Are Informativity-Based Linguistic Predictions Driven by Gender Stereotypes?

Introduction Predictions during language processing are ubiquitous [1]. For example, people predict that 'I had coffee with…' is more likely to be followed by 'cream' than 'vinegar', as driven by their *world knowledge*. However, recent studies [2-4] suggest that comprehenders may also show an *informativity bias* during predictive processing. For example, [2] found that following the preamble "Click on the yellow…", participants anticipated a clothing item rather than a banana, because stating that a clothing item is yellow is more informative than saying the same about a banana, which is prototypically yellow. The current study aims to investigate whether these findings can be extended to the domain of gender stereotypes.

We report two studies (Exp 1 and Exp 2) that leverage the gender modifier that optionally precedes occupations in **Mandarin Chinese (MC)**, as in (1), to investigate how the presence or absence of the gender modifier influences the prediction of occupations. If comprehenders' expectations are guided by informativity bias following a gender modifier, they are expected to show reduced preference for gender-stereotypical occupations when the modifier is present vs when it is absent. Results of offline responses in Exp1 offered support to the effects of informativity. In Exp2, we show that informativity also plays a role in online processing.

Exp 1 (N = 104, MC native speakers, Qualtrics) is a forced-choice sentence continuation task (Fig.1). We crossed GENDER (female vs. male name) and MODIFIER (gender modifier present vs. absent) in a 2X2 design (Table 1, 24 targets, 48 fillers). When the gender modifier was present, it was consistent with the gender of the name. A norming study (N = 40) confirmed the gender biases in names and occupations selected for the stimuli. We analyzed the binary outcome of female-stereotypical versus male-stereotypical occupations with the maximal logistic hierarchical model. **Results** (Fig.2) revealed a main effect of GENDER ($p < .001$): Overall, participants favor the occupation responses that match the gender of the name. We also found an interaction between GENDER and MODIFIER ($p < .001$): Participants showed reduced preference for the gender-stereotypical occupations when the gender modifier was present.

Exp 2 (N = 120, PCIbex) used A-Maze**,** in which participants read one word at a time by choosing between the correct continuation and an incorrect one (Fig. 3). We crossed STEREOTYPICALITY (stereotypical vs. astereotypical, i.e., whether the occupation is stereotypically associated with the gender indicated by the name) and MODIFIER (gender modifier present vs. absent) in a 2X2 design (Table 2, 24 targets, 36 fillers). We analyzed the RTs at the occupation noun in a maximal linear hierarchical model. **Results** (Fig.4) revealed a main effect of STEREOTYPICALITY ($p < .05$): Stereotypical occupations were read faster than astereotypical occupations. TYPICALITY and MODIFER also showed an interaction effect ($p< .05$): With a modifier, the difference between stereotypical and astereotypical occupations became smaller, echoing the findings in Exp1.

Conclusion: Our studies demonstrate the influence of gender stereotypes at an informativity level, suggesting the integration of societal beliefs into facets of language processing. We present evidence supporting the notion that awareness of an individual's gender triggers occupation-related gender stereotypes, complementing existing research that highlights gendered expectations based on occupational information [5, 6]. **Future Directions**: To address the potential role of frequencies, we will run a corpus analysis to compare the frequencies of *occupation* versus *modifier-occupation*. We also plan to explore whether our results are influenced by individual differences (e.g., gender, implicit gender bias, age).

(1) a. Mary shi yi-ge **(nv)** feixingyuan.
Mary is one-CL (female) pilot
"Mary is a **(female)** pilot."

b. John shi yi-ge **(nan)** baomu.
John is one-CL (male) babysitter
"John is a **(male)** babysitter."

Table 1 *Example target items in Exp1*

	$GENDER_{name}$	MODIFIER	Sentence	
a.	female	absent	Wang Hong shi yi-ge ____	("Wang Hong is a…")
b.	female	present	Wang Hong shi yi-ge nv ____	("Wang Hong is a female…")
c.	male	absent	Wang Wei shi yi-ge ____	("Wang Wei is a…")
d.	male	present	Wang Wei shi yi-ge nan ____	("Wang Wei is a male…")

Table 2 *Example target items in Exp2*

	STEREO-TYPICALITY	MODIFIER	Sentence	
a.	stereotypical	absent	Wang Hong shi yi-ge baomu.	("Wang Hong is a babysitter.")
b.	astereotypical	absent	Wang Wei shi yi-ge baomu.	("Wang Wei is a babysitter.")
c.	stereotypical	present	Wang Hong shi yi-ge nv baomu.	("Wang Hong is a female babysitter.")
d.	astereotypical	present	Wang Wei shi yi-ge nan baomu.	("Wang Wei is a male babysitter.")

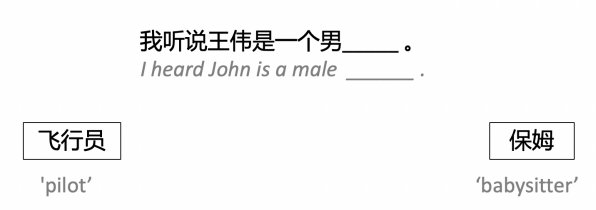

Fig.1 Exp 1: forced-choice sentence continuation task (English translation is included for the purpose of presentation)

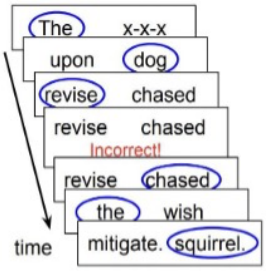

Fig.3 An illustration of the A-Maze task in English

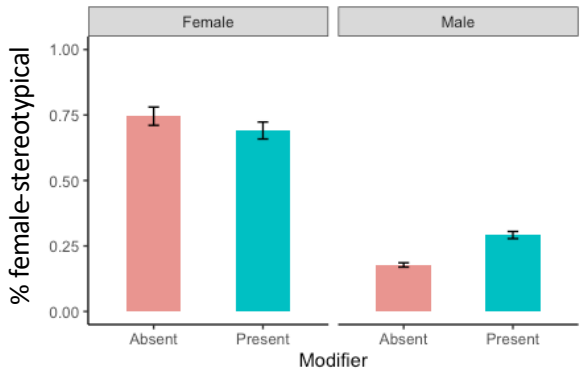

Fig.2 Exp 1 female-stereotypical responses by GENDER and MODIFIER

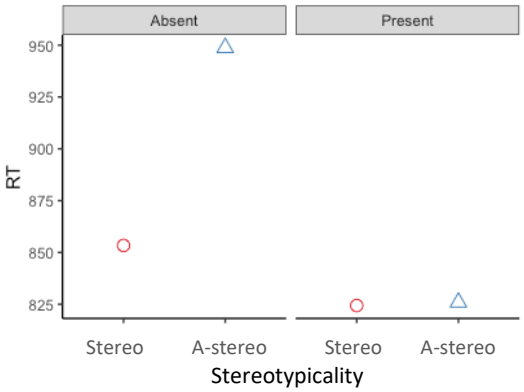

Fig.4 Exp 2 RTs at occupation nouns by STEREOTYPICALITY and MODIFIER

References [1] Kuperberg & Jaeger (2016) Lang. Cog. Neurosci. [2] Rohde & Rubio-Fernandez (2022) JML. [3] Rohde et al. (2021) Cognition. [4] He & Kaiser (2023) HSP. [5] Von der Malsburg et al. (2020) Psy Sci. [6] Papineau et al. (2022) Cog Sci