Encoding spatial information in two sign languages: A Comparison of Ghanaian (GSL) and Adamorobe (AdaSL) Sign Languages

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Visual Spatial Language

- The visual encoding of spatial information in signed languages
  - Use of space, hands and body
  - High potential for iconic representation – visual-spatial expression of visual-spatial information
- Affordances of the modality bring about high degree of similarity between sign languages in the spatial domain (Aronoff et al. 2003; Meier 2002)
  - System of classifier predicates (depicting verbs, Liddell 2003)
  - Simultaneity of expression

Visual Spatial Language

- However, also differences between sign languages in the spatial domain
  - e.g. lack of entity classifier predicates in Adamorobe Sign Language (AdaSL) (Nyst 2007)
- Various factors may contribute to differences in spatial domain
  - Contact with surrounding spoken language (e.g. AdaSL contact with Akan, Nyst 2007)
  - Age of sign languages (Senghas et al. 2004)
  - Make-up of signing community (e.g. urban vs. rural) (De Vos & Pfau 2015)
  - Language-specific structures (Perniss et al. 2015)

Present Study

- Compare the encoding of information about location, motion and action in two sign languages used in Ghana
  - Ghanaian Sign Language (GSL)
  - Adamorobe Sign Language (AdaSL)

Language information

Ghanaian Sign Language (GSL)

- Urban sign language
- Used by Deaf community in Ghana
- Developed after establishment of first schools for the deaf in 1957 (Kiyaga & Moores 2003)
- Estimated 110,625 Deaf people in Ghana (0.4% of population) (Ghana Nat. Assoc. of the Deaf, 2018)
- Language of instruction in Deaf schools

Adamorobe Sign Language (AdaSL)

- Rural sign language
- Used by both deaf and hearing signers in Adamorobe village
- Emerged in the 18th century (Okyere & Addo 1994)
- 40 Deaf people in the village (1.3% of current population of 3000) (down from 2% of a population of 2400, Nyst 2007)
- Older AdaSL signers uneducated; younger AdaSL signers educated in GSL at Deaf schools

Why GSL and AdaSL?

- Very little research on GSL to date
  - Handful of BA/MA theses on phonology, morphology and numeral incorporation

- Typological exceptions in the spatial domain have been described for AdaSL (Nyst 2007)
  - Absence of entity classifier predicates
  - Restriction to real-size spatial projections

Why GSL and AdaSL?

- Since the earlier research on AdaSL, there has been a considerable amount of language contact between GSL and AdaSL
  - Younger Deaf Adamorobeans are being educated in GSL in urban Deaf schools
  - Church services in Adamorobe village used to be interpreted from GSL to AdaSL
    - Now only in GSL due to death of GSL-AdaSL interpreter
  - AdaSL signers exposed to GSL through increased community outreach programs
    - Social pressures to adopt a more widely used sign language (i.e. GSL)

Data Collection

- Signers of GSL and AdaSL watched the *Pear Story* video (Chafe 1980)
  - Full video divided into six parts (approx. 1 minute each) to facilitate retelling, minimising information loss due to memory limitations
- Signers retold the story in their sign language
- Participants
  - GSL signers (N=10)
  - AdaSL signers (N=10)
    - 8 AdaSL signers non-educated
    - 2 AdaSL signers educated and bilingual in AdaSL and GSL

