**Number, animacy, and individual variation in the processing of cataphora**

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**Introduction:** Encountering a potentially cataphoric pronoun triggers the comprehender to search actively for a referent with compatible features [1-3]. This study tests how that search is modulated by number and animacy cues, across sentences with cataphoric *they* vs. either s*/he* or *it*. North American English is a notable testing ground: its pronoun system is undergoing change [4-6], with 'definite singular' uses of *they* (*dsT*) emerging for animate referents (1). For a reading time study, we recruited participants representing different generations and degrees of familiarity with *dsT*, finding differential RTs depending on grammatical context and comprehender demographics.

**Background:** Cataphora (a.k.a. backwards anaphora) involves a referential dependency where the proform precedes its referent/binder. Cataphoric pronouns are processed actively [3], in a way sensitive to grammatical constraints [2,7] and involving abstract predictions [8]; evidence for this generalization comes mostly from gender mismatch effects (as in (2)). Number mismatch effects (NMEs) have been observed too: for early '00s British English [1], Dutch [8], and contemporary American English [9], most clearly in *s/he*…PL configurations. For *they*…SG cases, NMEs seem to be less robust, and might be more fleeting [8] or emerge later [9]. For American English, there is evidence that younger and non-cisgender (e.g., transgender, nonbinary) comprehenders experience less of a NME given *they*…SG [9]. This latter finding aligns with offline acceptability of *dsT*, which tends to be rated best by speakers from those social groups [10,11].

**Design:** Building directly on [9] and [12], we designed a study on cataphora using the L-Maze method [13,14]. It comprises two 2x2 subexperiments with 28 itemsets each (plus 40 more fillers). Exp1 had a {*s/he*|*they*}…{HUM.SG|PL} design, with an intervening VP biasing a high-animacy reading of the pronoun (3); intended to replicate [9], it tests the extent to which individuals actively predict *dsT*. Exp2 had a novel {*it*|*they*}…{INAN.SG|PL} design, with an inanimate-biasing predicate (4); since *dsT* is restricted to animates, this provides a good baseline for the social-variable manipulation of Exp1. Participants (N=80) have been recruited from a pool of respondents to an earlier large demographic–sociolinguistic survey [12]. Online data collection is ongoing, via Prolific and PCIbex [15]; we aim for N=100, across four social bins (Table 1) crossing older/younger sociolinguistic generation (cf. [16]) and high/low *dsT*-familiarity score (derived from [12]).

**Results:** First, the linguistic manipulations (Fig1,Fig2,Table2). Echoing [9], singular and plural cataphors are processed asymmetrically. NMEs after *s/he* (Exp1) and *it* (Exp2) are robust and immediate, and in Exp1 they spill over into the next region. But there is little evidence for NMEs after *they* – even given inanimate-biasing verb-cues (as (4)), which should exclude the possibility of *dsT*. Next, the social variables (Table3). Age is a good baseline predictor of RTs, unsurprisingly; main effects of *dsT*-Familiarity could be confounded with age. There are also unexpected three-way interactions involving age. At the *they*…SG spill-over region in Exp1, the NME seems to be more dramatic for younger participants (countering expectations, and contrasting with [9]); given a slow RT baseline in the older generation, perhaps for them the *they*-NME wraps up before the spill-over region. Exploratory analyses will look for correlations with other social variables [12], and with acceptability judgements of *dsT* from a short survey that occurred after the maze task.

**Discussion:** Results show that singular and plural cataphors are not processed alike; whether interpreted animate or inanimate, *they* evokes strikingly weak number-feature expectations. This may be rooted in the formal representation of plural [cf. 17], which has been argued to be underspecified [18]. Insofar as *dsT* is actively anticipated, age and *dsT*-familiarity are not good predictors of that real-time parse here. Yet unresolved is whether there are any contexts in which [19], or individuals for whom, *they* evokes strong expectations for number, PL or SG. Our future socio-psycholinguistic work will address these issues with other real-time methods, like G-Maze or eyetracking, in combination with more direct measures of individuals' use/acceptability of *dsT*.

(1) %**My cousin**$_1$ got **their**$_1$ leg broken. ~ #**My table**$_1$ got **their**$_1$ leg broken. *dsT: only anim.*

(2) a. When **he**$_1$ smiles, my **uncle**$_1$ squints.
b. When **he**$_1$ smiles, my **#aunt**$_1$ squints. *Gender mismatch effect = RT(#aunt) > RT(uncle)*

(3) **Exp1 (Hum):** cataphor, {*s/he* vs. *they*} x human matrix subject, {SG vs. PL}
*Sample itemset:* When **she/they** exercise/s at home, the **reporter/reporters** miss/es the librarian's/s' enthusiastic encouragement.

(4) **Exp2 (Inan):** cataphor, {*it* vs. *they*} x inanimate matrix subject, {SG vs. PL}
*Sample itemset:* After **it/they** was/were replanted last spring, the **elm/elms** protected the petunia/s from harsh sunlight.

