



# Investigating the influence of hearing loss and hearing aid use on emotional states in everyday listening situations using ecological momentary assessment

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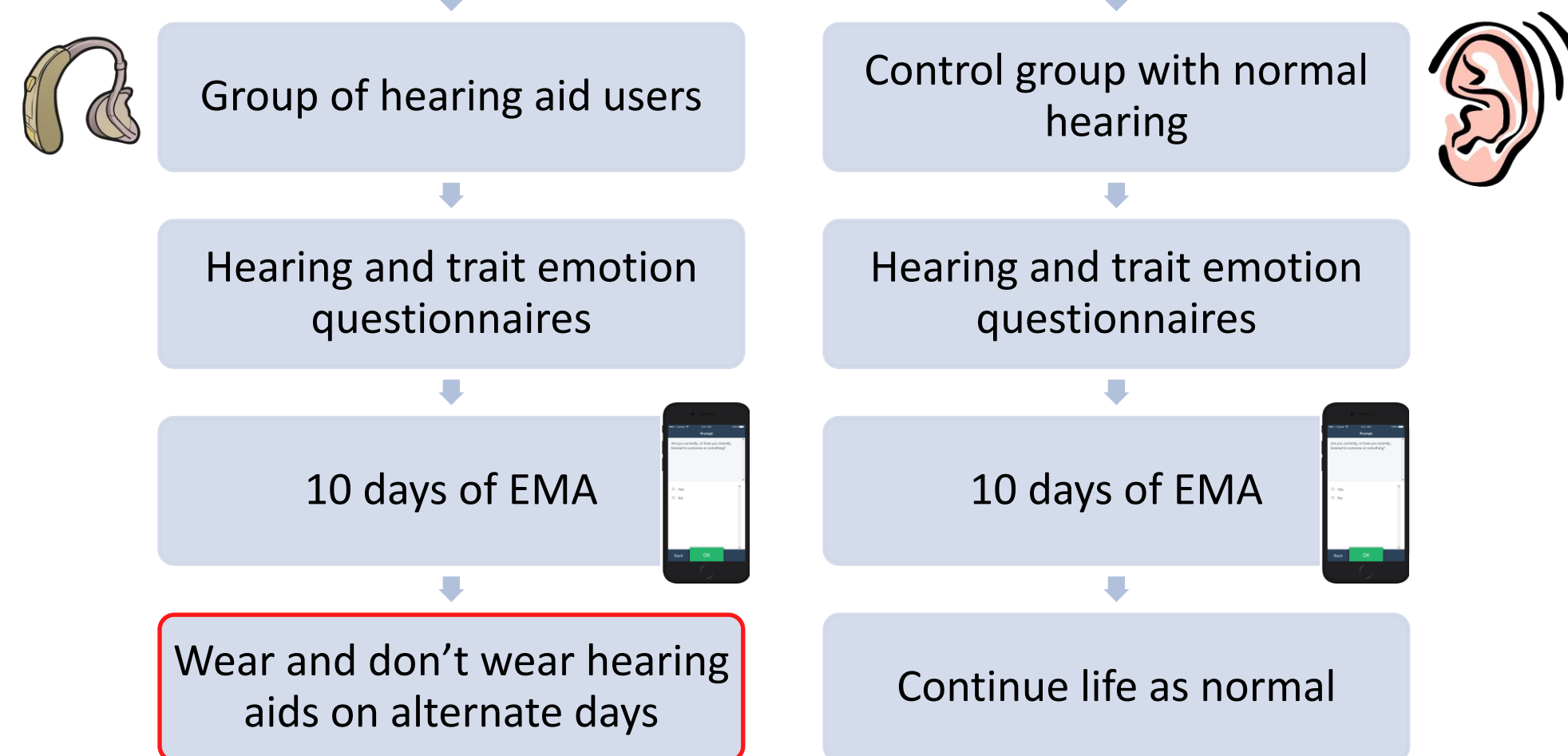
## Design

### Research Questions

- 1: In what situations, and for what specific emotions, do hearing aids have systematic positive or negative effects?
- 2: Are there general differences between reported emotional states of people with and without hearing loss, or are there particular listening situations where the groups diverge?

