

Projection variability in Paraguayan Guaraní

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Tonhauser, Beaver, Roberts, and Simons 2013 (*Language*, henceforth TBRS) found that Paraguayan Guaraní (Tupí-Guaraní) translations of English expressions associated with projective content are also associated with projective content. For instance, the content of the complement (CC) of Guaraní *-kuaa* ‘know’ in (1) projects out of the polar question, as in the English translation.

- (1) Sándra=pa oi-kuaa iñ-ermána hy’e guasu=ha? For English, Tonhauser, Beaver,
Sandra=q A3-know B3-sister stomach big=NMLZ and Degen 2018 (*Journal of Se-*
‘Does Sandra know that her sister is pregnant?’ *mantics*, henceforth TBD) re-

cently found substantial variability in the projectivity of projective content (see also, e.g., Karttunen 1971 on English and Xue and Onea 2011 on German). Taken together, these findings give rise to the hypothesis that there is projection variability in Guaraní and that there are cross-linguistic parallels in the projectivity of utterance content. The current work finds support for these hypotheses in two experimental investigations of projectivity in Guaraní that were conducted in Paraguay. This finding supports projection analyses that derive projectivity from truth conditional meaning and general pragmatic principles (e.g., Abrusán 2011, 2016; Simons et al. 2010; Beaver et al. 2017).

Pilot (n=5). The pilot had two goals: i) to identify whether Guaraní speakers are comfortable giving gradient projectivity ratings (TBRS collected categorical ones), and ii) to investigate the projectivity of the CC of 9 clause-embedding predicates: the cognitive predicates *-kuaa* ‘know’, *-hecha-kuaa* (see-know) ‘understand, realize’, *-juhu* ‘discover’, *-mo’ã* ‘think’, *-ha’arõ* ‘hope’, the emotive predicates *-gueroĩ* ‘be ashamed’, *-vy’a* ‘be happy’, *-ñembyasy* ‘regret’, and the assertive predicate *-mombe’u* ‘tell, confess’. The 9 stimuli were polar questions that combined the 9 predicates with the same proper name subject and the same complement; see (1) for *-kuaa* ‘know’. 5 native Guaraní speakers (also fluent in Spanish) were instructed to imagine that they were over-hearing a man called Samuel (who they don’t know) talking on his phone and asked to assess whether Samuel is certain that Sandra’s sister is pregnant. They responded on a 5-point Likert scale labeled (in Spanish) with ‘he’s not sure’ (indicating non-projection; coded as 1) at one end and ‘he’s very sure’ (maximal projection; 5) at the other. (Paraguayan schools use a 5-point system, with 5 the best grade.)

Results: Participants found it easy to respond on the scale and did not report difficulties with the task. As shown in Table 1, ratings were lowest for translations of English non-factives, *-mo’ã* ‘think’ and *-ha’arõ* ‘hope’, as expected. The observed projection variability mirrors what TBD observed for English: e.g., the CCs of emotive predicates were (numerically) more projective than those of cognitive ones.

Experiment (n=30). The experiment investigated the projectivity of content associated with 17 Guaraní expressions already explored in TBRS or translations of English expressions explored in TBD: the appositive content of non-restrictive relative clauses (NRRCs), the possession content of possessive NPs, the pre-jacent of exclusive *=nte* ‘only’, the polar content of proximal *haimete* ‘almost’, the pre-state content of a change-of-state expression and the CC of the 12 predicates *-kuaa* ‘know’, *-kuaa-uka* ‘point out’, *-juhu* ‘discover’, *-topa* ‘discover’, *-hecha* ‘see’, *-hecha-uka* ‘show, reveal’, *-hecha-kuaa* ‘realize’, *-vy’a* ‘be happy’, *-hendu* ‘hear’, *-mo’ã* ‘think’, *-’e* ‘say’ and *-mombe’u* ‘tell,

Table 1: Mean certainty rating by predicate (standard deviation in parens)

