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Visual-Motor Iconicity in the Spatial Language of Deaf Traditional Negev Arabic Speakers

Sign languages—including those of deaf people—are vivid expressions of visual linguistic iconicity (Gimeno-Martínez & Baus 2022; Novogrodsky & Meir 2020; Ostling et al. 2018; Taub 2010). Until now, the study of space in relation to sign languages has focused mainly on the semantic values of the signing space, i.e., the positions and spatial regions in which the signs are produced (Barberà Altimira 2015; Bauer 2014), while representations of spatial relations have received less attention. The present research aimed to compare the representations of spatial, static, projective relations on the horizontal plane—i.e., the frames of reference (FoRs) and related prepositions—of Traditional Negev Arabic hearing speakers (TNA) and speakers of the same language with profound, prelingual, neurosensory deafness (DTNA). FoRs are coordinate systems projected onto spatial arrays to locate any object (Figure, F) in relation to another object (Ground, G). FoRs can be object-centered, based on inherent facets of G; ego-centered, based on the coordinates projected by the speaker; or geocentric, based on external coordinates such as cardinal directions (Bohnemeyer 2011). TNA is a cluster of closely related tribal dialects of North-West Bedouin Ḥijāzi Arabic spoken in the Negev region (southern Israel) by women and men over age 75 without formal education. In childhood, DTNA speakers received domestic training in Negev Bedouin sign language (NBSL) and lip reading. NBSL is a tribal sign language that spontaneously developed among the Negev Bedouin due to the high prevalence of congenital deafness in their communities. Today, NBSL is used outside the Negev due to the modern relocation of Negev Bedouin tribes to other regions of Israel. The well-documented Al-Sayyid sign language (Sandler et al. 2005) can be considered an NBSL village variety. Four of the ten DTNA informants tested in this study had received basic training in Israeli Sign Language (ISL, a German-based sign creole) in adolescence. It is important to remember that, except for a few common elements, TNA spatial gesture and deixis differ from those of DTNA spatial sign language and are outside the scope of the present inquiry. I compared TNA/ DTNA linguistic FoRs and related prepositions. I tested whether and how the use of a sign language—based on the iconic, visual-motor channel—influences DTNA spatial semantic conceptualization compared to TNA. TNA is of particular relevance in disambiguating the role of language vs. sensory/motor experience in semantic conceptualization because its spatial linguistic representations display an extraordinary degree of cultural elaboration encoded in a culture-specific ontology of objects in space—based on the interplay of culture-based parameters, routine affordances, and axial constraints—all reflected in a complex spatial grammar (Cerqueglini 2022). The TNA front/back axis is treated according to semantic properties culturally attributed to Gs (e.g., familiarity) and axial constraints (whether or not F and G are aligned with the observer's visual field). With familiar, asymmetric Gs, the object-centered FoR is selected. With familiar, symmetric Gs, the ego-centered FoR using the translation strategy is selected with F-G-O(bserver) aligned, and the geocentric FoR is selected with F-G-O not aligned. With unfamiliar Gs, the geocentric FoR is preferred. The lateral axis is processed geocentrically with all Gs, while 'right' and 'left' only distinguish between hands. Ten TNA (five women/men) and ten DTNA (five women/men) were recruited for an individual linguistic test based on Levinson et al. (1992). Stimuli consisted of twenty spatial arrays of two toy objects (FG). F was a ping-pong ball. Ten Gs were selected according to a set of different functional and geometric properties. FG arrays were arranged one after the other on a table in front of the informants. Two arrays were tested for each G. Informants were asked in their language, 'Where is the ball in relation to G?' for each array, where G was the noun of the G-object. The maximum response time was five seconds. While TNA results confirm Cerqueglini (2022), DTNA results show some important differences. Consistently with TNA, the preposition 'in front' is used only

in association with familiar, asymmetric Gs that prime the selection of the object-centered FoR. Two different signs are used for 'behind,' one involving the upper body region, with familiar, asymmetric Gs—corresponding to the TNA object-centered FoR—and one signed at hip height when G is familiar and symmetric with FGO aligned—corresponding to the TNA ego-centered FoR, while TNA uses the word *wara* 'behind' in both cases. With familiar, asymmetric Gs such as knife and coffeepot, the right/left opposition is grammaticalized egocentrically ('right' is signed to the right of the speaker, 'left' to the left of the speaker), especially if the preposition to be used corresponds to the informant's dominant hand. When FG have a functional link (G-dog/man, F-ball) the scenes are often described with verbs of interactions and routine movements. Consistently with TNA, with familiar, symmetric Gs (stone, tree) and F-G-O aligned, 'in front' is avoided, substituted with the ego-centered expression 'F is on the farther side of G in relation to O.' Interestingly 'away from' is signed as the motion verb 'to leave' and the exact sign compulsorily encodes the cardinal direction, e.g., 'F leaves G eastward (from O),' producing a simultaneously ego-centered and geocentric representation. Regarding the geocentric FoR, in both TNA and DTNA, it is represented by four cardinal directions approximately corresponding to English 'east,' 'west,' 'north,' and 'south.' Unlike European and Native American sign languages (La Mont 1960), DTNA has no abstract way to sign cardinal directions—such as 'up' for 'north' and right for 'east'—other than pointing toward them. This data is consistent with TNA absolute pointing. Results show that despite strong similarities between TNA and DTNA, the dominant iconic, visual-motor channel used for signing affects the spatial conceptualization of DTNA speakers, leading to the development of an ego-centered right/left distinction in describing routine, daily scenes due to the use of hands for both interaction and iconic representation and a pervasive codification of directionality and motion even in static spatial scenes.

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