



tapping exercise (Thompson 2009), required more equipment, time, and the physical presence of both the participant and the researcher. It induced performance anxiety in some participants, who felt that the method measured physical coordination rather than intention, and a delay was apparent. The web survey let participants operate in their own time, without supervision, and was globally accessible, allowing far more participants. Behind the scenes, raw result processing is also much more efficient, with binary results connected directly to specific units within the utterance.

All syllables that received more votes than those adjacent to them are considered to be ‘perceived prominences’, but this list is then reduced statistically to only those which have a *significantly* higher number of results than their neighbors. The final set of significant perceived prominences (or, ‘PPMs’) is then further examined in several ways. Firstly, a durational analysis of ‘intervals and events’ (meaning PPMs and the time between them) looks for patterns of prominence that may create ‘rhythm’. Secondly, the location of PPM syllables within the utterances is compared with the predicted stress locations in those utterances, to see how closely they match. Thirdly, there is acoustic analysis of duration, pitch, vowel quality and loudness, in which the PPM syllables are assessed for any exceptional behavior in these areas. Additionally, we look for patterns and differences in response to the speech from the older versus the more recent speakers, and between the responses of the three participant proficiency groups (native versus non-proficient).

One discovery of the study has been that even though native speaker (or in this case, ‘high’ proficiency) perception is important for the analysis of prosody, these speakers do not always provide the clearest results from an acoustic point of view. For Māori, at least, the higher the proficiency, the less likely the listener is to find specific syllables prominent. Overall, ‘high’ proficiency speakers checked boxes more often than the other groups, which, perversely, led to a smaller number of PPMs recorded for that group. This is probably due to their understanding the meaning: they are less tuned to the sound than to the content, so when asked to pick what ‘stands out’, they are less selective. The impact of the acoustic cues is not as strong as for lower proficiency groups, who have only what the sound gives them. Both the influence of English on Māori and the fact that all the listeners spoke good English mean that they may all be tuned to the same cues. Only when semantic content is a factor do they focus on them less. A listener can’t be forced to focus on sound without the use of filtered speech, and the web survey format presents difficulties here. They are not insurmountable, but were out of the scope of the current study.

The methodology remains under development, even while producing results for the current study. The ultimate goal is a description or illustration of prosodic prominences in a given language, and the methodology intended to be modifiable and applicable to any language that could benefit from such description.

## References

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