Depicting Signs in Bimodal Bilingual Code Blending
A corpus study

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Bilingualism as a window into linguistic structure

Goals of our talk today:
Investigate a challenging phenomenon for sign language
formal linguistics: depicting signs/classifier predicates

Use data from bimodal bilingual language production to test
theories of:
(a) code-blending and (b) syntactic/semantic structure of
depicting signs (DS)

Bimodal (Sign/Speech) Bilingualism

We will begin with one model of bimodal bilingualism:

Language Synthesis Model
(Lillo-Martin, Quadros, Chen-Pichler, 2016)

Language Synthesis Model:
A bilingual utterance involves a single syntactic
structure and semantic form

Predictions:
1. Bimodal (sign/speech) code-blends should be limited to
material that shares underlying structure and meaning
2. Code-blends can therefore inform syntactic and semantic
theories of each language, including depicting signs

Depicting Signs/Classifier Predicates

Formal Syntactic/Semantic Theories of Depicting Signs

• Common in nearly all sign languages of the world
• Involve:

  - Handshape that reflects the noun class of its arguments
  - Movement and location provide spatial information

Motivation for the term “classifiers”
Motivation for the term “depicting signs”

Supalla 1986; Emmorey 2008; Emmorey and Hirsz 2003; Zwitserlood 2012, a.o.
Depicting signs: **Formal semantics**

- Handshape that reflects the noun class of its arguments.
- Movement and location provide spatial information.
- And a obligatory manner depiction/demonstration that is not morphemic.

Based on a morphemic but "semantically light" verb (e.g. `MOVE/BE-LOCATED`) that agrees with noun class...

Zucchi, Geraci, & Cocchette 2012, Davidson 2015

#### A demonstration code-blended DS: Sound effect = Vocal gesture

From subject (that agrees with handshape)

From location and movement

"The book [a flat object] went like [path movement]"

Emmorey, Borinstein, Thompson, & Gollan 2008

#### Categories of Depicting Signs

<table>
<thead>
<tr>
<th>Entity DS</th>
<th>Handling DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOK</td>
<td>DS, kill-down</td>
</tr>
<tr>
<td>BOOK</td>
<td>DS, fall-down</td>
</tr>
<tr>
<td>BOOK</td>
<td>DS, kill-book</td>
</tr>
</tbody>
</table>

#### Argument Structure (Benedicto and Brentari 2004)

- **Entity DS**: One internal (Non-agent) argument
- **Handling DS**: Same internal + One external agent argument

#### DS Argument Structure (Benedicto and Brentari 2004)
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Goals of our talk today:
Investigate a challenging phenomenon for sign language formal linguistics: depicting signs/classifier predicates

Use data from bimodal bilingual language production to test theories of:
(a) code-blending & (b) syntactic/semantic structure of DS

Prediction 1: DS verbs involve more code-switching (sign only productions) than non-DS verbs and also sound effects
Predicted by demonstration element in semantics

Prediction 2: Entity DS may be code-blended with verbs, objects, prepositions, adverbs, while Handling DS include subjects, too
Predicted by syntactic asymmetry
Data Collection and coding

Adult bimodal bilinguals (Codas)
- 3 from USA (ASL, English)
- 1 from Brazil (LIBRAS, Brazilian Portuguese)

Narratives of “Canary Row” cartoon in US and narrative of Charlie Chaplin short clip in Brazil, always to other bimodal bilinguals
Coding in ELAN: includes utterances in each language, type of verb (e.g, plain, non-plain (including DS)), modality (sign, speech, bimodal), and timing

4 Participants

<table>
<thead>
<tr>
<th>Codas</th>
<th>Sign rating** 1-7</th>
<th>Speech rating** 1-7</th>
<th>Interpreter?</th>
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</thead>
<tbody>
<tr>
<td>FB - Brazil</td>
<td>5</td>
<td>7</td>
<td>no</td>
</tr>
<tr>
<td>B2 - USA</td>
<td>6</td>
<td>7</td>
<td>no</td>
</tr>
<tr>
<td>M4 - USA</td>
<td>7</td>
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</tr>
<tr>
<td>M5 - USA</td>
<td>7</td>
<td>7</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Self-sign rating and native speaker/signer rating

