Identifying and Comparing Semantic Relations across Signed and Spoken Languages

(language of presentation: English)

Anonymised for Review

Little research has been carried out in the field of semantic networks for sign languages to date. Here, we present an approach that identifies semantic relations (see Table 1) between three sign languages and their surrounding spoken languages: British Sign Language (BSL), Australian Sign Language (Auslan) and English; and Swiss German Sign Language (DSGS) and German. This analysis will also determine whether semantic relations observed between sign language/spoken language pairs are similar cross-linguistically, whether the languages are historically related or not.

Our data consists of entries from a BSL lexical database of around 2500 signs (Cormier et al., 2012), an Auslan database of approximately 5000 signs (Johnston, 2001), and a DSGS database of approximately 4500 signs (Boyes Braem, 2001). Within each database, all signs are represented with an ID gloss (i.e. a unique identifying label; Johnston, 2003) and a set of keywords (i.e. translation equivalents in English or German to express the range of meanings that lexical item can have).

Using the keywords within each database, we searched for pairs of lexical items that constituted a semantic relation in a wordnet of the corresponding spoken language (Princeton Wordnet for English (Miller, 1993) and German GermaNet (Hamp and Feldweg, 1997)). For every relation obtained that was valid for the corresponding spoken language, we indicated whether this relation holds for the sign language under consideration. Once completed, we compared semantic relations across pairs (e.g., BSL/English, Auslan/English, and DSGS/German) to identify any similarities.

Results show that semantic relations valid for the spoken language are often not valid for the corresponding sign language. For example (as reported in Ebling et al., 2012), Künstler (‘artist’) is a hypernym of Musiker (‘musician’) in German. In DSGS, however, KUNSTLER (depicting painting) is restricted to the meaning of a visual artist, e.g., a painter. Additionally, TRAINING (‘practice’) is confined to physical activity in DSGS, but may involve any sort of training in German. Hence, Training is a valid hyponym of Lehren (‘instruct’, ‘teach’) in German but not in DSGS. For English and BSL/Auslan, fry is a hyponym of cook in

English, and BSL/Auslan FRY (depicting a flat entity on both sides) is a hyponym of BSL COOK (depicting handling of a saucepan) and Auslan COOK (depicting handling of something with both hands) but not of BSL/Auslan COOK2 (depicting mixing in a bowl). Additionally, the semantic extension of many English words is different from that of BSL and Auslan. For example, in English, eat has hypernyms have, damage, and worry, but BSL/Auslan EAT does not have as hypernyms BSL/Auslan HAVE, DAMAGE, or WORRY.

Comparisons suggest that semantic relations between each sign language and its corresponding spoken language are quite similar. This appears to be due in part to the prevalence of iconicity in sign languages. Some differences may also be linked to the relative size of sign language lexica compared to spoken languages (Johnston & Schembri, 1999).
GOTT, ALLMÄCHTIGER, HERR, VATER ('God', 'Almighty', 'Lord', 'Holy' 'Father') is a hyponym of GROSSVATER, OPA, GROSSPAPA ('grandfather', 'granddad').

<table>
<thead>
<tr>
<th>Relation</th>
<th>Reverse Relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>synonymy</td>
<td>synonymy</td>
</tr>
<tr>
<td>antonymy</td>
<td>antonymy</td>
</tr>
<tr>
<td>hyperonymy</td>
<td>hyponymy</td>
</tr>
<tr>
<td>hyponymy</td>
<td>hyperonymy</td>
</tr>
<tr>
<td>meronymy</td>
<td>holonymy</td>
</tr>
<tr>
<td>holonymy</td>
<td>meronymy</td>
</tr>
</tbody>
</table>

Table 1: Common semantic relations

References