### RQ1: Impact of Hearing Aids

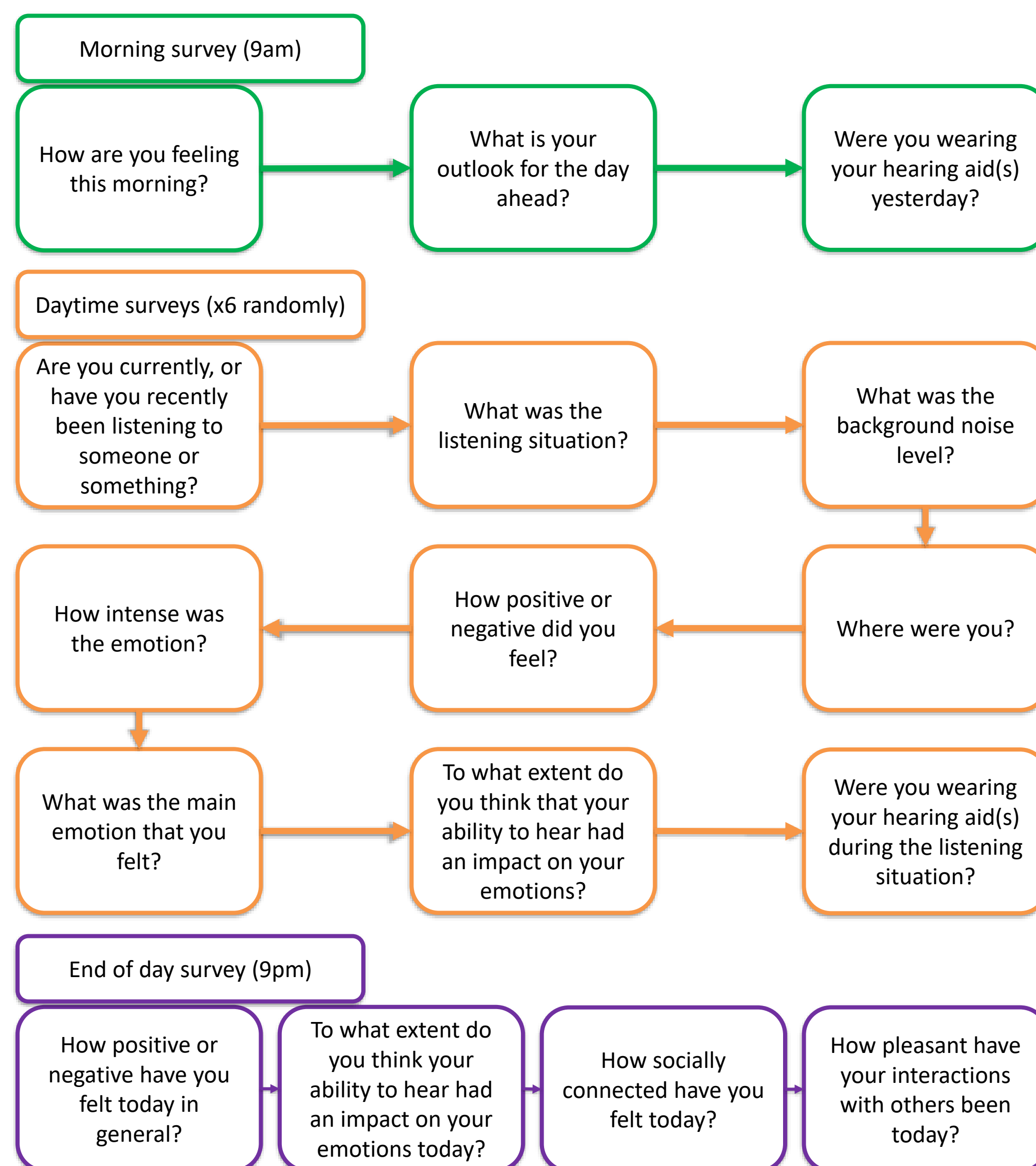
### RQ2: Impact of Hearing Loss



### Participant Characteristics

	Study participants: N=46	
	Hearing loss group	Normal hearing group
N	26	20
Age (average years)	69.15	61.15
Age (st dev)	6.3	8.2
Gender		
Male	10	3
Female	16	17
Baseline positive affect	17.6 (3.5)	18.3 (2.9)
Baseline negative affect	11 (4.6)	9.65 (2.6)

