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Linguistic Gender Is Related to Psychological Gender: The Case of “Chinese Characters”

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Past research (Ervin, 1972; Konishi, 1993) suggests that a noun's linguistic gender is not just an arbitrary, semantically-empty linguistic category. Rather, it may connote masculine or feminine properties, and thus can subtly influence responses to the noun and its referent. The present study extended this research by exploring how gendered radicals of nonsense Chinese characters might affect the characters' connotations. The results showed that when an unfamiliar Chinese character is encountered, meaning interpretation can be affected by the meaning of the radicals. Moreover, since gendered Chinese radicals are linked to shared representations of psychological gender, such representations may then affect the character's connotations.

In social psychology, gender refers to person categories that have their origins in a socially constructed view of human sexuality. In linguistics,

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gender, often referred to as linguistic or grammatical gender, refers to formal categories for nouns and noun-like words.

A noun's linguistic gender may be determined by the psychological gender of its referent. For example, in English, *husband* and *uncle* are masculine nouns, whereas *wife* and *aunt* are feminine nouns. However, in some European languages (e.g., German and Spanish), not only do words referring to entities of a particular psychological gender fall into the appropriate linguistic gender category, all nouns in these languages are also inflected for gender on an arbitrary basis. In some languages, a noun's linguistic gender is related to its form. For example, in Spanish, most nouns ending in *-o* are masculine, whereas most nouns ending in *-a* are feminine. However, sometimes, a noun's linguistic gender may be unrelated to its form or semantic properties. For example, the word for "spoon" is masculine in German (*der Löffel*) and feminine in Spanish (*la cuchara*), whereas the word for "fork" is feminine in German (*die Gabel*) and masculine in Spanish (*el tenedor*) (see Comrie, 1999; Krauss & Chiu, 1998 for reviews).

Linguistic gender plays an important role as a device to establish local and global coherence in sentences and in discourse (Friederici & Jacobsen, 1999). Tawmoski-de Ryck and Verluyten (1982) found that when there is no pronomial referent in a sentence, the linguistic gender of a noun determines the form of the pronoun. For example, when Spanish speakers talk about a car, they would use the masculine pronoun *el* even when the linguistically masculine noun *coche* (car) is not mentioned. Similarly, they would use the feminine pronoun *la* when they refer to a motorcycle (*moto*), which is linguistically feminine. In one experiment, Schriefers (1993) asked Dutch participants to pronounce a noun which was presented after an adjective. Utterance onset latencies were longer when the adjective and the target noun had different linguistic gender than when the two words had the same linguistic gender.

Do users of a language infer psychological gender properties from gender inflections of nouns? For example, do German speakers see spoons as man-like objects and forks as womanish objects? Ervin (1972) attempted to answer this question by asking Italian participants to rate on semantic differential scales (Osgood, Suci, & Tannenbaum, 1957) a list of Italianate nonsense words with either masculine (*-o*) or feminine (*-a*) endings. He found that *-o* nonsense words and the word for "men" had similar ratings, while *-a* nonsense words and the word for "women" received similar ratings. Since the nonsense words are semantically empty,

the participants might have derived the nonsense words' connotations from the words' linguistic gender.

Subsequent research by Konishi (1993) showed similar results. Konishi had German and Spanish native speakers rate a variety of words on semantic differential scales. Some of the words were linguistically masculine in German and linguistically feminine in Spanish (e.g., the words for "apple" and "rain"). Others were linguistically feminine in German and linguistically masculine in Spanish (e.g., the words for "air" and "desert"). Both German and Spanish speakers gave higher potency ratings to words that were linguistically masculine than words that were linguistically feminine in their own language. Note that words rated by the participants had the same semantic properties in German and Spanish. Konishi's findings suggested that a word's linguistic gender can affect what it connotes by evoking the associated shared representations of the psychological gender (e.g., "Women are less potent than men.").

The Case of Chinese Characters

In the present study, we sought to replicate Konishi's (1993) findings in Chinese. Chinese is written in the form of characters and each character is by itself a morpheme (unit of meaning). Although most Chinese characters are not inflected for gender, the unique morphological construction of Chinese characters offers a good opportunity to study the relationship of linguistic and psychological gender. The way words are represented in memory and the process by which skilled readers recognize complex words and derive their meanings is influenced by morphological relationships among words (Anshen & Aronoff, 1988; Nagy, Anderson, Schommer, Scott, & Stallman, 1989). Although there is little empirical research, Chinese linguists and educators believe that knowledge of morphology contributes to acquisition of Chinese characters and words (Hoosain, 1991).

