Sitting, standing, and lying in frames: a frame-based approach of stative verbs of location

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• Stative verbs of location (e.g. *stand*, *sit*, *hang*) encode gestalt properties and spatial information, which are perceived by gestalt recognition and spatial orientation.

→ Stative verbs of location (= SVLs) are an excellent object of the investigation of cognition and language (like spatial prepositions and dimensional adjectives).
The garden gnome is located on the mushroom.
The garden gnome is sitting on the mushroom.
• German has a comparatively large set of SVLs of different types:
  \( \text{sich befinden} \) 'be located', \( \text{stehen} \) 'stand', \( \text{liegen} \) 'lie',
  \( \text{sitzen} \) 'sit', \( \text{knien} \) 'kneel', \( \text{hängen} \) 'hang', \( \text{kleben an} \) 'stick (to)',
  \( \text{schwimmen (auf)} \) 'be afloat (in liquid)', ...

• The meaning and use of SVLs in German is well described:
  (Berthele 2004, Gerling & Orthen 1979, Kaufmann 1994, 95;
  Kutscher & Schultze-Berndt 2007, Lang & Carstensen 1990,
  Maienborn 1990, 91; Serra Borneto 1996, Schönefeld 2006,
  Wunderlich & Kaufmann 1990 among others)
Orientation matters

*sehen 'stand'

*legen 'lie'
Der Gartenzwerg steht auf dem Sockel.
'The garden gnome is standing on the plinth.'

Der Gartenzwerg liegt auf der Wiese.
'The garden gnome is lying on the lawn.'
Support matters, too!

*stehe*n 'stand'

support from below
Support matters, too!

hängen 'hang'

support from above
Support matters, too!

*Der Gartenzwerg hängt am Seil/am Galgen.*
'The garden gnome is hanging at the rope/the gallows.'
The supported part (of the body) also matters

- *sitzen* 'sit'
  - supported by bottom

- *knien* 'kneel'
  - supported by knees
Der Gartenzwerg sitzt auf der Schaukel.
'The garden gnome is sitting on the swing.'

Der Gartenzwerg kniet auf der Wiese.
'The garden gnome is kneeling on the lawn.'
'Standing' and 'lying' do not necessarily involve specific parts of the body
...or other objects
nor does 'hanging'
'Standing' and 'lying' are dependent on inherent gestalt properties.

#stehender / liegender Ziegelstein
#standing / lying brick

stehender / (?) liegender Sarg
standing / (?) lying coffin
'Standing' and 'lying' are dependent on inherent object properties

standender / # liegender Sarg
standing / # lying coffin
Spatial knowledge of objects can be captured in object schemata (Lang 1987, 2001)

Object schema for *brick* (Lang 2001):

<table>
<thead>
<tr>
<th>1D</th>
<th>2D</th>
<th>3D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>Across</td>
<td>Min</td>
</tr>
</tbody>
</table>

Object schema for *coffin* (Lang 2001):

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</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>Across</td>
<td>Min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(canonic.) Vert</td>
</tr>
</tbody>
</table>

saliency/prominence of axis
Representation of SVLs in two-level semantics
(Kaufmann 1995)

a. *kneien* 'kneel': $\lambda P \lambda x \ [\text{KNEEL}(x) \ & \ P(x)]$
   b. $\text{Int}(\text{KNEEL}(x)) = \exists y \ [\text{support}_f \ (d-us(y), \ \text{knee}(x))]$

a. *stehen* 'stand': $\lambda P \lambda x \ [\text{STAND}(x) \ & \ P(x)]$
   b. $\text{Int}(\text{STAND}(x)) = \exists y \ [\text{support}_f \ (d-us(y), \ s(prom(x)))]$

a. *liegen* 'lie': $\lambda P \lambda x \ [\text{LIE}(x) \ & \ P(x)]$
   b. $\text{Int}(\text{LIE}(x)) = \exists y [\text{support}_f \ (d-us(y)), \ s(nprom(x))]$

a. *hängen* 'hang': $\lambda P \lambda x \ [\text{HANG}(x) \ & \ P(x)]$
   b. $\text{Int}(\text{HANG}(X)) = \exists y [\text{support}_f \ (d-nus(y), \ \text{side}(x))]$
**knien 'kneel':**

\[ \text{Int}(\text{KNEEL}(x)) = \exists y \ [\text{support}_f(d-\text{us}(y), \text{knee}(x))] \]
Analysis: Framework

• Conceptual knowledge is captured in frame representations.
• Frame representations provide an explicit, variable-free, and cognitively plausible format.
• Frames are defined as recursive attribute-value structures (Barsalou 1992).
• The attributes correspond to mathematical functions.
Der Gartenzwerg kniet.
'The garden gnome is kneeling.'

a. *knen* 'kneel': \( \lambda P \forall x [\text{KNEEL}(x) & P(x)] \)

b. Int(\text{KNEEL}(x)) = \exists y [\text{support}_f(d-US(y), knee(x))]
Der Gartenzwerg ist/befindet sich auf der Wiese.

sein / sich befinden 'be / be located'
Der Gartenzwerg kniet auf der Wiese.
'The garden gnome is kneeling on the lawn.'