## Smartphone survey questions

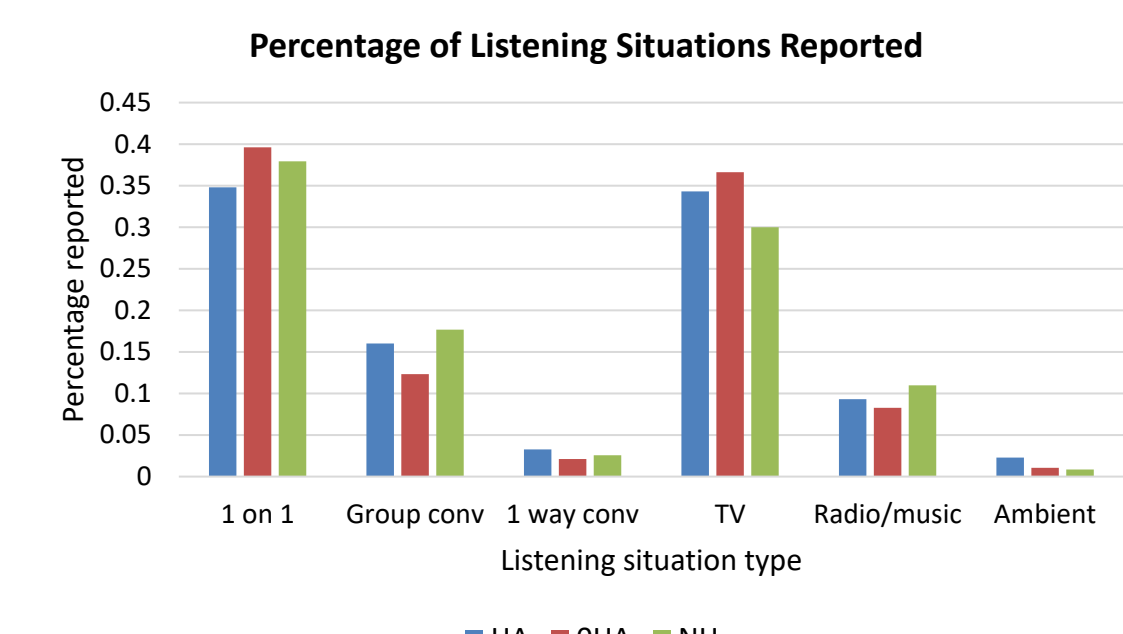


### Baseline questionnaires:

Social activity level (SAL), Social participation restrictions (SPaRQ), Hearing handicap (HHIE/A), Trait emotion (PANAS), Single item hearing ability question

