Recurrent Gestures of Open Hand and Gesture Space – a Quantitative Approach

Recurrent gestures are conventionally identified based on stable form–meaning pairings that appear consistently across contexts. Typically, hand shape and movement direction are treated as primary identifying features; however, Ladewig's work on cyclic gestures (2014) highlights spatial location as an intra-family distinguishing factor. The empirical study presented here investigates whether properties of spatial location can also be used to analyse the Open Hand gesture family (see Kendon, 2004; Müller, 2004). It applies statistical, quantitative analysis to recurrent gestures-an approach not commonly adopted in gesture studies, arguing that their repeatable nature warrants such treatment.

The dataset consists of ten TTRPG sessions recorded in a controlled setting, chosen to approximate natural interaction while maintaining experimental consistency. The present analysis is based on one fully annotated session (3h32m), comprising 159 recurrent Open Hand gestures. Each instance was coded for palm orientation (Up, Down, Vertical, Edgewise), motion direction, repetition, and three spatial properties: spatial extent (horizontal, relative to the speaker), height (table->above head), and elbow extension (minimal->full). Height and elbow extension were converted into ordinal variables to allow linear mixed-effects modelling.

Across all orientations, height and elbow extension show a stable inverse relationship: higher gestures tend to be performed closer to the body, whereas lower gestures involve greater extension, a pattern that may be partially explained by biomechanical constraints.

Cluster analysis indicates that the structuring role of spatial properties differs by palm orientation. Palm Up gestures (n=64) cluster primarily around spatial extent and height. The division previously described mainly in terms of motion direction (Müller, 2004, p. 21) can also be accounted for by spatial properties: for instance, 'palm lateral' gestures tend to be wide and vary in height depending on meaning - higher for invitations, lower for expressions of uncertainty (vide Kendon, 2004, pp. 275–280). Palm Vertical gestures (n=39) are largely differentiated by height. While consistent with existing descriptions (Kendon, 2004, pp. 251–255), variation in height and spatial extent appears to reflect differences in intensity. Palm Edgewise gestures (n=27) are structured mainly by motion direction and height. One cluster aligns with descriptions of brushing aside and sweeping away gestures, while another shows undescribed gesture performed at low height with a vertical, repetitive movement. Palm Down gestures (n=23) display high internal variability, forming six clusters. This raises the question of whether the category is more complex than previously assumed, or whether variation in spatial realisation reflects subtle shifts in meaning.

The study carries several theoretical implications. It demonstrates the gestures can be analysed using structured analytical tools. Incorporating spatial properties into such frameworks enables more precise comparison between gesture variants, facilitating the identification of both shared structural patterns and meaningful distinctions.

Although preliminary and exploratory, the study offers insights into the internal structure of Open Hand gesture families. Cluster analysis reveals patterns consistent with previous literature, while also highlighting cases where existing classifications may be insufficient (Palm Edgewise) or require reconsideration (Palm Down). The next step is to incorporate contextual and functional analyses, to be compared against the structural patterns identified here.

(500 words)

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