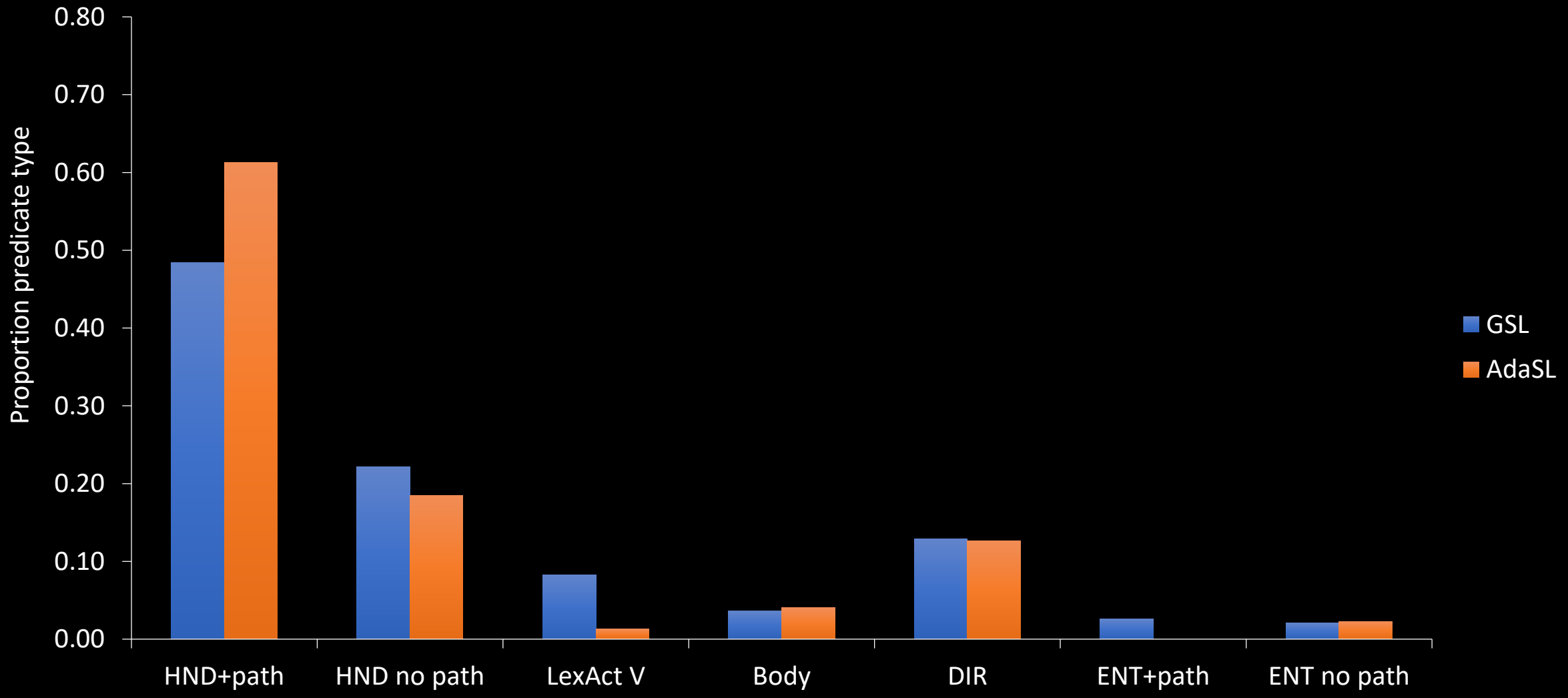
Coding

- Scene by scene coding to allow direct comparison of event encoding between the two sign languages
  - Total of 112 scenes identified in *Pear Story* video and categorised as Location (14), Action (54) or Motion (44) scenes
- GSL and AdaSL signing coded for
  - Predicate type, e.g.
    - Classifier (handling, entity)
    - Directional (e.g. *go*, *come*)
    - Manner verb (e.g. *walk*, *run*)
    - Motion verb (e.g. *meet*, *descend*)
    - Action verb (e.g. *pick, give*)
  - Bimanual simultaneous constructions
  - Serial verbs constructions for event depiction (Nyst 2007)