Predicate	Mean (sd)
<i>-vy’a</i> ‘be happy’	5 (0)
<i>-gueroĩ</i> ‘be ashamed’	5 (0)
<i>-ñembyasy</i> ‘regret’	4.8 (.4)
<i>-hecha-kuaa</i> ‘realize’	4.4 (.9)
<i>-mombe’u</i> ‘tell, confess’	4 (1.7)
<i>-kuaa</i> ‘know’	3.6 (2.3)
<i>-juhu</i> ‘discover’	3.4 (1.7)
<i>-mo’ã</i> ‘think’	3.2 (1.3)
<i>-ha’arõ</i> ‘hope’	1.75 (1.5)

confess'. Two polar questions each were formed with these 17 expressions, for a total of 34 polar questions. To minimize variability, the lexical content of each pair was similar, as shown for the

- (2) a. Sándra lóro=*pa* hasy?
Sandra parrot=*q* A3.sick
'Is Sandra's parrot sick?'
b. Mário ryguasú=*pa* o-kuru?
Mario chicken=*q* A3-brood
'Is Mario's chicken brooding?'

questions with possessive NPs in (2); all polar questions featured only third person singular proper name subjects and realized the question clitic =*pa* on the first constituent. 6 non-projective controls served as attention checks. The stimuli were recordings of utterances of the 34 target and 6 control polar questions by a female Guaraní speaker. 30 native Guaraní

speakers (fluent in Spanish; 19 women, 11 men) listened to the utterances in a pseudo-randomized order. They were told that these utterances were made by somebody called Magda who they overheard talking on the phone. They were asked (in Spanish) how certain Magda is about the relevant content and responded on a 5-point Likert scale labeled 'no certainty' (1; no projection) at one end, 'low certainty' in the middle (3) and 'a lot of certainty' (5; maximum projection) at the other end.

Results: As shown in the box plot in Fig. 1, there is by-expression variability in certainty ratings.

As expected, mean ratings were lowest for controls and *-mo'ã* 'think' (2.3 and 2.6). Parallel to TBD's findings for English, mean ratings were highest for NRRCs and possessive NPs (4.4 and 4.5). Confirming findings from TBRS, mean ratings for =*nte* 'only' and *haimete* 'almost' were lower, at 3.5 (both). A mixed-effects ordinal regression model predicting rating from expression (reference level: controls) and random by-participant and by-item intercepts was fit to the data (1129 data points). Pairwise differences were identified by the `lsmeans`

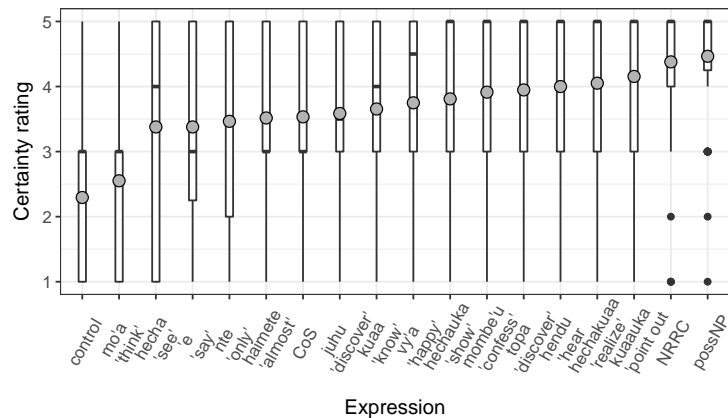


Fig. 1: Certainty ratings by expression, including controls. Grey dots indicate means, notches indicate medians

package using the Tukey multiple-comparison test. The analysis revealed that all contents except for the CC of *-mo'ã* 'think' are projective compared to the controls, in line with TBD's finding for English that projectivity is a gradient property of utterance content. The analysis also revealed that the contents of NRRCs and possessive NPs are more projective than those of the change-of-state expression, *haimete* 'almost', *-hecha* 'see', *-juhu* 'discover', *-e* 'say' and =*nte* 'only'; these findings and the observed by-participant variability again mirror those of TBD for English.

Discussion.

The results of both investigations support the hypothesis that there is projection variability in Guaraní. Given that Guaraní is genetically unrelated and typologically different from English, this suggests that projection variability is a cross-linguistic property of utterance content. The observed parallels between English and Guaraní provide cross-linguistic evidence for Simons's (2001) claim that at least some projective content is nondetachable (Grice 1975). This, in turn, challenges conventionalist projection analyses (e.g., Heim 1983; van der Sandt 1992), which do not lead us to expect parallels in projection variability, and support analyses that derive projectivity from truth conditional meaning and general pragmatic principles (see references above).