Is the Ecological Momentary Assessment a Valid Methodology in Audiology?

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INTRODUCTION

- Ecological Momentary Assessment (EMA) was designed to overcome major disadvantages of self-report outcome measures such as recall bias and low contextual resolution.
- In EMA, repeated, real-time data collections are conducted.
- Because the individual's experiences are recorded immediately or in a short time frame, EMA is less affected by recall bias.
- EMA has high contextual resolution, because information about the listening context can be collected in each assessment.
- However, the validity of EMA in audiology is unknown.
  - EMA assumes respondents can approximately report on listening experiences and describe the characteristics of listening contexts. It is unclear if respondents can do so in the real world.
  - EMA generated data is notoriously noisy due to uncontrollability of real-world environments. To remove the noise, EMA uses repeated assessments and aggregates the data. It is unknown whether the aggregated EMA data are consistent with established knowledge/theory in audiology.
- Experiment 1: Can hearing-impaired adults approximately rate their speech recognition performance in the lab and characterize listening contexts in EMA surveys.
- Experiment 2: Is the pattern of the from repeated assessments consistent with established knowledge in audiology?

EXPERIMENT 1 METHODS

Participants
- Eight experienced hearing aid using adults
- Age 31-80 (mean = 67.4)/ 4 Males, 4 Females

Laboratory Procedures
- Connected Speech Test (CST) sentences
- Multi-talker babble noise fixed at 60 dBA
- Each participant was tested in three conditions:
  - Standard: Fixed SNR across 20 sentences
  - Roving: Variable SNR across 20 sentences
  - Long-term Roving: Variable SNR across 60 sentences
- Each type of condition was conducted at -6, 0, and +6 dB,
- Participants were instructed to repeat as much of each sentence as possible.
- Participants were asked to rate how much speech they understood.

Field-based Procedures
- Participants walked around with two normally hearing research assistants to a variety (10) of different listening environments.
- Each participant then described the situations:
  - Listening environment
  - Speech location
  - Noisiness
  - Noise location
  - Indoor space
  - Presence of carpeting
  - Reverberation
- The two research assistants described each listening situation from the point of view of the participant.

EXPERIMENT 1 RESULTS

Participants
- Twenty-seven adults with hearing impairment
- Age 40-88 (mean = 66.3)/ 7 Males, 20 Females

EMA Journals and dosimeters
- Paper-and-pencil journal
- 7 days
- Major listening condition longer than ten minutes
- Activity
- Environment
- Speech understanding
- Speech location
- Noisiness
- Hearing aid use
- Larsen Davis Spark 703 noise dosimeter
- Participants maintained their regular daily activities and schedules
- A total of 1267 journal entries covering 2032.1 hours of dosimeter recordings

EXPERIMENT 2 METHODS

Participants
- Twenty-one adults with hearing impairment
- Age 40-88 (mean = 66.3)/ 7 Males, 20 Females

EXPERIMENT 2 RESULTS

Participants
- Higher noisiness rating significantly associated with higher event Leq
- Better speech understanding significantly associated with lower HFA
- Listening experience: (less severe hearing loss), the use of hearing aids (better audibility), front-located speech (visual cues), and lower event Leq (better audibility)
- More research needs to be conducted in the future to examine other psychometric characteristics of EMA in audiology such as test-retest reliability and sensitivity.

ACKNOWLEDGEMENTS
This project was funded by NIDCD/NIH 1R03DC012551 and NIDRR.

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AAS
March, 2015
Scottsdale, AZ

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