Encoding Spatial Alignment in Grammar:
Evidence from Negev and Sinai Bedouin Arabic, Gawwada, and Hausa

Spatial frames of reference (FoRs) are linguistic and cognitive strategies used to project coordinate systems onto spatial arrays to locate an object (Figure, F) relative to another object (Ground, G). FoRs include two types: egocentric (depending on the coordinates of the observer, O) and allocentric. Allocentric FoRs are classified as intrinsic (depending on the G's inherent sides), and geocentric (depending on external sources) (Bohnemeyer and O'Meara, 2012).

Traditional aṣ-Ṣāniʕ Arabic-speakers (TAA, a Negev Arabic tribal variety) tested on "Man & Tree" (Levinson et al., 1992) and "Ball & Chair" (Bohnemeyer, 2008) proved to grammatically discriminate FGO [+aligned] in all FoRs (Cerqueglini, 2019) using simple prepositions (1, 3) or *min*-compounds (2, 4):

(1) F *giddām* G
    F in front of G
    "F is in front of G."
(2) F *min* G *w-giddām*
    F from G and in front
    "F is in front of G."
(3) F *šarg* G
    F east G
    "F is east of G."
(4) *F* *min* G *w-šarg*
    F from G and east
    "F is east of G."

The sample doublets (1-2) and (3-4) have identical meanings, but the *min*-chains (2, 4) indicate FGO [+aligned], while simple prepositions (1, 3) are neutral regarding FGO's alignment. While TAA egocentric FoR applies only with FGO [+aligned], TAA allocentric strategies can also encode O's alignment vis-à-vis FG. This is unprecedented in the literature, yet similar to phenomena observed in the languages below.

Jbali Arabic (St. Catherine, Sinai, Egypt) distinguishes between:

(5) *F* *janb* G
    F beside G
    "F is beside G."
(6) *F* *f-ṭōl* G
    F in-along G
    "F is beside G."

where (6) describes FG [+aligned] along the same axis (established by the presence of other aligned elements; Nishio, 1996), while (5) is neutral regarding FG's alignment.
Like TAA, Jbali can encode O's position in geocentric descriptions:

(7) *F* *asfal* G
    F lower (than) G
    "F is downriver from G."
(8) *F* *min* G *asfal*
    F from G lower
    "F is downriver from G (with O located along the river's flow)."

Here (8) means that FGO are [+aligned] along the same axis (the St. Catherine wadi flow), while (7) is neutral regarding FGO's alignment.

Gawwada (Cushitic) distinguishes geocentric representations in which O is/is not on the same axis as FG. Gawwada uses an egocentric FoR based upon the main axial opposition between 'uphill/northeast' (*kut-e*) and 'downhill/southwest' (*kal-e*), with a third element bisecting the plane at the horizontal level (*kor-e*) (Tosco, 2009: 524). Adding the centrifugal suffix *-á* (OUT) or the centripetal suffix *-ú* (IN) to the prepositions, Gawwada produces geocentric representations that include egocentric, axial information:

(9) *minn-e*   *kup-ito*   *kal-á-y*
    house-PL   mountain-ASSOC.M   downhill-OUT-ASSOC
    "The house is downhill, behind the mountain (relative to O's position)'

Example (9) describes the alignment O-G-F from northeast (O) to southwest (F).

Furthermore, as well documented in FoR literature, Hausa (Chadic) uses egocentric strategies only with FGO [+aligned] (Hill, 1982).

The attention to FGO's mutual axial alignment may imply a common Afroasiatic heritage. This hypothesis is worth exploring by testing additional languages.

References

Bohnemeyer, J. (2008) "Elicitation Task: Frames of Reference in Discourse – the Ball & Chair Pictures". Pérez Báez, G. (ed.) *MesoSpace: Spatial Language and Cognition in Mesoamerica. 2008 Field Manual*. Unpublished results, University at Buffalo – SUNY, pp. 34–37.

Bohnemeyer, J., O'Meara, C. (2012) "Vectors and frames of reference: Evidence from Seri and Yucatec". Filipović, L., Jaszczolt, K. (eds.) *Space and Time across Languages and Cultures*, pp. 217–249. Amsterdam: John Benjamins.

Cerqueglini, L. (2019) "Spatial Frames of Reference in Traditional aṣ-Ṣāniʕ Arabic: Preliminary Observations of Language-to-Cognition Correlation", *Saggi e Studi Linguistici*, 57(1): 71–127.

Hill, C. (1982) "Up/Down, Front/Back, Left/Right: A Contrastive Study of Hausa and English". Weissenborn, J., Klein, W. (eds.) *Here and There: Cross-linguistic Studies on Deixis and Demonstration*, pp. 11-42. Amsterdam: Benjamins.

Levinson, S.C., Brown, P., Danziger, E., De León, L., Haviland, J.B., Pederson, E., Senft, G. (1992) "Man and Tree & Space Games". Levison, S. C. (ed.) *Space Stimuli Kit 1.2: November 1992*, pp. 7–14. Nijmegen: Max Planck Institute for Psycholinguistics.

Nishio, T. (1996) "Where Does the Wadi Come from? The Cognitive Space of the Sinaitic Bedouin", *Essays in Northeast African Studies. Senri Ethnological Studies* 43: 189–206.

Tosco, M. (2009) "The Grammar of Space in Gawwada", Brenzinger, M., Fehn, A. (eds.) *Proceedings of the 6th World Congress of African Linguistics, Cologne 2009*, pp. 523–532. Cologne: Köppe.