Social information in reference resolution: Last names and gender bias

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Whether I refer to someone as Lisa, Lisa Hahn, Professor Hahn or Hahn is influenced by many linguistic and social factors. We focus on the phenomenon of referring to people with last-name only (e.g. *Holmberg came in, Ramirez was promoted*, ex.1). Although last-name-only does not have an explicit gender marker, in many contexts in the U.S. (e.g. politics, sports, academia, science, conversation), men are more likely to be referred to by last-name-only than women (male bias, e.g. [1],[4], see also [2] for production and recall data). Moreover, referring to a researcher by last-name-only results in them being judged more famous (eminence bias [1]).

We conducted 5 studies on English to test the robustness and the source(s) of the male bias associated with the last-name-only style, focusing on the U.S. context. All studies used sentence completion (20 targets, 22 fillers): People read sentences ending in 'because + pronoun' (ex.2-7) and wrote continuations. We controlled verbs' implicit causality (IC): when followed by an explanation relation indicated by 'because,' some verbs are known to elicit mostly subject (IC1) and others mostly object (IC2) continuations (see e.g. [2] for norms). We used a balanced mix of IC1+IC2, based on [3], to minimize effects of grammatical role. The verbs were also balanced for valence (e.g. IC1: *inspire, bore*, IC2: *appreciate*, *criticize*).

All targets contained one first name and one last name (except for Exp.2), see (2-7). The last name was always in the position favored by verbs' IC bias (2a,b). This allows us to see how often people interpret *she* (vs. *he*) as referring to the verb-bias-compatible antecedent when it is realized as a last name. Data was double-coded by two coders blind to condition.

Exp.1 used fragments like (2) to test if the male bias persists when speakers lack rich mental representations of the referents. Fig.1 shows the proportion of continuations compatible with verbs' IC bias (subject continuations with IC1 verbs, object continuations with IC2 verbs) as a function of pronoun gender. A **tall bar** means people interpret the pronoun as referring to last-name-only referents; a **shorter bar** means people avoid interpreting the pronoun as referring to last-name-only referents. Overall, people consistently interpret '**he**' as referring to the last-name at high rates in all studies (tall **red** bars, no differences, glmer, emmeans with Tukey), but are less likely to interpret '**she**' (shorter **blue** bars) as referring to the last-name-only referent.

Looking more at Exp.1 reveals a male bias: People interpret 'he' as referring to the last-name-only referent on >85% on trials (sig above chance, in line with IC bias), but interpret 'she' as referring to the last-name-only referent on only 46% of trials (at chance). Thus, although the IC bias favors the last-name-only referent (*Smith impressed Amanda because she*), participants (both male and female) are 'reluctant' to interpret *Smith* as the antecedent of *she*.

Exp.2 tested if the male bias stems from last names' potential ambiguity coupled with a male default ('if in doubt, assume male'). Exp.2 used **gender-neutral novel (first) names** (ex.3, e.g. *Vesqui, Delas*, pre-tested). The results (Fig.1) are striking: people use *he* and *she* for gender-ambiguous names *equally often* (81%): gender ambiguity is not what drives last names' male bias. **Exp.3** looked at professional **status**. As last-name-only is linked to status [1], do people view last-name as male because they view status as male? If so, the male bias should be *strengthened* with "Dr." (ex.4). But Fig.1 shows no strengthening. In fact 'she' is *more likely* to be used for the last-name-only referent in Exp.3 than Exp.1 (p<.01). **Exp.4** tested if the male bias is weaker with **hyphenated last names** (ex.5), more common among women [5]. The bias is weakened relative to Exp.1 (p<.005), but not eliminated. **Exp.5a-b** tested **speaker gender**, by pairing each sentence with a picture of the person who said it (male/female). The male bias on female-speaker conditions is weaker than male-speaker conditions (p<.012), but still present.

Last-name-only has a strong, presumably socially conventionalized male bias that persists with hyphenated names and regardless of speaker gender, but doesn't stem directly from status or ambiguity. Our results highlight the value of including social factors in models of reference.

