Gender constraint in L1 and L2 reflexive pronoun resolution by Chinese-English bilinguals

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ABSTRACT

Previous behavioral research indicates that native speakers of Chinese are not very sensitive to lexical gender information, and one question that remains is how the rule of gender constraint functions in L1 and L2 reflexive pronoun resolution by Chinese-English bilinguals. To answer the question, the present study conducted two ERP experiments in which participants' ERP responses to L1 and L2 reflexive pronouns that were either congruent or incongruent with their antecedents were recorded and analyzed. Gender incongruity effect was observed in the L1 in the form of left anterior negativity effect (LAN) within 350—450 ms, but in the L2 in the form of midline enhanced positivity within 300 —500 ms. Then, within a later time window of 500—800 ms, the P600 component was observed for gender incongruity in both the L1 and the L2. However, large variance was observed in the participants' behavioral performance in the non-native language, and the amplitude of the P600 effect decreased linearly with the participants' inability to detect gender incongruity. The above findings demonstrate that the rule of gender constraint functions similarly in L1 and L2 reflexive pronoun resolution by Chinese-English bilinguals, but nevertheless the exact mechanism employed for the L1 and the L2 was not the same, with an LAN-P600 pattern for the L1 but an Earlier Positivity-P600 pattern for the L2. Moreover, the large variance in L2 processing should be taken into consideration in future research on L2 reflexive pronoun resolution.

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1. Introduction

The prerequisite for successful sentence and discourse comprehension involves establishing certain links among the constituent words. One of the links is the binding between anaphoric elements such as reflexive pronouns (i.e., *himself, herself*) and their antecedents during listening or reading. According to Binding Principle A, a reflexive pronoun "*himself*" as in the sentences "*Jack praises himself*" and "*Henry says Jack praises himself*" must be bound to the antecedent "*Jack*" in the local domain (i.e., within the immediate clause containing the reflexive, "c-commanding") (Chomsky, 1981). This is the locality constraint on reflexives. Sturt (2003) found that the locality constraint on binding was applied immediately upon the participants' first reading of the reflexive.

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Apart from the locality constraint mentioned above, the reflexive pronoun must also match the possible antecedent in gender, person and number (Badecker & Straub, 2002). The gender congruence between the reflexive pronoun and the antecedent, i.e., the gender constraint, is a factor that could be manipulated in experiments to investigate how different elements in a sentence are linked. According to Bock and Miller (1991), the congruity of gender information through anaphora is a way to constrain sentence elements and establish appropriate within-phrase and across-phrase links.

As for the cognitive processes underlying reflexive pronoun resolution, a two-stage model, early bonding and subsequent resolution processes, was proposed for all kinds of anaphoric interpretation (Garrod & Terras, 2000; Sanford, Garrod, Lucas, & Henderson, 1983). In the early bonding phase, appropriate links are established automatically between an anaphor and the possible antecedents when their semantic features match (Garrod & Terras, 2000; Sturt, 2003). In other words, when the reader encounters a pronoun, he/she will initiate a search in previous context for the antecedent guided by the semantic features (e.g., gender, number) of the anaphor (Callahan, 2008). In a similar sense, Van Berkum, Koornneef, Otten, and Nieuwland (2007) suggests that upon encountering a pronoun, readers immediately inspect their situation model for a suitable discourse entity by referring to the semantic features. Moreover, Dillon (2014) further proposed that the problem of selecting a reflexive's antecedent is a memory retrieval problem, such that antecedent retrieval is cue-based direct access by matching a set of features against the contents of working memory. In the subsequent resolution phase, the link is checked against the broader context and the antecedent is finalized (Garrod & Terras, 2000).