About 80 to 90% of the characters in modern Chinese are composed of two components: The radical and the stem (Hoosain, 1991). Both the radical and the stem may also be a morpheme. The radical (e.g., 口) gives a clue to the character's general meaning. For example, the character 喝 ("drink") and 唱 ("sing") share the radical 口 ("mouth"), and both characters involve oral activities. The stem may offer a phonetic clue to the character's pronunciation (e.g., 昌 in 唱) or a semantic clue to the character's meaning (e.g., 鳥 "birds" in 鳴 "the humming of birds").

In the present study, participants rated on semantic differential scales 9 nonsense Chinese characters, which were formed by combining 3 radicals (女 “woman”; 人 “human”; 牛 “cow”) with 3 stems (惠 “benefit”; 舌 “tongue”; 害 “harm”). The 3 stems had either positive (惠), neutral (舌) or negative (害) valence. We predicted that as in the Konishi (1993) study, participants’ ratings of the characters with the radical “woman” would be affected by the shared representations of the female gender. They might therefore give lower potency ratings to these characters than to other characters.

This prediction is consistent with several observations. First, there are 69 Chinese words listed in the *Chinese New Dictionary* (1993) that share the radical 女 (“woman”). Of these characters, 29 refer to a female role (e.g., 妹 “sister”), 8 refer to behaviors typically performed by women (e.g., 娩 “giving birth”), and only 8 refer to gender neutral referents (e.g., 姻 “marriage”). Thus, some shared conceptions of gender roles and gender-typed activities are represented in Chinese characters with the radical “woman.”

Second, research on the Chinese language has shown that a character’s radical can affect its connotations. Zhang, Zhang and Peng (1990) asked participants to make speeded judgments about whether a character refers to a female or a male. Reactions to characters that had the radical 女 (“woman”) were faster and more accurate when the character refers to a female (e.g., 姨 “aunt”, 妹 “sister”) than when it refers to a male (婿 “son-in-law”). Reactions to words such as “son-in-law” were slower because the gender inferred from the radical (“woman”) was inconsistent with the gender inferred from the character.

Finally, research has shown that the meaning of a Chinese character may be processed holistically or componentially, depending on how frequently the character is used in the language (Miao & Sang, 1991). Specifically, the meaning of frequently used characters is represented as a unitary morpheme in the mental lexicon and processed holistically. However, for infrequently used characters, meanings are deduced from componential analyses of the characters’ radical and stem. Thus, a character’s radical should influence the character’s meaning when the character has low frequency of use (Huang & Wang, 1992; Taft, Huang & Zhu, 1994; Taft & Zhu, 1997; Yu & Cao, 1992). Since the stimuli used in the present study were nonsense Chinese characters and should therefore be unfamiliar to the participants, the characters’ radicals should affect their connotations.

Method

Participants

Ninety-one (47 male, 44 female) Hong Kong Chinese aged between 17 and 22 volunteered to participate in the present study.

Materials and Procedures

The stimuli, shown in Table 1, consisted of 15 stimulus characters, 9 nonsense characters and 6 real characters. As mentioned, the 9 nonsense characters were formed by combining 3 radicals (女 “woman”; 人 “human”; 牛 “cow”) with 3 valenced stems (惠 “benefit”; 舌 “tongue”; 害 “harm”). The 6 real characters were the 3 radicals and the 3 stems.

Table 1. Stimulus characters used in the present study

Radical	Stem		
	惠 (“benefit”)	舌 (“tongue”)	害 (“harm”)
女 (“woman”)	媿	媿	媿
人 (“human”)	德	恬	倩
牛 (“cow”)	犍	犍	犍

The stimulus characters were presented in a randomized order with the same order for every participant. There are over 10,000 Chinese characters, and most of them are rarely used. Thus, the participants might not be aware that some stimulus characters were nonsense characters. They were instructed to rate all the stimulus characters, each on three 7-point semantic differential scales: evaluation (very good – very bad), potency (very strong – very weak), and activity (very active – very passive) (Osgood, Suci, & Tannenbaum, 1957).

The participants were told that this study concerned their understanding of Chinese characters. At the beginning of the study, they were told that some of the characters might be unfamiliar to them, and that they should guess what these characters meant.

Results

Nonsense Characters

A 2 (Participant Gender: Male or Female) × 3 (Radical: “Woman,”

“Human,” or “Cow”) \times 3 (Stem: “Benefit,” “Tongue,” or “Harm”) mixed-design ANOVA was performed on the each of three (evaluation, potency and activity) ratings of the nine nonsense characters.