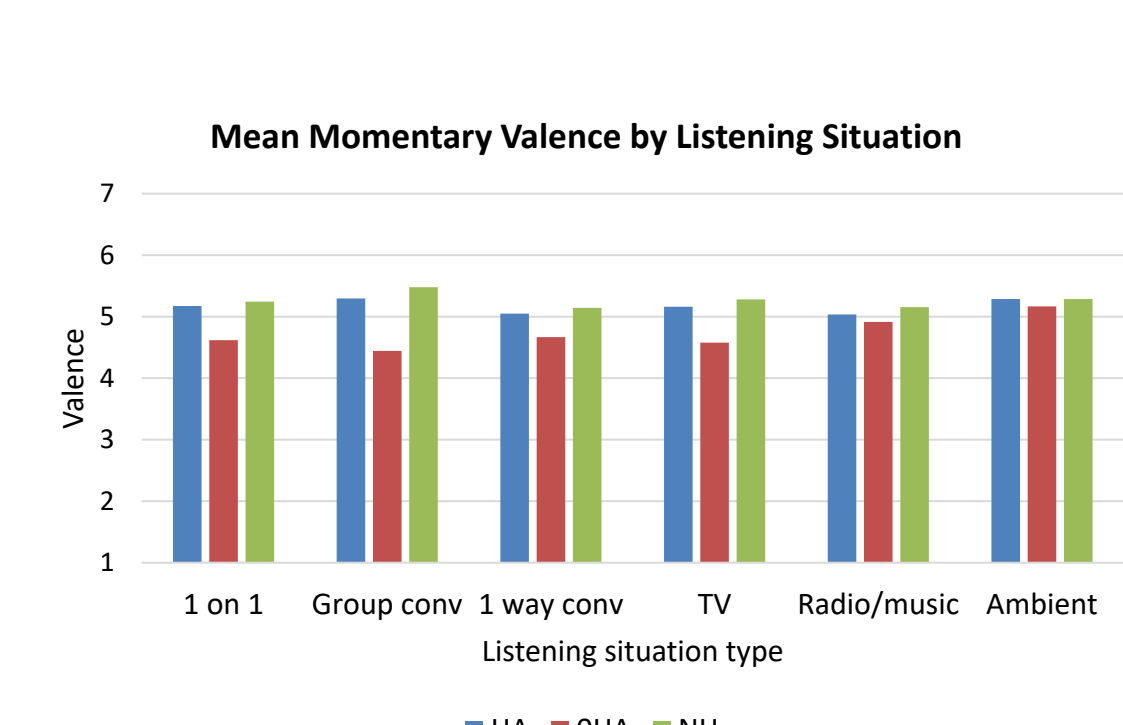
## Results: Valence & arousal

### Situations



Participants with and without hearing loss, and when wearing and not wearing hearing aids, report similar patterns of listening situations. Hearing aids used less for group conversations than one on one.

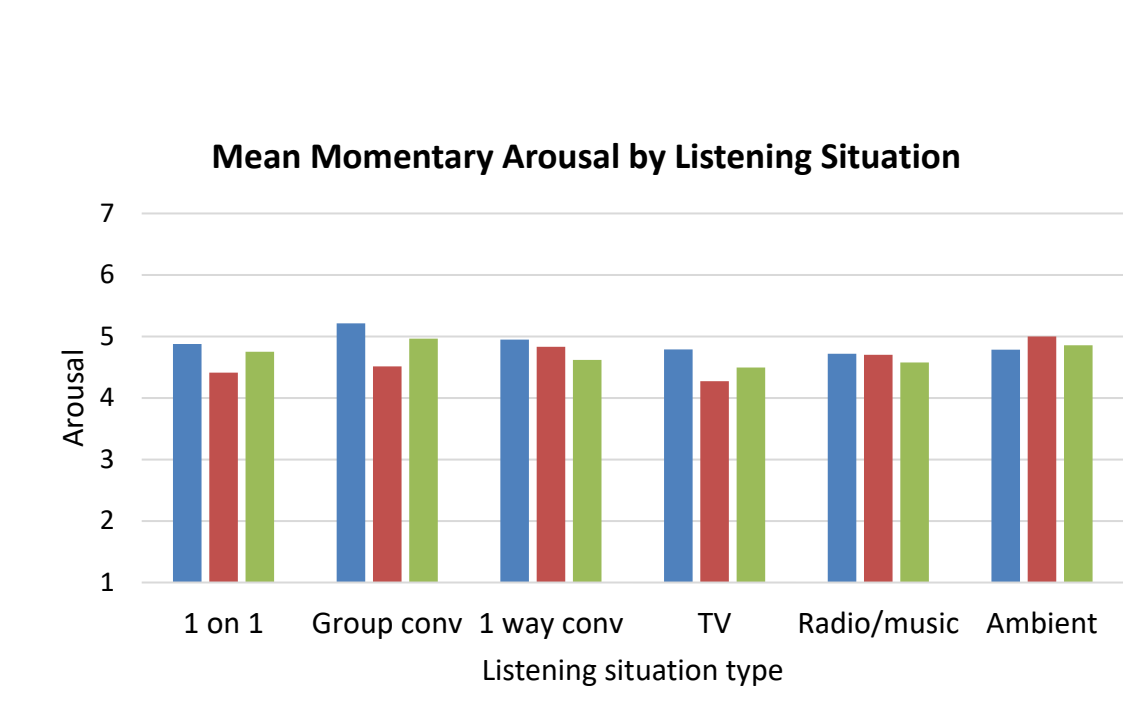
### Valence



### Effects of predictors on valence (HL group)

CONSTRUCT	B	SE	T
SITUATION TYPE	-0.008	0.019	-0.42
HEARING AID USE	0.59	0.22	2.67**
DAY OF THE STUDY	-0.027	0.009	-3.02**
BACKGROUND NOISE	-0.28	0.04	-6.56***
LOCATION	0.022	0.015	1.4
HEARING LOSS	-0.02	0.15	-0.16
HEARING HANDICAP	-0.02	0.007	-2.9*
SSQ12	-0.012	0.006	-1.7
SPARQ-SB	0.012	0.009	1.34
SPARQ-SP	-0.005	0.009	-0.52
SOCIAL ACTIVITY	0.33	0.007	-2.6*
AGE	0.007	0.017	-0.43
GENDER	-0.015	0.17	-0.08
POSITIVE AFFECT	0.034	0.03	1.1
NEGATIVE AFFECT	-0.01	0.03	-0.38