However, there is one prerequisite for all the above theoretical elaborations concerning the gender constraint between the reflexive pronoun and its antecedent during the bonding stage: the gender information lexically specified in the reflexive pronoun (e.g., *himself, herself*) and the antecedent (i.e., nouns with definitional or stereotypical gender) is supposed to be activated as part of lexical access. Although gender information, as a semantic feature, is assumed to be automatically retrieved during semantic retrieval (Kreiner, Sturt, & Garrod, 2008), some studies found that this assumption is not true for all populations, especially for native Chinese speakers (Chen & Su, 2011; Dong, Wen, Zeng, & Ji, 2014).

Previous behavioral studies indicate that native speakers of Chinese are not as sensitive to lexical gender information as corresponding native speakers of English. Chen and Su (2011) compared the performance of English and Chinese participants in two tasks presented in their own respective native language. They were asked in one task to listen to a story and answer gender and non-gender related questions, and then in another task, to read sentences and determine which of the two pictures presented immediately afterwards matches the sentence. The results showed that relative to the non-gender-related condition, the Chinese participants were much slower and less accurate than the English participants in answering the gender-related questions and in responding to the gender-related sentences. Furthermore, Dong et al. (2014) conducted self-paced reading experiments on Chinese-English bilinguals to compare their performance in two conditions: pronoun-antecedent semantic gender matched or not matched. The mismatch effect was observed only when the gender saliency of the antecedent was enhanced with a human picture presented before the antecedent. Without this manipulation, however, the gender mismatch effect disappeared not only for L2 English but also for L1 Chinese. The authors concluded that Chinese-English bilinguals probably do not automatically activate the gender information incorporated in the antecedent and the pronoun in the bonding phase in both the L1 and the L2. Moreover, Chinese-English bilinguals make lots of gender errors when speaking English in various language tasks (Dong & Jia, 2011).

The reason for the reduced sensitivity of native Chinese speakers to lexically specified gender information probably lies in the linguistic realization of semantic gender information in person pronouns in oral Chinese. To be specific, oral Chinese uses the same pronunciation,/ta/, to refer to both female and male singular third person pronoun, and does not distinguish between "*she/her/herself* …" and "*he/him/himself* …". Hence, in oral Chinese, speakers may not have to activate semantic gender information when using pronouns. What's more, despite the fact that "he" and "she" are distinguished in written Chinese through orthographic forms "他/*ta*/(he)" and "她/*ta*/(she)", these gender-encoding Chinese characters are often omitted in reflexive pronouns, leaving a gap in the sentence, e.g.,"周先生对(他$_{gap}$)自己很有信心。*Mr. Zhou has confidence in (him $_{gap}$)self*." Again, readers or listeners do not have to activate semantic gender information since there is no gender constraint here. Understanding Chinese, therefore, may not rely heavily on the constraints among sentence elements established with semantic gender information.

Then, one question arises in the field of research on reflexive pronoun resolution: will the binding force of the gender constraint, as a coreferential tool, weaken for speakers who have reduced sensitivity to lexical gender information? To be more specific, the issue under investigation in the current study is whether people like native Chinese speakers apply gender constraint during reflexive pronoun resolution when processing sentences such as "*The man prepared himself for the interview*" where the locality constraint within the clause is good enough for the pronoun-antecedent binding. Based on the above reasoning, it could be hypothesized that since the locality constraint has already guaranteed the intended reading, the gender constraint may not play its full role for readers who have reduced sensitivity to lexical gender information.

The factor of gender congruity was manipulated in the current study in a way that the reflexive pronoun was either congruent or incongruent with the antecedent (i.e., Congruent vs. Incongruent). The gender incongruity effect would demonstrate whether gender constraint is applied or not. To avoid the confounding factor of linearity, the experimental materials (e.g., "*Mr./Miss Williams found himself/herself the center of attention.*") were designed in a way that there was no ambiguity in co-reference between the reflexive pronoun and its antecedent because these two items were successfully constrained by their position within the clause (within-phrase anaphora) (Binding Principle A, Chomsky, 1981). Antecedents (e.g., *Mr./Miss Williams*) with unambiguous and definitional semantic gender instead of stereotypical gender were used to