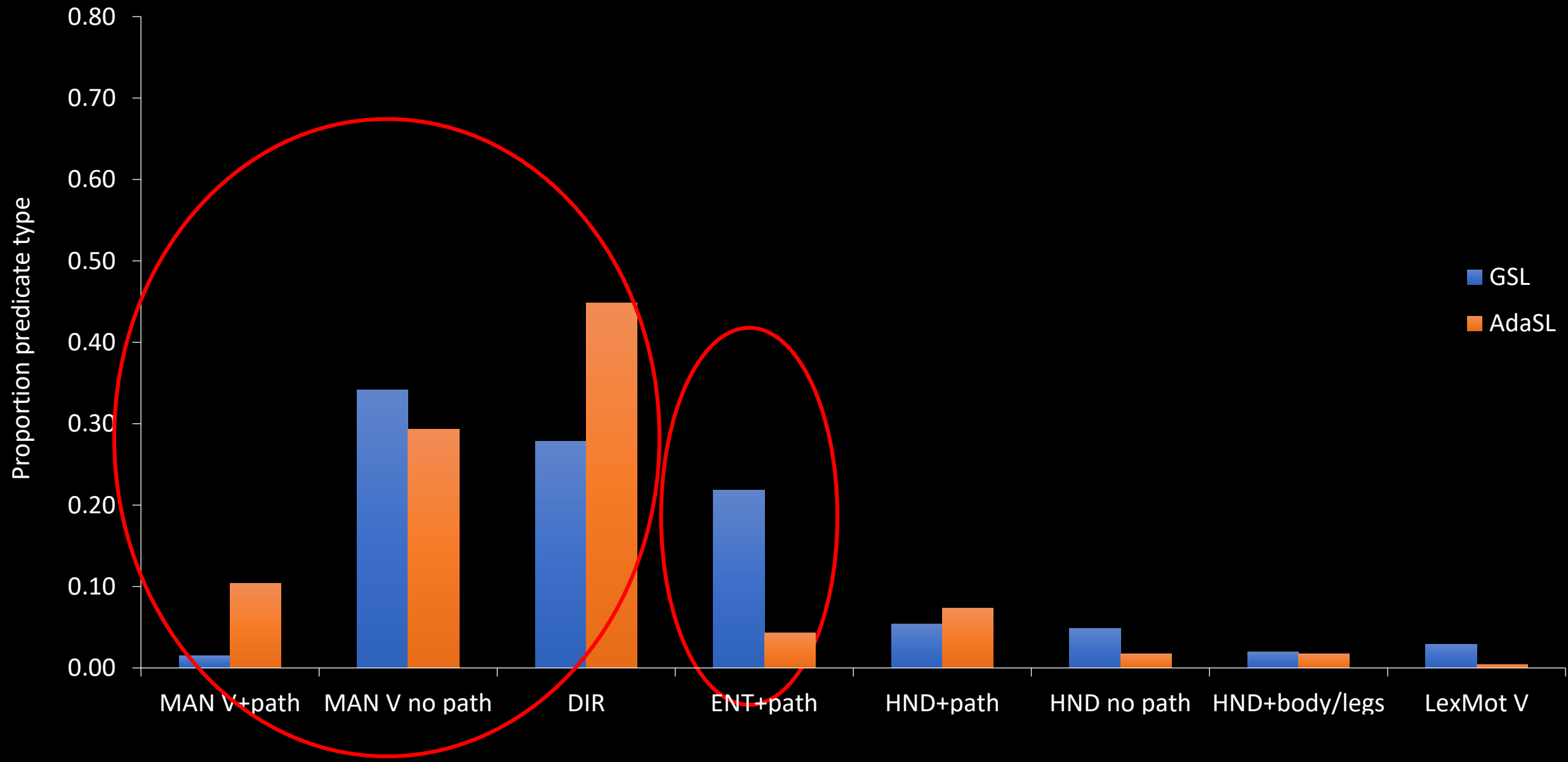
Analysis

- Expression of location, action and motion events
  - **Location**: static location of referents
  - **Action**: agentive transitive action (e.g. picking pear, carrying basket, giving hat to boy)
  - **Motion**: intransitive path motion (e.g. walking, running, riding bicycle)
- Analysed only events/scenes that were encoded by at least 5 signers (half) in each language
  - 0 Location scenes (0/14=0%)
  - 22 Action scenes (22/54=41%)
  - 16 Motion scenes (16/44=36%)

Predicate types in ACTION events



Predicate types in MOTION events



Encoding Motion with Entity classifiers

GSL

RH: CL_E (boy)
LH: CL_E (girl)

GSL

RH: CL_E (boy)
LH: CL_E (girl)

AdaSL

RH: CL_E (boy)
LH: CL_E (girl)

AdaSL

RH: CL_E (boy)
LH: CL_E (girl)

Simultaneous constructions

- Preliminary analysis of the use of bimanual simultaneous constructions in the motion and action event analysed