Evaluation. The main effect of Stem was significant, $F(2, 178) = 68.69, p = .0001$. Participants gave more positive evaluation to “characters” with the positively valenced stem (“benefit,” $M = 4.62$) than to those with the neutral stem (“tongue,” $M = 4.07$). They also rated “characters” with the neutral stem more positively than they did those with the negative stems ($M = 3.26$). This result is not surprising given the clear valence of the 3 stems, and suggested that the participants did base their judgments on the components of the “characters.”

The Participant Gender \times Radical interaction was also significant, $F(2, 178) = 3.65, p < .05$. Follow-up analyses revealed only one discernible difference — Male participants gave significantly more positive ratings to “characters” with the radical “cow” ($M = 4.20$) than to those with the radical “woman” ($M = 3.79$).

Potency. The main effect of Radical was significant, $F(2, 178) = 14.05, p < .0001$. Figure 1 depicts the nature of this effect. As in Konishi (1993), participants gave lower potency ratings to character with the radical “woman” ($M = 3.44$) than to “characters” with the radical “human” ($M = 3.91$) or “cow” ($M = 3.96$).

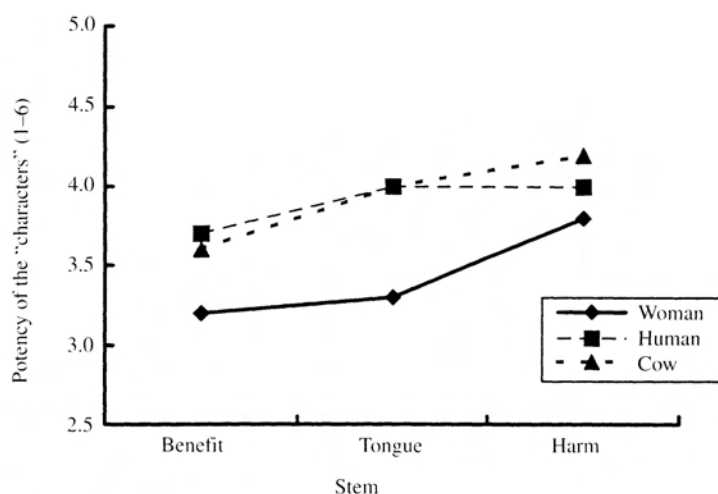


Figure 1. Rated potency levels of the nonsense characters

The main effect of Stem was also reliable, $F(2, 178) = 10.38, p < .0001$. “Characters” with the negative valence stem “harm” ($M = 4.02$) received higher potency rating than did those with the stem “benefit” ($M = 3.52$).

Activity. The main effect of Radical was significant, $F(2, 178) = 4.25, p < .05$. As shown in Figure 2, participants rated “characters” with the radical “woman” ($M = 3.70$) lower in activity than they did those with the radical “human” ($M = 4.00$).

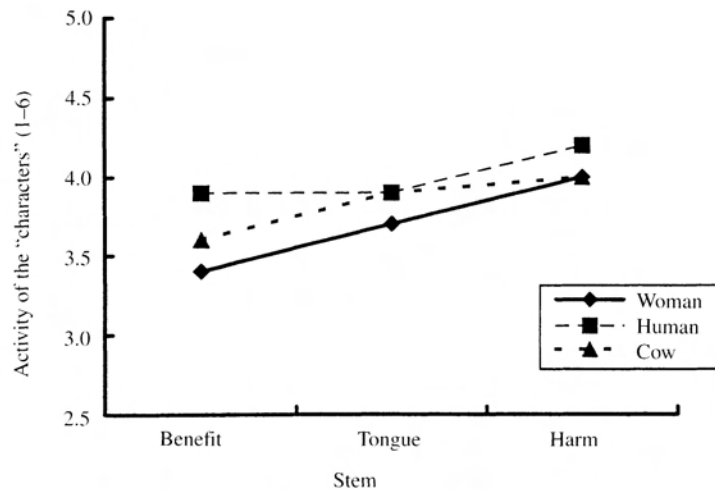


Figure 2. Rated activity levels of the nonsense characters

The main effect of Stem was also significant, $F(2, 178) = 7.22, p < .01$. “Characters” with the stem “harm” ($M = 4.07$) was judged to be more active than those with the stem “benefit” ($M = 3.64$).

Real Characters

A 2 (Participant Gender) \times 3 (Character: “Woman,” “Human,” or “Cow”) ANOVA was performed on each of the three (evaluation, potency, and activity) ratings. “Cow” ($M = 5.38$) received more positive evaluation than did “woman” ($M = 4.93$) and “human” ($M = 5.07$), $F(2, 178) = 3.88, p < .05$.

