Gentle plumbers and forceful florists: Processing gender stereotyped adjectives and nouns

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English occupational role names, like *florist* and *plumber*, link semantic roles to gender stereotyped representations in the real world (Hentschel et al., 2019; Gaucher et al., 2011). It is well-known that phrases that violate gender stereotype expectations disrupt language processing: sentences with pronouns (*he/she*) incongruent with these gender stereotyped antecedents (*dental hygienist/truck driver*) are processed slower and rated as less acceptable than congruent ones (Banaji & Hardin, 1996; Oakhill et al., 2005; Hammond-Thrasher & Järvikivi, 2023). Adjectives, like *sensitive* and *dominant*, also carry gender stereotype information (Gaucher et al., 2011); however, there is no systematic exploration of their processing in multi-sentence contexts with stereotype congruous and incongruous adjective-noun phrases.

We investigated noun- and adjective- level gender stereotype clashes within three-sentence vignettes (Table 1). Participants (N = 211) read 80 short stories pairing male/female gender stereotyped adjectives and role nouns with pronouns either congruent or incongruent with the stereotypical gender of each role noun. This task was followed by a yes-or-no decision as to whether the last sentence was a sensible continuation of the vignette. Participants' choices (yes/no) and response latencies were recorded for analysis. In addition, we inspected the effects of participants' political ideology (Wilson-Patterson PIQ) and personality (HEXACO PI-R).

Binomial generalized additive mixed-effects modeling (GAMMs) in R showed several significant effects for sensibility check data (Fig. 1): Fully Congruent items (i.e., gender alignment across the adjective, noun, and pronoun) were consistently judged to be sensible more frequently than Incongruent items ($p < 0.0001$). There were significantly more "Yes" responses for Incongruent Male items (i.e., feminine adjective, male role name, and female pronoun) compared to Incongruent Female items (i.e., masculine adjective, female role name, and male pronoun; $p < 0.002$). Finally, there was a significant three-way interaction: items combining feminine adjectives with feminine role names and male pronouns were responded to with the least number of "Yes" responses; contrastively, items combining masculine adjectives with masculine role names and female pronouns were responded to with significantly more "Yes" responses compared to the former ($p < 0.001$). GAMMs for response time data (Fig. 2) showed no differences between Incongruent noun-pronoun conditions; in contrast, for Congruent conditions, participants took longer to respond when female stereotyped adjectives preceded congruent male stereotyped noun-pronoun pairs. For sensibility check decisions, more liberal participants were significantly more likely to accept incongruent adjective-noun continuations (gentle truck driver - he) compared to congruent pairs (buff truck driver - he) than more conservative participants; further, participants lower on the Honesty-Humility trait took longer to respond to Incongruent than congruent conditions (cf. Hammond-Thrasher & Järvikivi, 2023).

The results indicate that clashes with gender stereotypes embedded in both adjectives and nouns significantly disrupt language comprehension, and that the magnitude of the violation as well as the specific gender of each stereotype predicts the extent of this disruption. Especially the findings that stories describing male agents fulfilling stereotypically feminine roles were judged to be less sensible than those describing female agents fulfilling stereotypically masculine roles (Hammond-Thrasher & Järvikivi, 2023; Grant et al., 2019), and that masculine roles paired with a feminine adjective were read slower, echo sociological findings indicating that migration of women to masculine roles is more prominent than the migration of men to feminine roles (Haines et al., 2014), in line with Social Role Theory (Eagly, 1987).

Table 1. Sample three-Sentence vignette

Sentence 1	Sentence 2	Sentence 3
You are driving down a busy highway.	You see the gentle/truck driver change lanes.	You watch her/him turn on the wind-shield wipers.

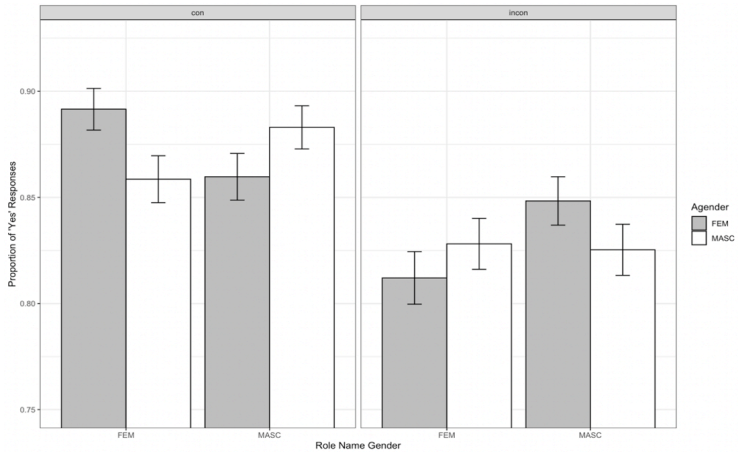

Figure 1. Proportion of "Yes" key presses across Congruence, Role Gender, and Adj Gender

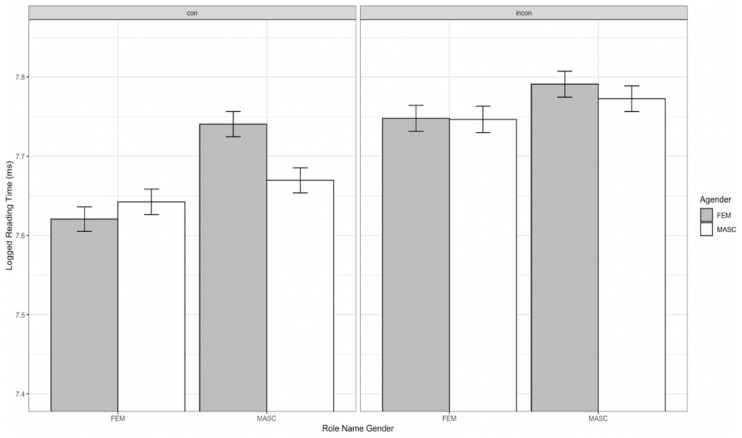

Figure 2. Log Response Latencies across Congruence, Role Gender, and Adj Gender

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