Is turn prediction accuracy dependent on the idiosyncrasies of one's own experience?

Nina Fisher, Lauren V Hadley, Martin J Pickering (The University of Edinburgh)

According to the prediction-by-simulation account of turn-taking, people's ability to predict an observed action is based on their experience of producing that action. Hence, in an interaction, prediction of a partner should vary according to how well an individual can represent their partner's production style using their own motor system. It appears that pianists represent their own style best, and are more accurate at making predictions when observing their own output than the output of others (Keller et al., 2007). This suggests that musicians similar to interlocutors in speech, use simulation to generate accurate turn-end predictions; in this study we directly compare turn-taking across music and language investigating whether simulation is used to facilitate turn-taking across music and also language.

We investigated whether people predict the timing of their own utterances and musical performances more accurately than those recorded from other people. In session 1, we recorded 30 pianists playing 60 melodic phrases on a MIDI keyboard, and reciting 60 utterances. In session 2 (three months later), we recorded the pianists playing a further set of 60 melodies and 60 utterances. In session 3 (a further three months later), we presented the pianists with their own recordings, the recordings of one participant judged similar, and of one participant judged dissimilar in style. Two independent raters listened to a sub-set of phrases and sentences from each participant and subjectively selected the most similar and dissimilar participant. Participants were asked to predict the end of the melodic phrases and utterances and respond either by pressing a button, or by producing a verbal/musical response. This manipulation was included to explore whether turn prediction accuracy changes when simply asked to predict an end (as is the case in many studies investigating turn-taking) or when asked to predict and produce a response (which is arguably a more ecologically valid investigation).

Results suggest that there are no significant differences between responses to recordings six months prior and three months prior to testing, which suggests that predictions were not reliant on memory of production. Analyses suggests that people were more accurate at predicting their own turn-ends than when predicting turn-ends when the stimuli was produced by the similar and dissimilar participants. There was a difference between response type, with participants taking significantly longer to respond when using the button press than when producing a response, which is surprising as one would assume it would be more difficult to predict and produce a response than to simply predict a turn-end. However, there was a significant interaction between the language and the music with participants being more accurate at predicting the turn-end of the utterances using the button press than when asked to produce a verbal response (which is what one would expect), though the opposite pattern was observed for music with participants taking significantly longer to predict musical turn-ends using a button press than when producing a musical response.

These findings suggest that prediction accuracy may be dependent on the idiosyncrasies of one's own experience which provides support for the prediction-by-simulation account of turn-taking. Furthermore, it appears that this finding crosses both language and music which suggests that mechanisms involved in turn-end prediction may cross these domains. However, there may be some difference between musical and linguistic interactions in terms of production, an area which requires further exploration.