Consistent with the findings for the nonsense characters, “woman” ($M = 3.43$) received a lower potency rating than did “human” ($M = 5.09$),

which was seen as less potent than "cow" ($M = 5.59$), $F(2, 178) = 72.81$, $p < .001$. Finally, "woman" ($M = 3.74$) and "cow" ($M = 3.75$) were judged to be less active than "human" ($M = 5.04$), $F(2, 178) = 30.81$, $p < .001$.

Discussion

The present study replicated the findings of previous studies with respect to the relationship between linguistic and psychological gender (Ervin, 1977; Konishi, 1993). Our findings suggested that nonsense characters with the radical "woman" might have activated the cultural representation of woman. Thus, such "characters" received relatively low potency and activity ratings. When participants rated the character "woman," which is also a radical, they also gave relatively low potency and activity ratings. Thus, "woman" may be associated with being relatively weak and passive. Because the participants had never come across the nonsense Chinese characters before, they might have engaged in componential processing rather than holistic processing when they interpreted these characters. Component analysis required active processing of the radicals and the stems of these characters. As a result, the meaning of the radical "woman" may have colored the characters' connotations. Because the radical "woman" is associated with shared representations of woman, when the participants encountered an unfamiliar character with this radical, such representations were evoked and used to guide meaning interpretation.

Other researchers have reported similar effects of linguistic stereotype. In one study, Banaji and Hardin (1996) presented participants with primes related to gender (e.g., doctor, mother) followed by gendered pronouns (e.g., she, he). Participants responded faster when the gender of the pronouns was consistent (versus inconsistent) with the gender of the prime, despite the participants' deliberate attempt to ignore the prime and independent of whether participants were aware of the gender relation between the primes and the pronouns. This finding showed that stereotypical gender connotations encoded in the language can be automatically activated.

Previous research has also shown that gender information can affect the processing of subsequent words in a sentence (Kerr & Underwood, 1984). Foertsch and Gernsbacher (1997) had English-speaking participants read sentences with gendered referential antecedents [truck driver (masculine), nurse (feminine)] followed by a clause containing a gendered pronoun (he or she). Participants' reading times were shorter when the gendered clause was consistent with the gendered referential antecedent

(*he* with *truck driver*; *she* with *nurse*) than when they were inconsistent with each other (*she* with *truck driver*, *he* with *nurse*).

One limitation of the present research is that we did not check whether or not the participants treated the nonsense characters as real characters. Although we told the participants that they should try to guess the meaning of the unfamiliar characters, some participants might suspect that the “unfamiliar” characters did not exist. We do not know how such suspicions might have affected the results.

In addition, we did not assess the participants’ language proficiency. In one study (Shu & Anderson, 1997), researchers compared the ability to decode the meaning of unfamiliar characters between children who were judged by their teachers to have high reading levels and those who were judged to have relatively low reading levels. Children with higher reading levels were more accurate in decoding the meaning of unfamiliar characters only when the relationship between the unfamiliar character and its radical was transparent (the meaning relation between the radical and the character was regular) and the radical was familiar to the participants. The effect of reading ability disappeared between students with different reading levels when the radical was unfamiliar or when the relationship between the unfamiliar character and the radical was opaque (the meaning relation between the radical and the character was irregular). These findings showed that grade school children use their knowledge of the radicals to infer the meaning of unfamiliar characters. In addition, proficiency in the Chinese language may moderate the accuracy in the decoding task. It would be interesting to explore in future research how language proficiency moderates the projection of shared beliefs onto unfamiliar characters.

With appropriate caveats, the evidence suggests that linguistic gender and psychological gender are related. Hence, studies on linguistic gender could reveal the shared representations of psychological gender in the linguistic community. In addition, shared representations of gender may be evoked when individuals encounter formal or morphological inflection of gender in the language. Thus, members of a linguistic community may, by virtue of using the language, be socialized into shared beliefs in the community. Moreover, the shared representations will be evoked whenever the language is used and hence developed into highly accessible cognitions. In short, language, aside from being a carrier of shared beliefs, may also serve to maintain and reinforce these beliefs. This possibility merits further exploration.

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以「中文字」為例說明語言性別與心理性別間的關係

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摘要

過去的研究指出，一個名詞在語言學上屬雌性或雄性，並不是一種武斷和意義空泛的區別；反之，它可能會使人將男性或女性的心理素質放置在那名詞的含義上。因此，一個名詞的語言性別可能會影響讀者對這個名詞或它所代表的事物產生的反應。本研究旨在探討讀者如何理解一些以「女」字為部首、由研究員杜撰出來的中文字，結果顯示當讀者看到一些陌生的文字時，部首的意義便影響了他們對字義的解釋；由於雌性的部首能引起與女性的心理素質有關的聯想，因此以「女」字為部首的文字，會令讀者將女性的心理素質加諸字義之上。