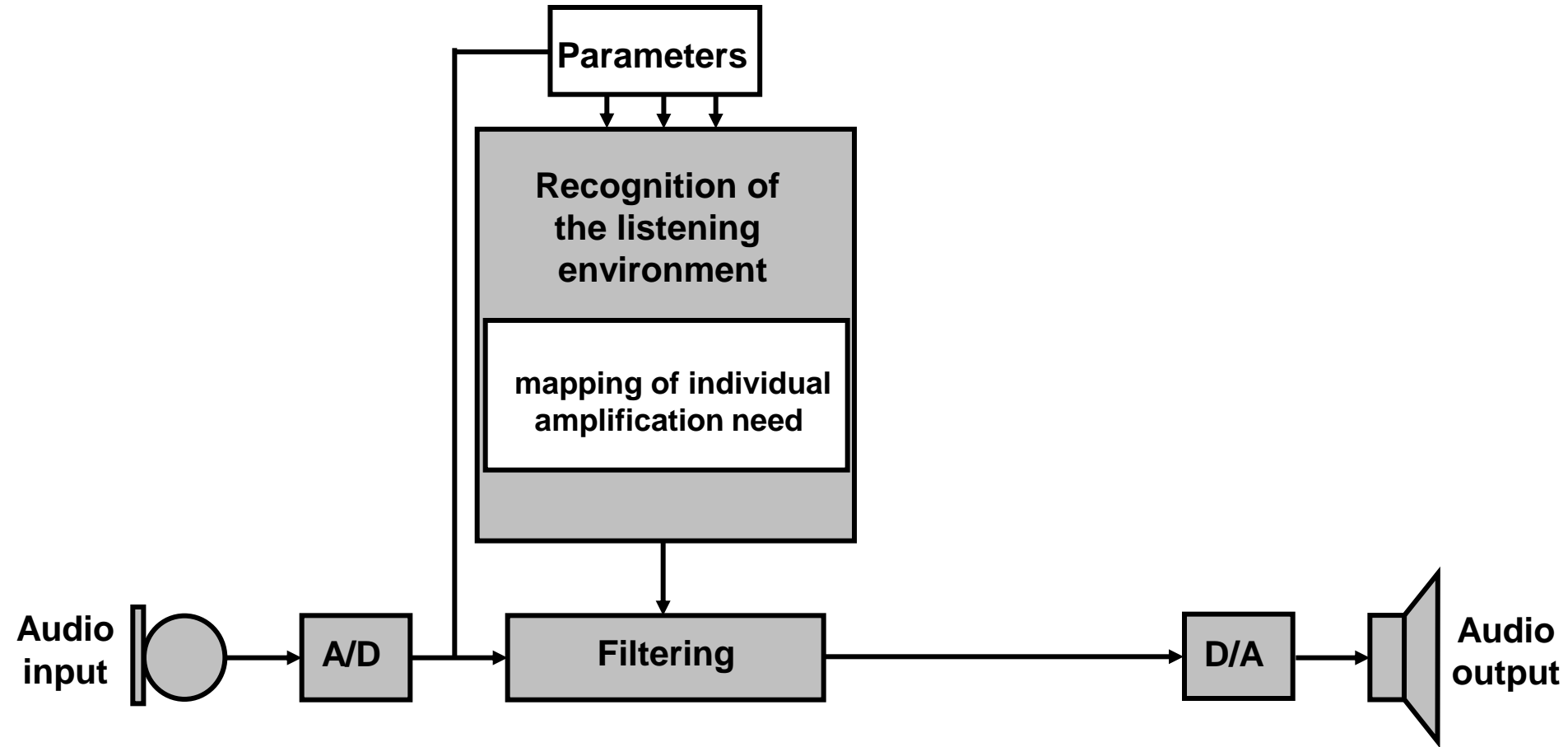
Evaluation software



Evaluation software



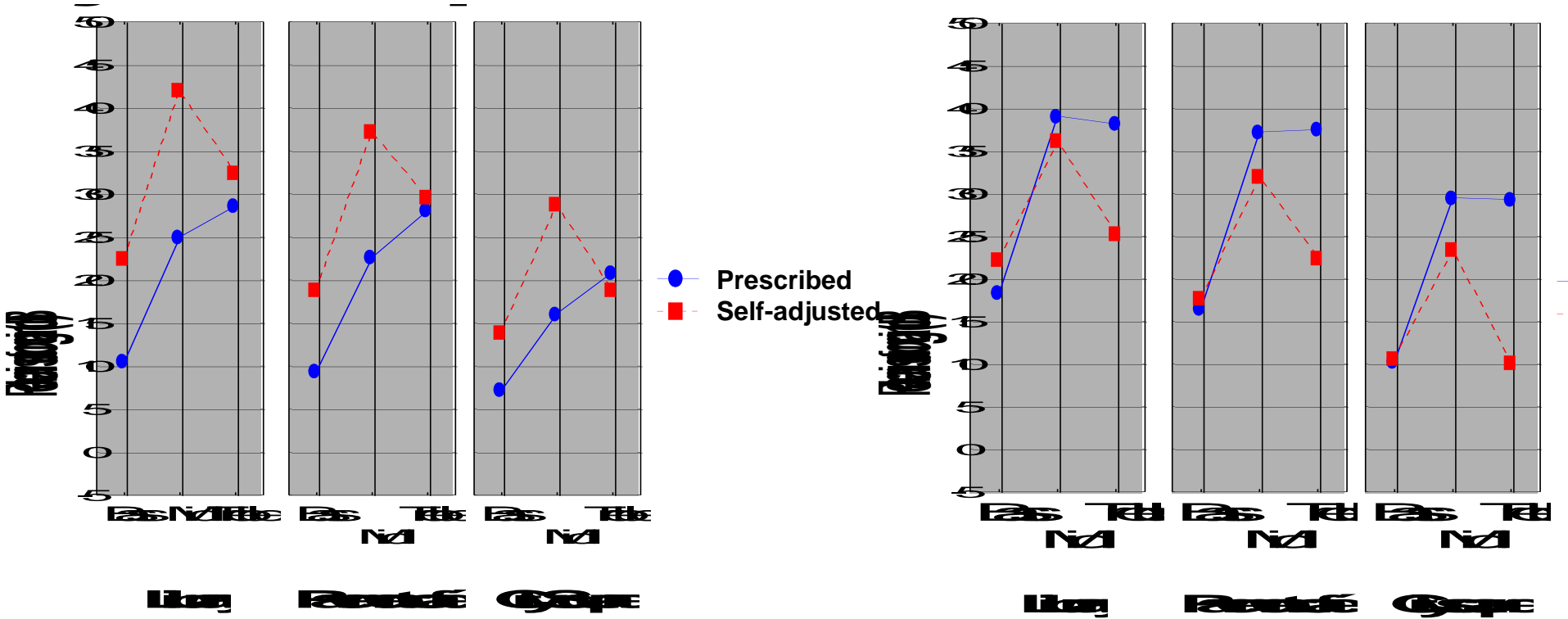
Evaluation software



Large variation in self-adjustments

Subject #11. Wants more amplification

Subject #4. Wants less amplification



Evaluation Hardware



Could be programmed to include:

- Self-adjusted settings**
- Prescribed settings**
- Or both via A/B-switch**

Hypothese

- Compared to Prescribed settings, Self-adjustments...
...result in better **speech recognition** and/or have a higher rate of **preference** because of better individual fine-tunings (Experiment 1)