(1a) "I would go so far as to say that had Watson and Crick not come into Rosalind's photograph -- by hook or crook; whichever way it was -- they would have lost the race entirely" (from podcast by Scientific American on Dr. Rosalind Franklin)
(1b) "Johnson is a great professor. He is funny" (from ratemyprofessors.com)
(1c) "Welsh is my favorite professor. She's just amazing" (from reddit.com)

Example stimuli [last-name-only forms and their variants marked with **green** here for ease of exposition]

(2) **Exp.1:** (a) **Smith** impressed Eric because he…   [IC1 verb + he]
                    Smith impressed Amanda because she…   [IC1 verb + she]
                (b) Oscar appreciated **McDermott** because he…   [IC2 verb + he]
                    Megan appreciated **McDermott** because she…   [IC2 verb+ she]

(3) **Exp.2 gender-neutral first names**: **Leneit** impressed Eric/Amanda because he/she…

(4) **Exp.3 Dr title**: **Dr. Smith** impressed Eric/Amanda because he/she…

(5) **Exp.4 Hyphenated last names**: **Pickford-Smith** impressed Eric/Amanda because he/she…

(6) **Exp.5a Sentence+image of female speaker:** **Smith** impressed Eric/Amanda because he/she…

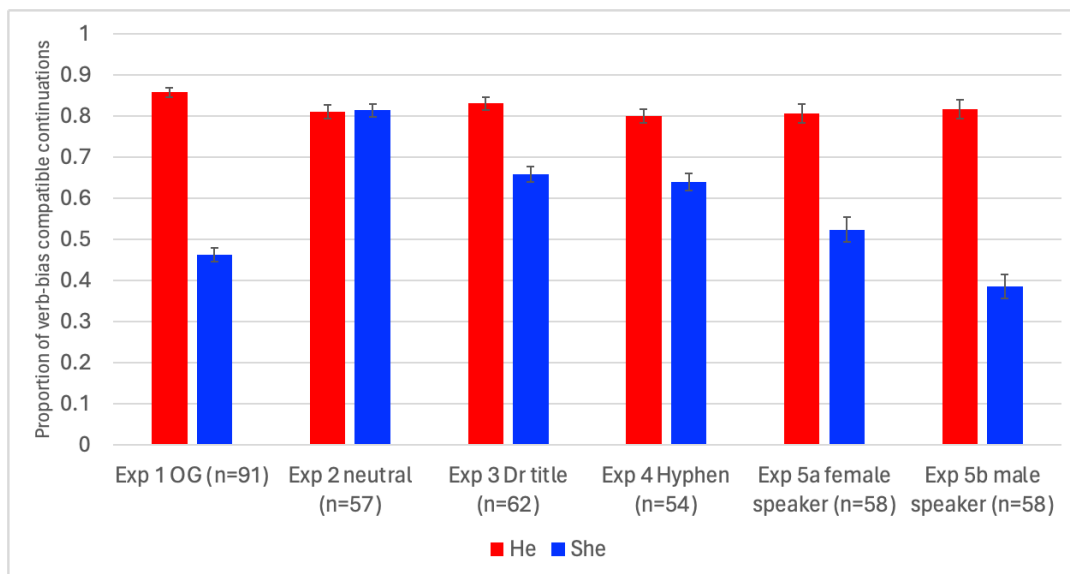(7) **Exp.5b Sentence+image of male speaker**: **Smith** impressed Eric/Amanda because he/she…

Figure 1. Proportion of continuations where the prompt pronoun (*he/she*) is used to refer to the last-name-only referent (in the verb-bias compatible position) in each study. Error bars: +/- 1 SE

References
[1] Atir, S., & Ferguson, M. J. (2018). How gender determines the way we speak about professionals. *PNAS Proceedings* 115(28), 7278–7283 [2] Gardner, B. & Brown-Schmidt, S. (2019). *"Call me by my last name": Gender bias through production about and memory for names*. 60th Psychonomics meeting. [3] Hartshorne, J. & Snedeker, J. (2013). Verb Argument Structure Predicts Implicit Causality, *LCN* 28: 1474-1508. [4] McConnell-Ginet, S. (2003). "What's in a Name?" Social Labeling and Gender Practices. *Handbook of Language and Gender*. [5] Shafer, E. F., & Christensen, M. A. (2018). Flipping the (Surname) Script: Men's Nontraditional Surname Choice at Marriage. *J of Family Issues,* 39, 3055-3074.