### Arousal

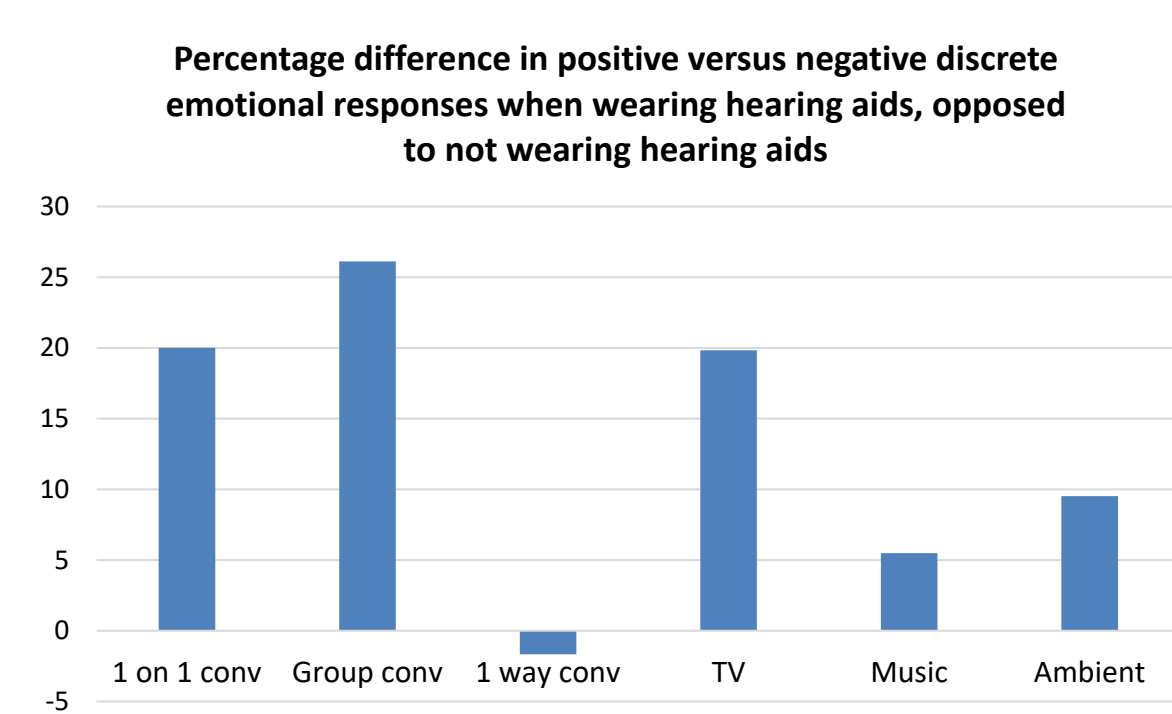


### Effects of predictors on arousal (HL group)

CONSTRUCT	B	SE	T
SITUATION TYPE	-0.014	0.018	-0.75
HEARING AID USE	0.45	0.19	2.4*
DAY OF THE STUDY	0.03	0.009	3.52***
BACKGROUND NOISE	0.014	0.042	0.34
LOCATION	-0.003	0.015	-0.22
HEARING LOSS	0.33	0.15	2.17*
HEARING HANDICAP	-0.007	0.007	-3.95**
SSQ12	-0.007	0.007	-1.12
SPARQ-SB	0.015	0.009	1.63
SPARQ-SP	0.003	0.009	0.43
SOCIAL ACTIVITY	0.051	0.1	0.5
AGE	-0.035	0.016	-2.2*
GENDER	-0.55	0.17	-3.2**
POSITIVE AFFECT	0.14	0.029	4.85***
NEGATIVE AFFECT	-0.004	0.028	-0.16

- No significant difference between people wearing hearing aids and normal hearing group.
- Wearing a hearing aid significantly related to higher valence and arousal ratings.
- Varying relationships of different variables to valence/arousal (e.g. women lower arousal).