Mild to moderate hearing losses

Hypothese

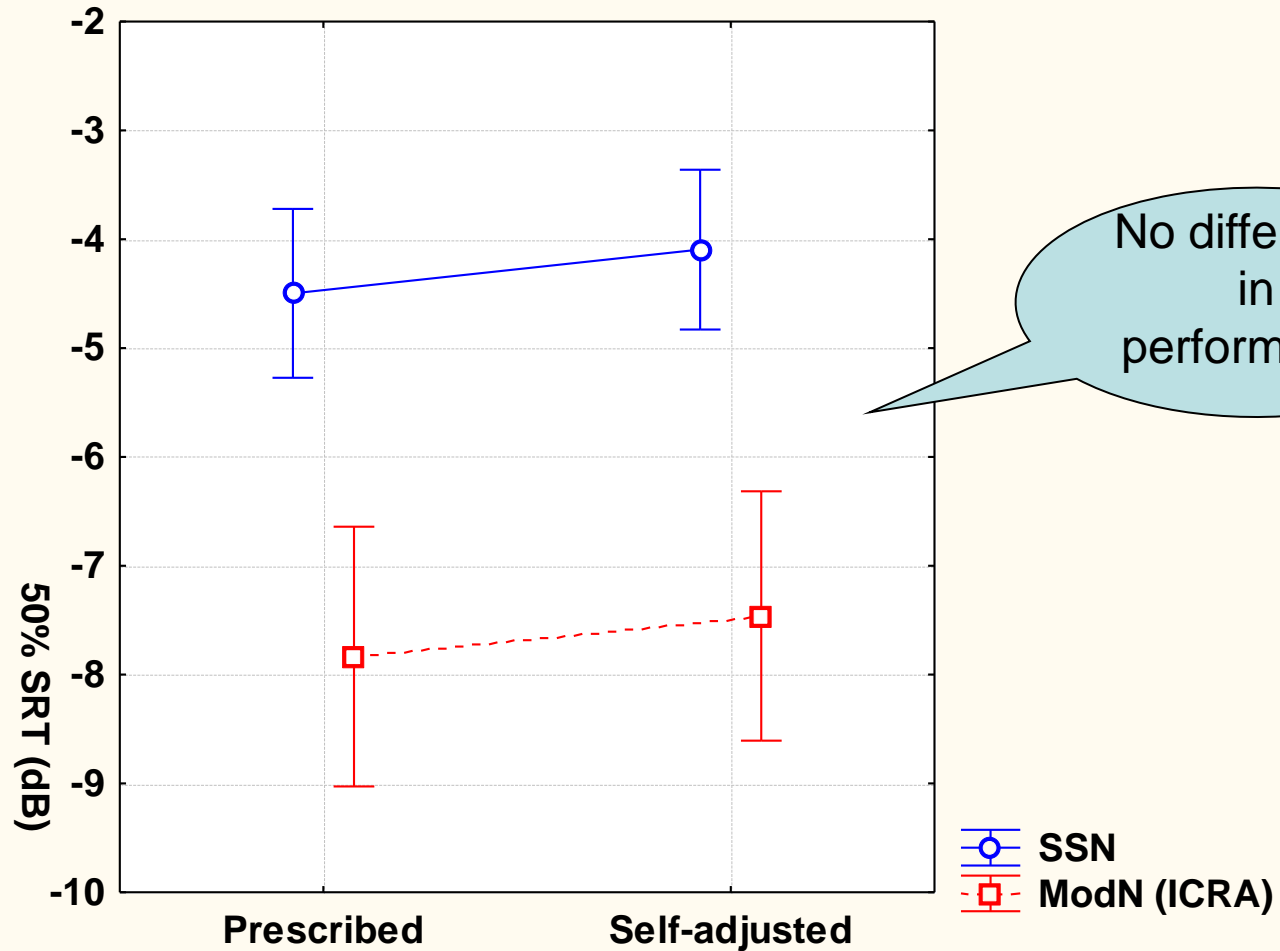
- **Compared to Prescribed settings, Self-adjustments...**
...result in better **speech recognition and/or have a higher rate of **preference** because of better individual fine-tunings (Experiment 1)**
- Mild to moderate hearing losses

Test design

Experiment 1 (N=18, experienced users)

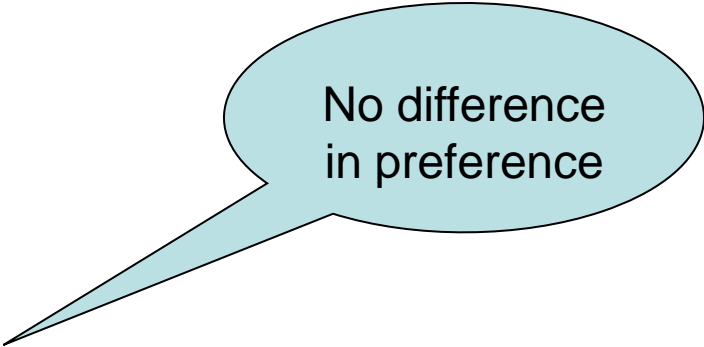
	Biased narratives		Unbiased narrative
	Test period 1 (not blinded)	Test period 2 (not blinded)	Test period 3 (triple blinded)
Narrative	'Computer-prescribed' aid	'Self-adjusted' aid	A/B: New fitting methods A/B
Actual contents in Experimental Aid	<i>One program:</i> Prescribed settings	<i>One program:</i> Self-adjusted settings	<i>Two programs:</i> A/B: Prescribed settings/ Self-adjusted settings
		-Rate preference (non-blind)	-Rate preference (blind)

Speech recognition in noise



Individual results: Preference consistency?

