# Token Gestures: Self-repair and Gesture in Schizophrenia

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**Background:** Many patients with schizophrenia experience difficulty engaging in successful social interaction. Successful social encounters require mutual understanding between interacting partners. To achieve this, partners must monitor their own behaviour, and others', for potential misunderstandings and attempt to address them as they arise. One way in which this can be done is self-repair, where the speaker identifies, and repairs or revises, their own speech as it is being produced. When verbal difficulties are encountered people may compensate by using additional multi-modal resources such as hand gesture[1] and head nods.[2] Patients with schizophrenia have difficulty monitoring their own behaviour,[3] and display fewer hand gestures when speaking.[4] However, it is unclear if patients use less self-repair during conversation or if their use of self-repair is associated with their use of gesture. These questions are addressed in the current analysis.

**Methods:** Twenty patient interactions (1 patient, 2 healthy controls) and 20 control interactions (3 healthy participants), lasting approximately 5 minutes, were audio-visually recorded and motion captured in 3D. Participants' speech was transcribed in ELAN. Self-repairs were annotated using STIR;[5] a system that automatically detects speech repairs on transcripts. Participants' self-repair rate per word was identified. An index of gesture was derived from participants' hand movements in 3D. Gestures were identified as hand movement speeds >1 standard deviation from an individual's mean speed. The presence of gesture was assessed on a frame by frame basis and the percentage of frames spent gesturing was identified for each individual.

**Results:** A mixed models analysis, adjusting for triadic group, age, gender and IQ, identified that healthy participants in the control groups used significantly more self-repair than schizophrenia patients ($Chi^2$=17.95, 95%CI -.03 to -.01 $p$<.001). Bivariate correlations revealed that, in control group participants, increased self-repair was associated with increased gesture (Rho (51) = 0.35, $p$ = 0.01). In contrast, self-repair rates were not associated with gesture use in patients with schizophrenia (Rho (19) = -0.04, $p$ = 0.86).

**Conclusion:** During social interaction, schizophrenia patients repair their own speech less, and make less use of hand gesture when repair is required. In line with previous studies,[3] these findings may reflect patients' difficulty monitoring their own behaviour. However, when self-repair does occur, patients are not employing other compensatory nonverbal modalities to assist with the difficulty. This may reflect a disconnect between communication modalities in patients with schizophrenia. Overall, the ability to self-monitor and flexibly modify speech during conversation appears to be impaired in schizophrenia. This may make achieving mutual-understanding more difficult, contributing to the debilitating social deficits experienced by this patient group.

## References


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