- Bimanual simultaneous constructions occurred in

	Action events	Motion events
GSL	19%	11%
AdaSL	11%	6%

Types of Simultaneous constructions
(in data subset)

MOTION events

Hand1	Hand2	GSL	AdaSL	Example
Entity CL	Entity CL	✓	✓	boy and girl riding toward each other
Entity CL	Handling CL	✓	✓ (1x)	man moving while dragging goat
Subject ref.	predicate	✓	✓	GIRL + ride bicycle
Directional	manner predicate	✓	✓	GO + ride bicycle
Directional	Handling CL	✗	✓	man goes while dragging goat
Limb CL	Handling CL	✗	✓ (1x)	limping while pushing bicycle

ACTION events

Hand1	Hand2	GSL	AdaSL	Example
Handling CL	Ground obj.	✓	✓	put pear in basket
Handling CL	Handling CL	✓	✓	holding pear while taking bandana off neck
Handling CL	Lex. sign	✓	✓	pick pear + AGAIN
Handling CL	Index (to ref.)	✓	✓	give pear to boy (there)
Handling CL	numeral (number ref.)	✓	✗	give three pears
Handling CL	Entity CL	✓	✗	boy eating pear

Examples of SC depicting Motion

AdaSL

RH: GO
LH:CL_H(hold bicycle)

GSL

RH: CL_E (man, two-legged CL)
LH: CL_H (drags animal)

AdaSL

RH: CL_L (limb)
LH: CL_H (hold bicycle)

GSL

RH: CL_E (boy, two-legged CL)
LH: CL_H (hold bicycle)

Examples of SC depicting Action

AdaSL

RH: CL_E (play tennis)
LH: CL_H (eat/hold fruit)

GSL

RH: CL_H (hold fruit)
LH: CL_H (play tennis)

