1. **What is Predictive Coding model Of Music**

The predictive coding model of music is a model of how the brain continuously attempts to minimize precision-weighted prediction errors. By forming expectations at different temporal scales and comparing these to incoming sensory signals, the PCM proposes that when we listen to music, our brains are conducting “recursive Bayesian processes” minimize the prediction error signal. Perception is thought to minimize prediction error signals by improving predictions and action reduces prediction error by changing the actual sensory inputs to make them align better with expectations.

By not only predicting streams of sensory content, but also its *precession*, its inverse variance, predictions errors can be weighted how surprising they are.

The tonality of musical piece is not necessarily directly sensed, but is rather an instrumental part of the generative model that a listener holds. Tonality is predicted from stastical regularities in melodies that the brain of listener has identified.

The PCM further suggests that our experience of pleasure when listening to a piece of music depends on a goldilocks zone of predicability, where surprise in predictible settings and predictiblity in otherwise surprising context are favored. (Vuust et al., 2022)

Potentially, the result of brain attempting to minimize long-term prediction errors, since difficult to predict, in noisy signals would decrase the precession to much on signals and thus not drive updating, while high predictability in high precision enviroments would lead to corrections always being confirmed, which in turn would prevent updating.

An interesting corrolary is the second-order predictions that musicians must make. If the pleasure in a musical piece is determined by how well it hits the goldilocks precession weighted signals, they must be, atleast implicitly, modeling precision-weighted errors signals of another brain.

The coupling between motor and perceptual circuits further suggest that muscial experience should be diminished if motor processes are inhibited.

1. **What does active inf say about neuronal implementations**

Message-passing?

1. **Neuronal responses to music**

MMN amplitude has for example been shown to decrease in when the predictablity of the context decreases. According to the PCM, this a “clear example of a precision-weighted prediction error”. ERAN responses are signals of violations of harmony expectations. Its Amplitude and latency is also modulated by attentation and musical training. It strongly depends on much it deviates from the rules of musical harmony. It is probably by better coupling motor and action circuits that allows muscicians more precise inference. These responses are culture dependent, suggesting the violated expectations are formed from life-long learned stastical regularities in the listeners musical home culture.

When the melodic context is less predictable, the MMN amplitude is reduced. Shorter Latency of the MMN also refer to a larger precision-weighted prediction error.

(Vuust et al., 2022)