a. *knen* 'kneel': $\lambda P \exists x \left[ \text{KNEEL}(x) & P(x) \right]$

b. $\text{Int}(\text{KNEEL}(x)) = \exists y \left[ \text{support}_f(d\text{-us}(y), \text{knee}(x)) \right]$

c. *auf* 'on': $\lambda y \lambda x \left[ \text{LOC}(x, \text{UPPER\_REGION}(y)) & \text{CONTACT}(x,y) \right]$

\[
\text{garden gnome} \xrightarrow{\text{figure, theme}} \text{location} \xrightarrow{\text{ground}} \text{lawn} \xrightarrow{\text{upper region}} \text{upper region} \xrightarrow{\text{gestalt}} \text{kneeling gestalt} \xrightarrow{\text{knees}} \text{under-side} \xrightarrow{\text{supporter}} \text{deict. upper side} \xrightarrow{\text{physical state}} \text{solid}
\]
Der Gartenzwerg kniet auf der Wiese.
'The garden gnome is kneeling on the lawn.'

a. *knien* 'kneel': $\lambda P \forall x [\text{KNEEL}(x) \& P(x)]$
b. $\text{Int}($KNEEL$(x)) = \exists y \ [\text{support}_f(d\text{-us}(y), \text{knee}(x))]$
c. *auf* 'on': $\lambda y \forall x [\text{LOC}(x, \text{UPPER_REGION}(y)) \& \text{CONTACT}(x,y)]$
Der Gartenzwerg sitzt auf der Schaukel.
'The garden gnome is sitting on the swing.'
Object schema of Ziegelstein 'brick'

<table>
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saliency/prominency of axis: 1D > 2D > 3D
Der Ziegelstein liegt auf dem Tisch.
'The brick is lying on the table.'

lying bricks

liegen 'lie': maximal axis (1D) = horizontal
Der Ziegelstein liegt auf dem Tisch.
'The brick is lying on the table.'
Der Ziegelstein steht auf dem Tisch.
'The brick is standing on the table.'

stood bricks

steinen 'stand': minimal axis ≠ vertical


\[ \text{stehen 'stand': option 1} \]

option 1:
minimal axis (3D) ≠ vertical
\[ \rightarrow \] minimal axis = horizontal

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**Diagram:**
- **standing gestalt**
  - **3D orientat.** horiz.
  - **supporter**
    - deict. upper side
  - **deictic underside**
  - **physical state** solid

**Nodes:**
- **ground**
- **region**
- **figure**
- **theme**
- **location**
- **gestalt**
Der Ziegelstein steht auf dem Tisch.
'The brick is standing on the table.'
saliency/prominency of axis: 1D > 2D > 3D
Der Sarg steht in der Kapelle.
'The coffin is standing in the chapel.'
**stehen 'stand': option 2**

**option 1:**
canonical vertical = vertical

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Diagram:
- Standing gestalt
- Supporter
- Deictic underside
- Canonical vertical
- Orientat.
- Vert.
- Ground
- Region
- Figure
- Theme
- Location
- Gestalt
Der Sarg steht in der Kapelle.
'The coffin is standing in the chapel.'
Animacy restriction in French

a. *Maurice se trouve / est allongé / est couché dans le pré.
   'Maurice is / is lying / is lying on the meadow.'

b. Le livre *se trouve / *est allongé / *est couché sur la table.
   'The book is / *is lying / *is lying on the table.'
Animacy restriction in French

être allongé(e) / être couché(e):

- lying human gestalt
  - 1D orientat. horiz.
  - supporter
    - deictic underside
  - deictic upper side
  - physical state
  - solid
- figure
  - theme
  - location
  - upper region
  - ground
  - region
Korean *seta* 'stand'

a. *Ku*  

kenmwul-i namtaymwun-yeph-ey se-iss-ta.

the building-NOM south.gate-side-LOC stand-be-IND

'The building stands next to the South Gate.'

Song (2002:361)

b. * *Ku*  

hwapwun-i namdaymwun-yeph-ey se-iss-ta.

the flower.pot-NOM main.gate-side-LOC stand-be-IND

intended: 'The flower pot stands next to the main gate.'

Song (2002:361)

Song (2002):  

*seta* 'stand' + non-human subject

→ HEIGHT(subj. referent) ≥ HEIGHT(human)
The Buckingham Palace is standing in front of my eyes.
seta 'stand': non-human figure
seta 'stand': human figure

Diagram:
- Figure
- Ground
- Region
- Location
- Gestalt
- Standing human gestalt
- Vertical
- Orientat.
- Canonic.
- Supporter
- Deictic underside
- Deict. upper side
- Physical state
- Solid
Advantages of a frame analysis of SVLs

- All the elements of a location scenario (figure, ground, locational relation, type of support, ...) are captured by frame representations
  → no extra-representational format

- The combinatorics of the elements of a location scenario is captured technically by the unification of the frames of the parts.

- The representation format allows for easy access to the relevant object properties

- Frame representations show a flexible degree of complexity (zooming in and out by expanding/not expanding nodes)
Bleiben Sie *sitzen*, wir *stehen* Ihnen für Fragen zur Verfügung!
Please, remain **seated**, we will **lie** back and await your questions!