## Other key results

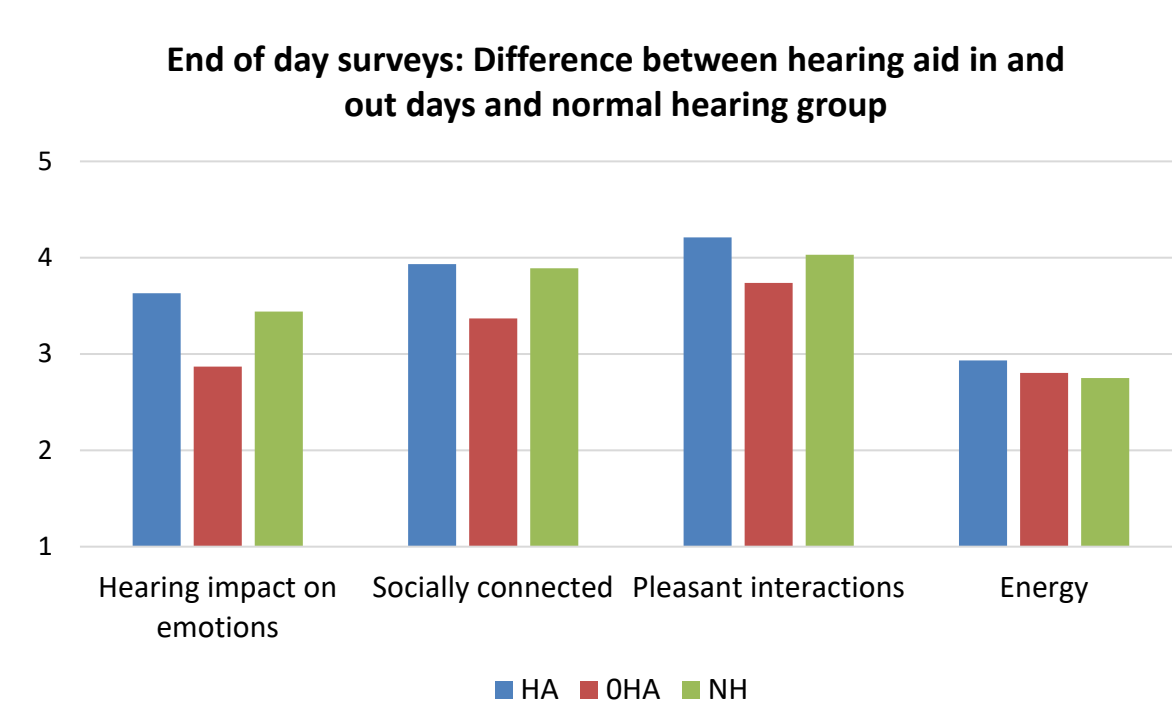


### Discrete emotions

When not wearing hearing aids there were large numbers of negative discrete emotions given.

When wearing hearing aids there was a noticeable change towards more positive discrete emotions.

16 choices (8 positive 8 negative)



### End-of-day variables

No significant difference between days wearing hearing aid(s) and normal hearing group.

Wearing hearing aid(s), compared to not wearing, results in significantly higher social connection, pleasant interactions and perceived impact of hearing ability on emotions. There was no effect on energy.

### Changing feelings towards hearing aid(s)

When asked how people's feelings had changed towards their hearing aids after the study nobody felt worse, 12 experienced no change, and 14 felt better about their hearing aids.

How have your feelings towards your hearing aids changed during this study	
A lot more negative	0
More Negative	0
No change	12
More positive	7
A lot more positive	7

## Conclusions

### Valence & Arousal

- Hearing loss without amplification is linked to worse reported valence and arousal.
- No significant effect of situation type.
- Significant link to hearing handicap ( $\uparrow$ HH =  $\downarrow$ V&A).
- Hearing aid(s) restore valence/arousal to "normal" levels

### Discrete emotions

- Choice of 16 discrete emotions (half positive/negative).
- When wearing hearing aids the proportion of positive emotions increased by up to 26%.
- This was most evident for traditionally challenging listening situations.

### Psychosocial variables

- Hearing loss without amplification is linked to worse daily social connection and pleasant interactions. Also more negative perceived impact of hearing ability on emotions.
- No difference between people with and without hearing loss for trait positive and negative affect.

## Next: EMA before and after first hearing aid fitting

### Research Questions

- 1: What effect does first ever hearing aid fitting have on the affective experience of everyday life?
- 2: Is greater affective benefit associated with continued use of hearing aid(s) after one year?