Subject	Preference (blinded)
#2	Self-adjusted
#3	Self-adjusted
#13	Self-adjusted
#20	Self-adjusted
#15	Self-adjusted
#5	Self-adjusted
#17	Self-adjusted
#1	Self-adjusted
#6	No difference
#16	No difference
#4	Prescribed
#12	Prescribed
#24	Prescribed
#14	Prescribed
#19	Prescribed
#11	Prescribed
#7	Prescribed
#22	Prescribed



No difference
in preference

Individual results: Preference consistency

Subject	<i>Preference (blinded)</i>
#2	Self-adjusted
#3	Self-adjusted
#13	Self-adjusted
#20	Self-adjusted
#15	Self-adjusted
#5	Self-adjusted
#17	Self-adjusted
#1	Self-adjusted
#6	No difference
#16	No difference
#4	Prescribed
#12	Prescribed
#24	Prescribed
#14	Prescribed
#19	Prescribed
#11	Prescribed
#7	Prescribed
#22	Prescribed

<i>Preference consistency (blind/non- blind)</i>
Yes
Yes
Yes
Yes
Yes
No
No
No
No
Yes
No
Yes
No
Yes
Yes
Yes
Yes
Yes

Individual results: Preference consistency

Subject	Preference (blinded)	Preference consistency (blind/non- blind)
#2	Self-adjusted	Yes
#3	Self-adjusted	Yes
#13	Self-adjusted	Yes
#20	Self-adjusted	Yes
#15	Self-adjusted	Yes
#5	Self-adjusted	No
#17	Self-adjusted	No
#1	Self-adjusted	No
#6	No difference	No
#16	No difference	Yes
#4	Prescribed	No
#12	Prescribed	Yes
#24	Prescribed	No
#14	Prescribed	Yes
#19	Prescribed	Yes
#11	Prescribed	Yes
#7	Prescribed	Yes
#22	Prescribed	Yes

Individual results: **SRT in noise?**

Subject	Preference (blinded)	Preference consistency (blind/non- blind)
#2	Self-adjusted	Yes
#3	Self-adjusted	Yes
#13	Self-adjusted	Yes
#20	Self-adjusted	Yes
#15	Self-adjusted	Yes
#5	Self-adjusted	No
#17	Self-adjusted	No
#1	Self-adjusted	No
#6	No difference	No
#16	No difference	Yes
#4	Prescribed	No
#12	Prescribed	Yes
#24	Prescribed	No
#14	Prescribed	Yes
#19	Prescribed	Yes
#11	Prescribed	Yes
#7	Prescribed	Yes
#22	Prescribed	Yes

Individual results: **SRT in noise**

Subject	Preference (blinded)	Preference consistency (blind/non-blind)
#2	Self-adjusted	Yes
#3	Self-adjusted	Yes
#13	Self-adjusted	Yes
#20	Self-adjusted	Yes
#15	Self-adjusted	Yes
#5	Self-adjusted	No
#17	Self-adjusted	No
#1	Self-adjusted	No
#6	No difference	No
#16	No difference	Yes
#4	Prescribed	No
#12	Prescribed	Yes
#24	Prescribed	No
#14	Prescribed	Yes
#19	Prescribed	Yes
#11	Prescribed	Yes
#7	Prescribed	Yes
#22	Prescribed	Yes

SRT in noise
Self-adj.+
Self-adj.+
Self-adj.+
Self-adj.+
Tie
Presc+
Presc+
Self-adj.+
Presc+
Self-adj.+
Presc+
Tie
Presc+
Presc+

Individual results: Self-adjustment settings outcome?

Subject	Preference (blinded)	Preference consistency (blind/non-blind)	SRT in noise
#2	Self-adjusted	Yes	Self-adj.+
#3	Self-adjusted	Yes	Self-adj.+
#13	Self-adjusted	Yes	Self-adj.+
#20	Self-adjusted	Yes	Self-adj.+
#15	Self-adjusted	Yes	Tie
#5	Self-adjusted	No	
#17	Self-adjusted	No	Presc+
#1	Self-adjusted	No	Presc+
#6	No difference	No	Self-adj.+
#16	No difference	Yes	Presc+
#4	Prescribed	No	
#12	Prescribed	Yes	
#24	Prescribed	No	
#14	Prescribed	Yes	Self-adj.+
#19	Prescribed	Yes	Presc+
#11	Prescribed	Yes	Tie
#7	Prescribed	Yes	Presc+
#22	Prescribed	Yes	Presc+

Individual results: Interview outcome?

Subject	Preference (blinded)	Preference consistency (blind/non-blind)	SRT in noise	Self-adjust outcome
#2	Self-adjusted	Yes	Self-adj.+	OK
#3	Self-adjusted	Yes	Self-adj.+	OK
#13	Self-adjusted	Yes	Self-adj.+	OK
#20	Self-adjusted	Yes	Self-adj.+	OK
#15	Self-adjusted	Yes	Tie	OK
#5	Self-adjusted	No		OK
#17	Self-adjusted	No	Presc+	Fail
#1	Self-adjusted	No	Presc+	OK
#6	No difference	No	Self-adj.+	OK
#16	No difference	Yes	Presc+	Fail
#4	Prescribed	No		OK
#12	Prescribed	Yes		Fail
#24	Prescribed	No		Fail
#14	Prescribed	Yes	Self-adj.+	Fail
#19	Prescribed	Yes	Presc+	Fail
#11	Prescribed	Yes	Tie	Fail
#7	Prescribed	Yes	Presc+	Fail
#22	Prescribed	Yes	Presc+	Fail