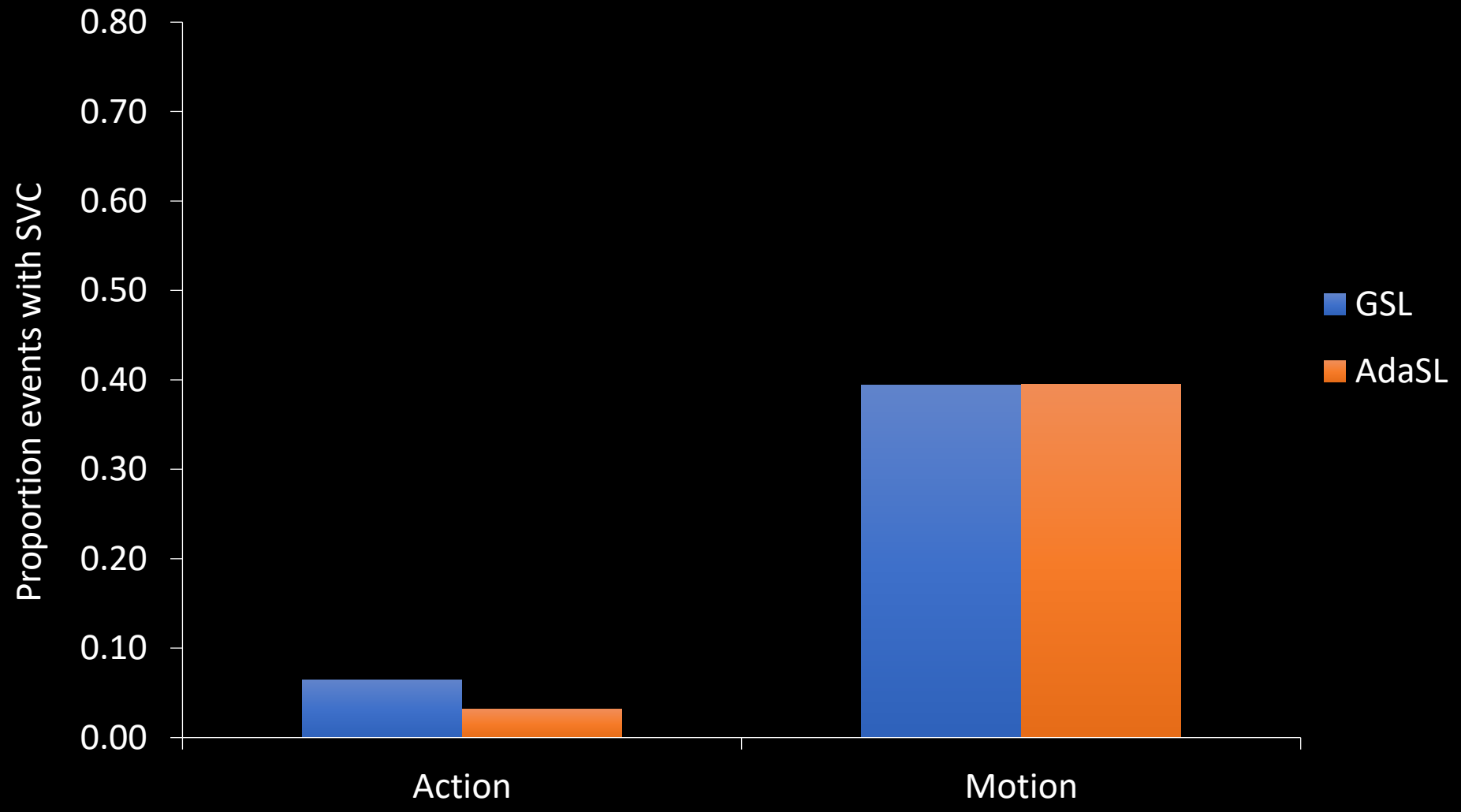
AdaSL

RH: MAN
LH: CL_H (hold pear)