Results

I. Quantitative Overview

II. Examples

Depicting signs are more likely to be produced alone (without speech) compared to other verb types

<table>
<thead>
<tr>
<th>Codas</th>
<th>Total Number DS</th>
<th>Total Number other verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sign only</td>
<td>Bimodal</td>
</tr>
<tr>
<td>FB - Brazil</td>
<td>8</td>
<td>14</td>
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<tr>
<td>B2 - USA</td>
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<td>M4 - USA</td>
<td>6</td>
<td>24</td>
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<tr>
<td>M5 - USA</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

Entity DS

Handling DS
Handling DS blended with subject

DS (climb-up-pipe) so he climbs up that

Handling DS blended with subject

DS (climb-up-pipe) it's-age I (grandmother) (grandmother) 1 (grandmother)

and then, um, takes off the cover and granny's there again

and she beats him.
DS: Entity DS not blended with subject

**Entity DS not blended with subject**

DS(round-belly) DS(cat-rolls-through-wall) DS(knock-down) FS(pins) and then he ends up going to a bowling alley and knocks down all the pins.

**Entity DS not blended with subject**

IX(self) WANT SEE IX(self) DS(cat-climb-up)

I want to see me climb.

**Depicting sign with sound effect**

GO PLACE DS(get-stone) DS(throw-away-stone-to-window) BREAK GLASS. DS(glass-break)

Vainum lugar pega pedra jogapara quebrar o vidro. &=soundeffects. Quebrou, sim. The son goes to a place and throws away the stone to break the window. The glass breaks.

**Depicting sign with sound effect**

NOW FS(he) so now he DS(cat-walking-around) walk walk walk walk walk walk

The son starts walking around.

**Depicting sign with sound effect**

"so Tweety sees this and says"... DS(round-object) BOWLING BALL. DS(lift-ball) DS(drop-ball) ENTER FS(gutter) __ Bowling ball __ drops it down into the gutter.

There is a bowling ball that Tweety drops down into the gutter.

**De picting sign with no speech**

THIRD TIME SO N DS(go-tostone) FS(very-good) DS(ball-going-down-stone) RT FS(ball)

Very good gutter, you know, & sound effects, to fit the ball.

It's a very good gutter to fit the ball from up to down.

DS: "pfht"
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**Result 1:** DS verbs have more code switching (sign only) and more sound effects (vocal gestures) than non-DS verbs. Predicted by demonstration element in semantics.

**Result 2:** Entity DS are code-blended with verbs, objects, prepositions, adverbs, while Handling DS include subjects, too. Predicted by syntactic asymmetry.

Discussion

- Our analysis of code-blends provide more evidence of the morpho-syntactic complexity of depicting signs.
  - Further support for both morphemic and non-morphemic components.
- Results are particularly compatible with theories of bilingualism that predict tight connection between syntax and semantics of both languages.

Looking ahead

Encourage more formal theories of syntax, semantics, and bilingualism that make specific predictions for both monolingual and bilingual language patterns.

More work to be done testing these predictions with much larger data samples than the one we presented, including from:
- conventional linguistic judgments
- corpus studies
- psycholinguistic experiments

Acknowledgments

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Counterexample: Entity DS blended with subject

LAST ONE IX  FS(cable-car) WIRE (DS(at walk across-wire) and he's walking on that)

Synthesis model

A single derivation with the option of using elements from multiple languages

Sample blended syntax

TopP
RABBIT
CP
where
PU
go

Sign: RABBIT PU
Speech: where go
Translation: Where did the rabbit go?

DS Blends with speech

M4(USA) – Partially preserved content in English: verb only
ASL: DS(climb-up-pipe)
English: climb
(He) climbed up the pipe.

M5(USA) – Partially preserved content in English: preposition, article and object
ASL: DS(across-the-street)
English: across the street
(He walked) across the street.

M5(USA) – Partially preserved content in English: verb plus aspect expressed through repetition
ASL: DS(walking-around)
English: walk walk walk walk walk
(He) walked (around continually).