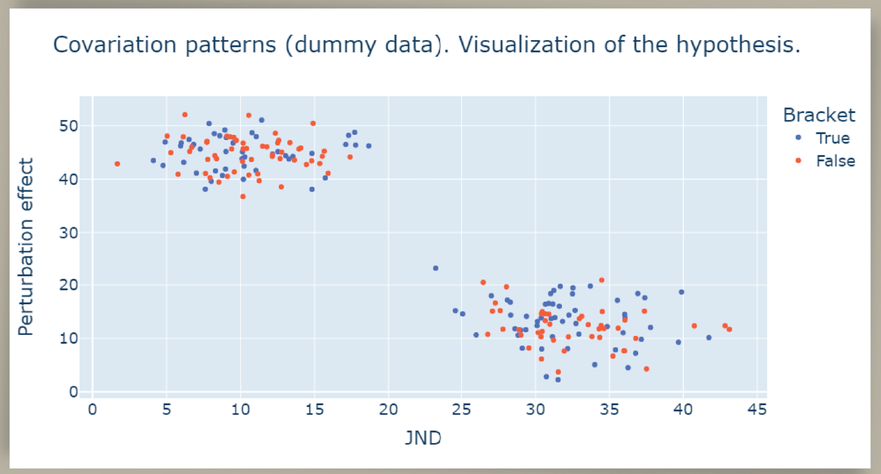
SPEECH PERTURBATION EXPERIMENT: The Backstage

"A picture is worth a thousand words



Hypotheticaly, there're expected to be 2 groups of individuals:

more adaptive to perceptual feedback and better at perceptual discrimination

less adaptive to perceptual feedback and less sensitive in perceptual discrimination

Speech Science 101

Pitch is a **perceptual** property of sounds that makes it possible to judge them as "higher" and "lower"

What happens when it unexpectedly changes (it - the fundamental frequency, to be precise, which is an objective characteristic)?

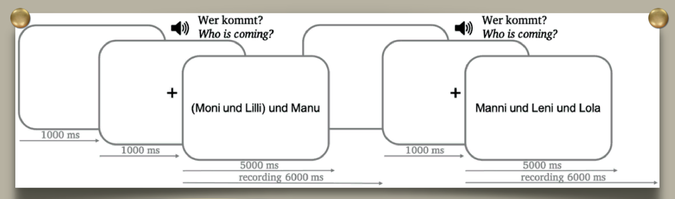
Pitch-shift reflex kicks in. It is a compensatory response in voice correcting the discrepancy between the intended voice pitch and the (perturbed) feedback pitch.

How humans react to the unexpected change in their pitch? What does this individual reaction depend on? Let's find out (or at least try to).

Experimental tasks

SUDDEN PITCH PERTURBATION IN AUDITORY FEEDBACK

the participants wear sound-isolating headphones and read out loud some sentences. They hear either their normal voice or the pitch-perturbed feedback.



JUST-NOTICEABLE-DIFFERENCE DISCRIMINATION TASK

the participants hear two (almost) identical sounds and decide if they are similar or different. Difference in pitch starts big and is stepwise adjusted until the participant reaches the minimally detectable difference.

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POV OF A PROGRAMMER & AMATEUR LINGUIST
IANA PALACHEVA

My tasks as a technical aide

summarized the relevant literature

binge-watched YouTube videos on acoustics

set up the equipment in the acoustics lab

regularly brainstormed the experimental design

configured the speech manipulation software (Audapter) for the experiment

when failed, attempted to transfer the setting to another framework designed for sound professionals (Max8)

finally fixed the main issue with Audapter

gave up on using the original codebase (impossible to customize and extremely unstable)

designed the GUI for the pitch perturbation experiment from scratch in Matlab

set up the JND task (UI and algorithm) in Python

DOCUMENTING EVERYTHING, SET UP THE GITHUB REPO TO SHARE THE CODE AND THE FINDINGS!

LESSONS I LEARNED SO FAR

If something looks like a piece of cake - be careful, it may hide inside a hard to swallow pill.

Acquiring the data from humans is really hard. From now on, I solemnly swear to appreciate every single data point I get!

If you feel frustrated with a codebase - try to customize everything from scratch. You'll enjoy the process more, learn better and it's easier to customize!

This work is a small part of the dissertation project of a PhD candidate Andrea Hofmann. The work is focused on different perspectives of prosodic cue use in perception, production, and their potential interaction. Thank you for a wonderful collaboration, Andrea :)