

Supplemental Digital Content 3: Data Extraction variables

Study characteristics

Aims: objectives of the study

- explicitly mentioned not family related
- explicitly mentioned family related
- not stated or unclear

Hypothesis: proposed explanation at the beginning of research

- explicitly stated not related to family and language
- explicitly related to family and language
- not stated or unclear

Funder: fully or partly sponsored

- Explicitly mentioned
- Not mentioned

Date of the study: year when the research was carried out

- Explicitly stated
- implicit
- not stated or unclear

Type of study:

- RCT: randomized controlled trial - experimental design with participants randomly assigned to an experimental or control group
- Quasi-experimental: with assignment to different conditions open to decisions by individuals recruiting or applying the intervention
- Cohort Analytic Study: observational study in which groups are assembled according to whether or not they have received the intervention
- Case Control Study: retrospective study of records or interviews of individuals with a given outcome and controls
- Cohort Study: pre post without control group study
- Interrupted time series: study including multiple data collection points with knowledge of when the treatment was applied. Would include single- or multiple- case studies
- Other case study: Not interrupted time series
- Longitudinal: several observations of the same subjects over a period of time
- Cross-sectional: measurements taken at a single point in time. If there are several observations over a period of time, the subjects are different in each moment (retrieved from <https://learning.closer.ac.uk/introduction/types-of-longitudinal-research/prospective-vs-retrospective-studies/>)

Country of study: place where the research was carried out

Conflict of interest

- author explicit
- potential conflict inferred
- no conflict

- not stated

Sample size: total number of cochlear implanted children that participated in the study

- explicitly stated
- implicit
- not stated/unclear

Participating groups

- One Cochlear implant group
- More than one CI group
- Other kind of groups
- not stated/unclear

Sex of the individuals: percentage of female in the cochlear implanted sample

- explicitly stated
- not stated/unclear

SES of the individuals: Socioeconomic status is the social standing or class of an individual or group. It is often measured as a combination of education, income and occupation (American Psychological Association)

- mixed group
- low SES
- middle SES
- high SES
- not stated/unclear

Ethnicity of the individuals: The fact or state of belonging to a social group that has a common national or cultural tradition

- Minority group
- Majority group
- mixed group
- not stated/unclear

Age data of groups: age of participants at baseline

- explicitly stated
- not stated/unclear

Age at cochlear implant: age at the implantation of the first cochlear implant

- explicitly stated
- not stated/unclear

Age at onset of hearing loss: age at confirmatory diagnosis

- explicitly stated
- not stated/unclear

Exclusion criteria for CI group

- cognitive (IQ)
- multilingualism
- other Comorbidities
- others

Language

- monolingual
- multilingual

- uncertain

Mean IQ of the individuals:

- explicitly stated
- not stated/unclear

Comorbidities: the fact that people who have a disease or condition also have one more or other diseases or conditions

- included
- not included/unclear

Residual hearing prior to implantation: Hearing acuity that remains after hearing loss

- explicitly stated
- implicit
- not stated/unclear

Etiology of hearing loss: origination of hearing loss

- explicitly stated
- implicit
- not stated/unclear

Unilateral/bilateral hearing loss: hearing impairment in one ear and normal hearing in the other ear/ hearing impairment in both ears

- explicitly stated
- implicit
- not stated/unclear

Family characteristics

Family Socioeconomic status (SES)

- Family income: total compensation received by all family members age 15 or older living in the same household. Compensation may include wages, social security, child support, pensions capital gains, and dividends (BusinessDictionary n.a.).
- Neighbourhood index: summarises information about the economic and social conditions of people and households within an area, including both relative advantage and disadvantage measures 2000 US Census Bureau's TIGER (Topologically Integrated Geographic Encoding and Referencing) database (US Census Bureau, 2000). The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) (Australian Bureau of Statistics 2018)
- Parental educational level: maternal/main carer's educational level or family's highest educational level.

Family size:

- number of children plus number of parents living in the same household.

Family relationships:

- interpersonal relationships within the family including cohesion, expressiveness and conflict (Moos & Moos, 2009)

Family values:

- a family's orientation referring to personal growth (independence, achievement, active-recreational orientation, moral-religious emphasis) or to

system maintenance (emphasis on structure, organization and rules) (Moos & Moos, 2009)

Parental stress:

- the aversive psychological reaction to the demand of being a parent (Deater-Deckard, 1998, p. 315)

Family involvement in intervention

- the level of family participation in children's intervention and educational programs (Moeller, 2000)

Family self-efficacy

- the belief that one will be able to perform parenting tasks successfully (Teti & Gelfand, 1991)

Parenting style

- maternal/main carer's responsiveness, sensitivity, emotional availability, warmth and regard towards their child, provision of control and structure

Parental linguistic input

- Parental linguistic input quality: quality of parental child-centred language including the use of facilitative language techniques, lexical diversity and structural complexity as well as interactional features (turn-taking interactions).
- Parental linguistic input quantity: Amount of parental child centred language

Home literacy environment:

- Adult reading time, frequency of dialogic book reading and parental teaching or tutoring literacy skills (eg. the alphabet, phoneme awareness, reading of words)

Language outcome

Speech perception

- auditory perception of speech sounds (individually or at word level)

Speech production

- correct/intelligible production of speech sounds at word level

Vocabulary size receptive

- quantity of words a person can comprehend

Vocabulary size expressive

- quantity of words a person can produce

Grammar receptive

- correct comprehension of grammatical structures

Grammar expressive

- correct use of grammatical structures

Grammar expressive: length of utterance

- mean length of utterances (words or morphemes)

Grammar composite expressive/receptive

- composite score referring to the use and comprehension of grammatical structures

Global receptive

- composite language score referring to different dimensions of language comprehension (word, sentence, discourse level)

Global expressive

- composite language score referring to different dimensions of expressive language (word, sentence, discourse level)

Global expressive/receptive combined

- global language score referring to the correct use and comprehension of language

Social communication skills:

- social use of language/pragmatic language skills

Confounders

Chronological age: average age of the cochlear implanted children that form the sample (and standard deviation) at baseline

Sex: percentage of female in the cochlear implanted sample

IQ: mean intelligence quotient of the cochlear implanted sample

Age at implantation: age at implantation of the first cochlear implant

Age at onset of hearing loss: age at confirmatory diagnosis

Residual hearing prior to implantation: Hearing acuity that remains after hearing loss and pre implantation

Communication Mode: spoken (oral) language, sign language, sign supported language

Unilateral hearing loss: hearing impairment in one ear and normal hearing in the other ear

Bilateral hearing loss: hearing impairment in both ears

Note. Grouped variables in meta-analyses are marked in italics.

References

Australian Bureau of Statistics. (2018). The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD). Retrieved from <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~IRSAD~20>

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Deater-Deckard, K. (1998). Parenting stress and child adjustment: some old hypotheses and new questions. *Clinical Psychology: Science and Practice*, 5, 314-432

Moeller, M.P. (2000). Early intervention and language development in children who are deaf and hard of hearing. *Pediatrics*, 106(3), E43

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Teti, D.M. and Gelfand, D.M. (1991). Behavioral competence among mothers of infants in the first year: The mediational role of maternal self-efficacy. *Child Development*, 62, 918-929.