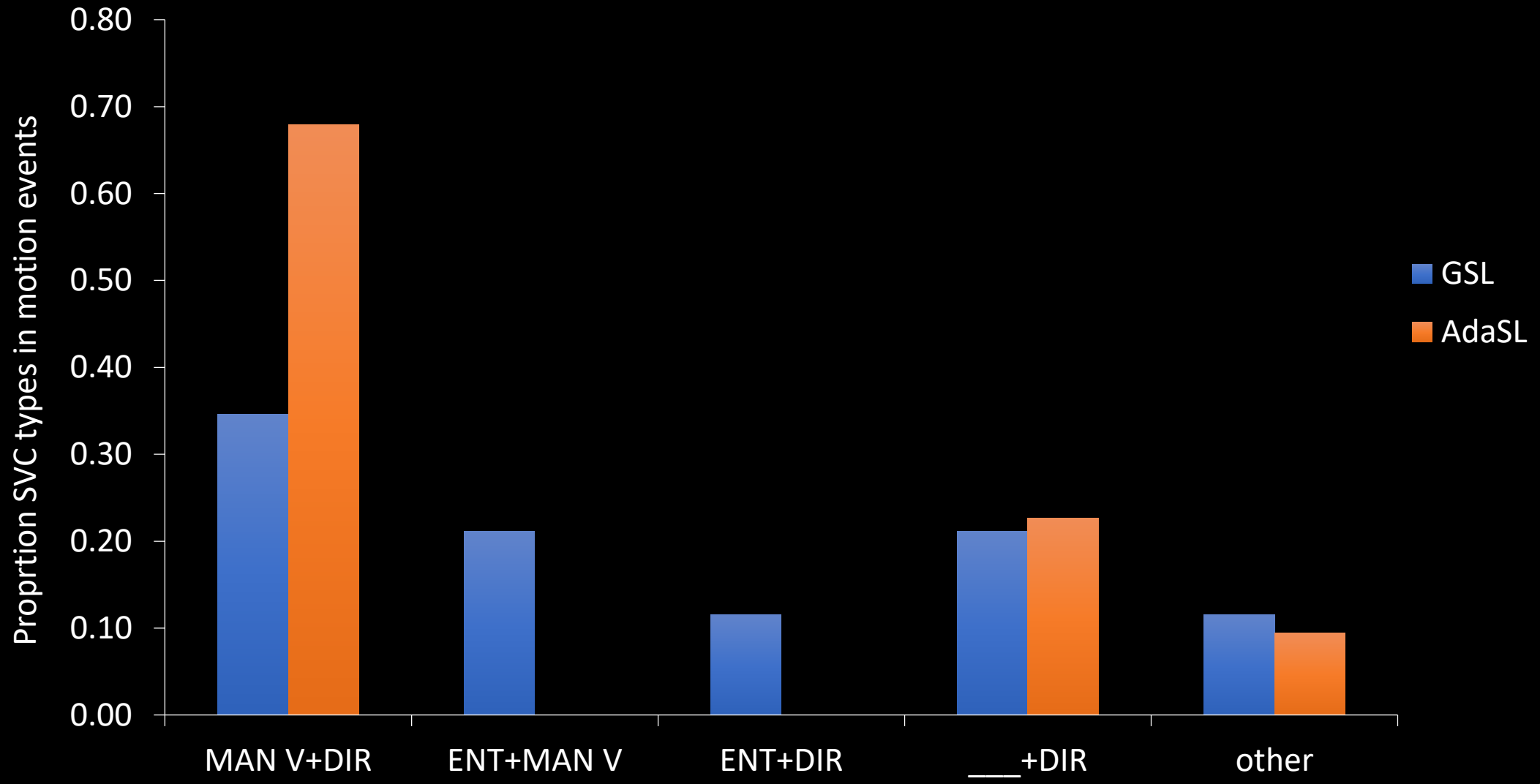
GSL

RH: CL_H (eat)
LH: CL_E (boy)

Serial verb constructions (SVCs)
(in data subset)



Types of SVCs encoding Motion events
(in data subset)



Summary and discussion

- GSL and AdaSL signers used similar strategies overall to express Motion and Action information
  - Action: Mostly handling handshapes (with or without path of object)
  - Motion: Manner verbs and directionals used substantially in both languages
- GSL signers used entity classifiers with path for encoding motion to considerable degree
  - Also occurred in AdaSL motion encoding!
- Higher preference for directional verbs for motion encoding in AdaSL signers compared to GSL signers
- Simultaneous constructions of various types used by signers of both languages
  - About twice as often by GSL signers – but also considerable use by AdaSL signers!
- Serial verb constructions used by signers of both languages to similar extent for action and motion encoding
  - Manner verb plus directional used by both but particularly common for AdaSL (Nyst 2007)
  - Manner verb OR directional plus entity classifiers used in GSL

Effects of GSL-AdaSL language contact?

Entity classifier use in AdaSL

- Nyst (2007) found no use of entity classifiers for motion encoding in AdaSL and no use of reduced-sized event space representation (observer perpective)
  - We found use of entity classifiers in AdaSL for depicting motion of referents
    - Especially for motion seen from a distance (e.g. walking and riding bicycle across field) – less of a reduced-sized event space representation
- 6 out of 10 AdaSL signers used entity classifiers
  - Interestingly, the two GSL-educated (bilingual GSL-AdaSL) signers did not use entity classifiers
  - The two educated signers also did not use any GSL signs (borrowings) in their narrations, in contrast to all other AdaSL signers

Effects of GSL-AdaSL language contact?

Use of simultaneous constructions in AdaSL

- Nyst (2007a,b) found very little use of simultaneous constructions in AdaSL, and of restricted type
  - We found considerable use of simultaneous constructions and of a wide variety of different types in our subset of data, similar to use of SCs in GSL
- Or due to different types of data analysed, and different nature of stimulus videos?
  - Nyst (2007) analysed spontaneous narrations and cartoon retellings (Tweety and Sylvester)
  - Pear Story has human characters in landscape, with actions familiar to both GSL and AdaSL signers

Conclusion

- The visual-spatial affordances of the visual modality give rise to a high degree of similarity in event representation
  - Cross-linguistic investigation is important and reveals differences in sign languages in this domain
- Language contact between GSL and AdaSL may be causing change in AdaSL
  - Emergence of entity classifier system in AdaSL
- Education of AdaSL signers may influence the change in progress
  - Bilingual signers with awareness of knowledge of two different sign languages
  - Avoidance of entity classifiers in AdaSL use as structure belonging to GSL
  - No borrowings from GSL

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