

## General learner strategy in ambiguous pronoun resolution

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**Background:** Previous research on L2 pronoun resolution has found that resolving more complex pronominal forms (e.g., overt pronouns in a pro-drop language) constitutes a major challenge for L2 learners, compared to more reduced counterparts (i.e., null pronouns). Learners often exhibit a preference for more salient antecedents (e.g., subjecthood, topic-hood and first-mention) for complex pronouns linked to less salient antecedents, which is often explained by L1 influence [5]. However, this observation is also compatible with an L1-independent general learner strategy of preferring the more accessible referent for all pronominal forms [3,4]. The current study aimed to investigate the role of L1, general learner effects, and their interaction with L2 proficiency in anaphoric pronoun resolution. We examined how Chinese and Spanish learners interpret more reduced personal pronouns (PPs, *er/sie* “he/she”) and more complex demonstrative pronouns (DPs, *der/die* “that”) in German.

**Predictions:** If learners have acquired the form-specific division of labor between PPs and DPs, they are expected to show a subject preference for PPs and an object preference for DPs. When learners exhibit target-deviant interpretation, we can further investigate whether the pattern is due to the L1 transfer or to the general learner strategy. If L1 influences pronoun resolution in the L2, Spanish learners are expected to exhibit an object antecedent preference, while the interpretation of Chinese learners should be strongly biased toward the subject antecedent. By contrast, if two learner groups do not differ from each other, it indicates an L1-independent learner strategy. In this case, both learner groups should generally prefer the more accessible subject antecedent regardless of pronominal forms. Finally, according to the *Shallow Structure Hypothesis* [1], learners rely more on discourse-contextual information than syntactic information in L2 processing. If so, learners' resolution may vary as a function of clause type (i.e., “before” vs. “while” contexts).

**Method:** We recruited 34 German native speakers, 61 intermediate to advanced Spanish and 64 Chinese learners of German for an eye-tracking experiment using the Visual World Paradigm. Participants were viewing a picture, where two potential antecedents were presented, while listening to a sentence containing either a PP or DP (Figure 1, left). Pronominal forms were configured either in a “before” or a “while” clause (Figure 1, right). After this sentence, participants heard a question that prompted them to resolve the pronoun to one of the two potential referents. In addition, participants were required to fill out a background questionnaire and take a LexTALE vocabulary test [2] and a cloze grammar test.

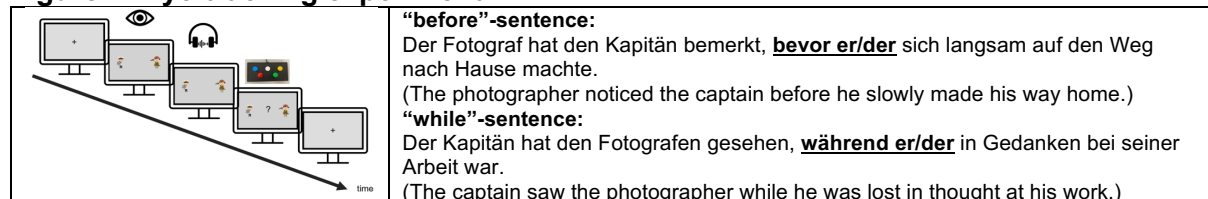
**Results:** As Table 1 shows, online (Table 1a), different from the L1 speakers, L2 learners elicited more fixation on the subject referent for both PPs and DPs, suggesting a default general learner effect. A linear mixed-effects model on log-odds transformed fixation data of both learner groups revealed a significant main effect of pronominal form and L1 (Table 1b). Offline (Table 1c), a generalized linear mixed-effects model revealed a significant main effect of L1, pronominal form, and discourse relation realized by the conjunctions (“before” vs. “while”). No significant interaction was found in online or offline processing in comparison of the two learner groups. Moreover, high proficiency levels, as measured by the grammar task, were positively correlated with the target-like interpretation of DPs in forced choices, but not in the online processing.

To conclude, it is extremely difficult for L2 learners to acquire the division of labor between PPs and DPs. L2 learners tend to rely on a general learner strategy and place more weight on discourse information. However, learners can reduce their reliance on general learner strategies and approach a target-like interpretation as proficiency increases.

## References

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**Figure 1: Eye-tracking experiment**



**Table 1: Online and offline results**

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ONLINE  | <p><b>a</b></p> <p>Figure a: Proportional looks to the subject referents over the course for native German speakers, L1 Spanish L2 German learners, and L1 Mandarin L2 German learners. (The dashed vertical line at 0ms indicates the pronoun onset.)</p>                                                                                                                                                                               | <p><b>Abbreviations:</b><br/>DE: L1 German speakers (blue)<br/>DEES: Spanish learners of German (yellow)<br/>DECN: Chinese learners of German (red)</p> <p>PP: Personal pronoun<br/>DP: Demonstrative pronoun</p>                                                                                                                                                                                                                                                                                                                                                                                                         |
|         | <p><b>b</b></p> <p>Figure b: Average log odds and error bars of looks to subject antecedents, relative to object antecedents across the three groups L1 German (DE), L1 Spanish-L2 German learners (DEES) and L1 Mandarin-L2 German learners (DECN) (A positive value indicates increased looks towards the subject referent than toward the object referent, while a negative value indicates more look toward the object referent)</p> | <p><b>Comparison between two learner groups (in each time window):</b></p> <ul style="list-style-type: none"> <li>Significant main effect of L1</li> <li>Significant main effect of pronoun</li> <li>No significant main effect of discourse relation</li> <li>No significant interactions</li> </ul> <p>No correlations between L2 proficiency and target interpretation of personal and demonstrative pronouns</p>                                                                                                                                                                                                      |
| OFFLINE | <p><b>c</b></p> <p>Figure c: Mean and standard error of subject antecedent preference in percentage of each group (L1 German (DE), L1 Spanish-L2 German (DEES) and L1 Mandarin-L2 German (DECN))</p>                                                                                                                                                                                                                                     | <p><b>Comparison between two learner groups:</b></p> <ul style="list-style-type: none"> <li>Main effect of pronoun (estimate = -0.3056, SE = 0.0658, z = -4.643, p = 3.44e-06***)</li> <li>Main effect of L1 (estimate = 0.2984, SE = 0.1051, z = 2.839, p = 0.0045**)</li> <li>Main effect of discourse relation (estimate = 0.3139, SE = 0.0784, z = -4.005, p = 6.21e-05**)</li> <li>No significant interaction</li> </ul> <p>Positive correlation between L2-proficiency and target interpretation of demonstrative pronouns (Chinese learners: r = 0.33, p = 0.00015***; Spanish learners: r = 0.065, p = 0.479)</p> |