Individual results: Interview outcome

Subject	Preference (blinded)	Preference consistency (blind/non-blind)	SRT in noise	Self-adjust outcome
#2	Self-adjusted	Yes	Self-adj.+	OK
#3	Self-adjusted	Yes	Self-adj.+	OK
#13	Self-adjusted	Yes	Self-adj.+	OK
#20	Self-adjusted	Yes	Self-adj.+	OK
#15	Self-adjusted	Yes	Tie	OK
#5	Self-adjusted	No		OK
#17	Self-adjusted	No	Presc+	Fail
#1	Self-adjusted	No	Presc+	OK
#6	No difference	No	Self-adj.+	OK
#16	No difference	Yes	Presc+	Fail
#4	Prescribed	No		OK
#12	Prescribed	Yes		Fail
#24	Prescribed	No		Fail
#14	Prescribed	Yes	Self-adj.+	Fail
#19	Prescribed	Yes	Presc+	Fail
#11	Prescribed	Yes	Tie	Fail
#7	Prescribed	Yes	Presc+	Fail
#22	Prescribed	Yes	Presc+	Fail

Deep interview: Attitudes towards self-adjustments
Important to find the correct amplification
Important to find the correct amplification
Important to find the correct amplification
Important to find the correct amplification
Important to find the correct amplification
Ownership/participation important
Self-adjustment concept interesting
Dispenser better than me
Dispenser better than me
Ownership/participation important
Self-adjustment concept interesting
Self-adjustment concept interesting
Self-adjustment concept interesting
Dispenser better than me
Dispenser better than me
Dispenser better than me
Dispenser better than me
Dispenser better than me

Individual results: Interview outcome

Subject	Preference (blinded)	Preference consistency (blind/non-blind)	SRT in noise	Self-adjust outcome	Deep interview: Attitudes towards self-adjustments
#2	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#3	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#13	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#20	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#15	Self-adjusted	Yes	Tie	OK	Important to find the correct amplification
#5	Self-adjusted	No		OK	Ownership/participation important
#17	Self-adjusted	No	Presc+	Fail	Self-adjustment concept interesting
#1	Self-adjusted	No	Presc+	OK	Dispenser better than me
#6	No difference	No	Self-adj.+	OK	Dispenser better than me
#16	No difference	Yes	Presc+	Fail	Ownership/participation important
#4	Prescribed	No		OK	Self-adjustment concept interesting
#12	Prescribed	Yes		Fail	Self-adjustment concept interesting
#24	Prescribed	No		Fail	Self-adjustment concept interesting
#14	Prescribed	Yes	Self-adj.+	Fail	Dispenser better than me
#19	Prescribed	Yes	Presc+	Fail	Dispenser better than me
#11	Prescribed	Yes	Tie	Fail	Dispenser better than me
#7	Prescribed	Yes	Presc+	Fail	Dispenser better than me
#22	Prescribed	Yes	Presc+	Fail	Dispenser better than me

Individual results

Subject	Preference (blinded)	Preference consistency (blind/non-blind)	SRT in noise	Self-adjust outcome	Deep interview: Attitudes towards self-adjustments
#2	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
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#3	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#13	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#20	Self-adjusted	Yes	Self-adj.+	OK	Important to find the correct amplification
#15	Self-adjusted	Yes	Tie	OK	Important to find the correct amplification

Positive reinforcement

Lesson #1:

Negative reinforcement

#14	Prescribed	Yes	Self-adj.+	Fail	Dispenser better than me
#19	Prescribed	Yes	Presc+	Fail	Dispenser better than me
#11	Prescribed	Yes	Tie	Fail	Dispenser better than me
#7	Prescribed	Yes	Presc+	Fail	Dispenser better than me
#22	Prescribed	Yes	Presc+	Fail	Dispenser better than me

Hypotheses

- Compared to Prescribed settings, Self-adjustments...
...result in better **speech recognition** 😞
and/or have a higher rate of **preference** 😞

Lesson #1: Positive and negative reinforcement 😊😞

Summary and conclusion

- **Lesson #1:** *Positive and negative reinforcement*
 - Self-adjustment for those who believe in self-adjustments and are able to make consistent self-adjustments
 - Others – let it be!
 - How to find them?

Thank you!

Eriksholm Research Centre