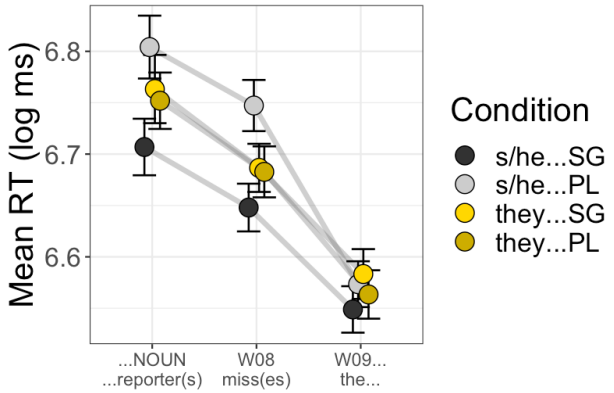


Fig1: Results at critical regions of **Exp1 (Hum)**

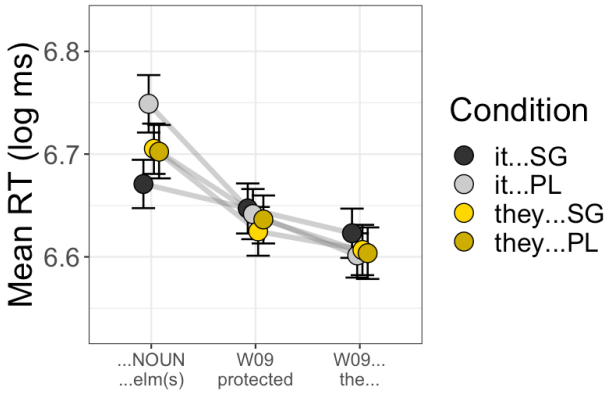


Fig2: Results at critical regions of **Exp2 (Inan)**

| | MORE familiar with *dsT* | LESS familiar with *dsT* |
|---|---|---|
| OLDER (born before '80) | N=11 | N=20 |
| YOUNGER (after '89) | N=24 | N=25 |

Table1: Participant breakdown by sociolinguistic generation and *dsT*-familiarity (goal: N=25 each)

| | Exp1 (Hum) | | Exp2 (Inan) | |
|---|---|---|---|---|
| | Noun | Spill | Noun | Spill |
| CATAPHOR | | | | |
| MISMATCH | *** | *** | *** | |
| CAT:MIS | *** | *** | * | |

Table2: Significance codes for lm's of log RTs (*** $p$<0.001, ** $p$<0.01, * $p$<0.05, . $p$<0.1)

| | SOCIALVAR = Generation | | | | SOCIALVAR = *dsT*-Familiarity | | | |
|---|---|---|---|---|---|---|---|---|
| | Exp1 (Hum) | | Exp2 (Inan) | | Exp1 (Hum) | | Exp2 (Inan) | |
| | Noun | Spill | Noun | Spill | Noun | Spill | Noun | Spill |
| CATAPHOR | | | | | | . | | |
| MISMATCH | *** | *** | *** | | *** | *** | ** | |
| SOCIALVAR | *** | *** | *** | *** | * | * | . | * |
| CAT:MIS | *** | *** | ** | | *** | *** | * | |
| CAT:SOC | | | | | | | | . |
| MIS:SOC | | | | | | | | |
| CAT:MIS:SOC | | * | * | | | | | |

Table3: Sig. codes for lm's. CAT = *s/he/it* vs. *they*; MIS = *s/he/it…SG* & *they…PL* vs. *s/he/it…PL* & *they…SG*

**References:** **[1]** Van Gompel & Liversedge (2003), *Journal of Exp Psych.* **[2]** Kazanina et al (2007), *JML*. **[3]** Giskes & Kush (2021), *Mem & Cog*. **[4]** Bjorkman (2017), *Glossa*. **[5]** Conrod (2019), U Washington diss. **[6]** Konnelly & Cowper (2020), *Glossa*. **[7]** Kush & Dillon (2021), *JML*. **[8]** Giskes & Kush (2022), *Glossa PsyLx*. **[9]** Foley & Ahn (submitted), ms. USC/Princeton. **[10]** Conrod (2022), *J of Lang & Sexuality*. **[11]** Camilliere et al (2021), *Proc of the Cog Sci Society*. **[12]** Ahn & Conrod (forthcoming), ms. Princeton/ Swarthmore. **[13]** Freedman & Forster (1985), *Cognition*. **[14]** Boyce et al (2020), *JML*. **[15]** *Zehr & Schwarz* (2018), PCIbex. **[16]** Tagliamonte (2023), NWAV talk, Queens College. **[17]** Patson (2014), *Lang & Ling Compass*. **[18]** Sauerland (2008), In *Phi Theory*, eds Harbour et al. **[19]** Moulton et al (2020), *Glossa*.