Considerations to promote inclusion of individuals with different hair types in EEG research

Biases in recruitment, accessibility, methods and measurements reduce inclusion of underrepresented minorities whose hair type or style is perceived to be incompatible with EEG from research study participation. Barriers to inclusion hinder generalizability and utility of psychophysiological findings for human health. Here are some considerations to encourage participation and address methodological bias.

Awareness for inclusivity in psychophysiology research

Psychophysiology methods (e.g., EEG) offer promise for:

- Refining assessments
- Identifying risk factors
- Informing treatments
- Parsing mechanisms of action

However, generalizability of findings is limited by

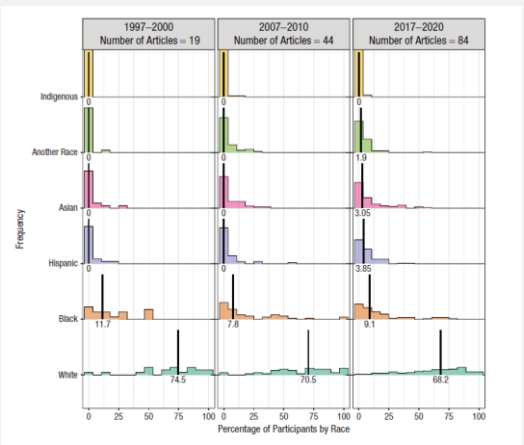
- Inequity in non-white representation
- Under-reporting of racial/ethnic characteristics

Biases against marginalized identities prevent equitable representation

- Researchers screen out potential participants by hairstyle
- When enrolled, sessions are terminated early due to hairstyle
- Collected data are often excluded during data processing

Consequences of bias

- Unrepresentative datasets and poor generalizability of findings
- Reifies notion that race is physical
- Misinterpretation of demographic differences
- Perpetuates mistrust in researchers



Participant demographics among the 13.8% of *Psychophysiology* articles that reported sample race and ethnicity. Vertical black lines refer to the median percentage of each race/ethnicity across included articles (Bradford et al., 2022).

Prepare participants for their study session

Various hair types and styles can be accommodated with suggestions and preparation:

- Glue-on or sewn-in weaves or extensions
- Locs, braids, twists, coils, or curls
- Chemically treated/freshly permed hair

To prepare participants…

- State that an electrode cap with gel/saline solution will be placed on the scalp and hair, and that hair may be temporarily adjusted
- Advise participants to arrive with clean, dry hair (no gels, oils, or heavy conditioners)
- Schedule EEG sessions to coincide with hair care (e.g., a wash day or between hairstyles)
- Suggest participants schedule their hair appointment in days following the EEG session

Suggest a hairstyle for the EEG session.

Low-to-medium density curls (b)
- braided crown around the hairline
- tight, low bun
- Braided pigtails
- Two 2-strend twists

Tight, high-density curls (c,d)
- Ahead of time, twist into several two-strand twists to stretch the curls
- On the day of the visit, untwist hair and style into a tight low bun and/or corn rows

Hair in a protective style
- Ahead of time, remove style, and flatten with a durag or headwrap
- Style into tight, low bun

Images from hellobrainlab

Enhance scalp access by styling hair

Images from hellobrainlab

Hair can be styled to enhance scalp access

- Ask for permission to touch and adjust hair
- Part or braid hair to create more scalp surface area for contact with electrodes
- Style a low bun or pigtails to manage excess hair

Images from PACER Lab

- Styrofoam netting over the cap and hair can enhance electrode contact with scalp
- Consider electrode sites and regions of interest when adjusting hair:
  - center part for midline electrodes
  - lateral braids for lateralized electrode

Other considerations for methodological & measurement bias

Images from Ty Lees and For All Lab

Best practice guidelines and equipment continue to develop. Here are some other considerations to promote inclusivity:

- Electrode design (e.g., disc, cup, pin, or multi-pin) may affect scalp contact through thicker hair types
- Controlling for EEG gel volume may enhance accuracy and sensitivity for individual differences
- Individual differences in follicle density and hair shape and type may require personalized approaches
- Signal:noise ratio measures of data quality may position researchers to objectively address biases involving hairtype. However, parameters and acceptable values remain unclear

This infographic was an initiative of the SPR Committee to Promote Student Interests' Diversity and Outreach Subcommittee '25 (Poole, Kallen, Harold)