Is it over-respectful or disrespectful? Differential patterns of brain activity in perceiving pragmatic violation of social status information during utterance comprehension

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ABSTRACT

A critical issue in the study of language communication is how extra-linguistic information, such as the social status of the communicators, is taken into account by the online comprehension system. In Mandarin Chinese, the second-person pronoun (*you/your*) can be in a respectful form (*nin/nin-de*) when the addressee is of higher status than the speaker or in a less respectful form (*ni/ni-de*) when the addressee is of equal or lower status. We conducted an event-related potential (ERP) study to investigate how social status information affects pronoun resolution during utterance comprehension. Participants read simple conversational scenarios for comprehension, with each scenario including a context describing a speaker and an addressee and a directly-quoted utterance beginning with the second-person pronoun. The relative status between the speaker and the addressee was varied, creating conditions in which the second-person pronoun was either consistent or inconsistent with the relationship between conversants, or in which the two conversants were of equal status. ERP results showed that, compared with the status-consistent and status-equal conditions, the status-inconsistent condition elicited an anterior N400-like effect on *nin-de* (over-respectful) and a broadly distributed N400 on *ni-de* (disrespectful). In a later time window, both the status-reversed and the status-equal conditions elicited a sustained positivity effect on *nin-de* and a sustained negativity effect on *ni-de*. These findings suggest that the comprehender builds up expectance towards the upcoming pronoun based on the perceived social status of conversants. While the inconsistent pronoun causes semantic integration difficulty in an earlier stage of processing, the strategy to resolve the inconsistency and the corresponding brain activity vary according to the pragmatic implications of the pronoun.

1. Introduction

A critical issue in the study of verbal communication is how extra-linguistic information is taken account by the comprehension system during online processing (Grice, 1975; Hagoort & Van Berkum, 2007). Psycholinguistic research has demonstrated that the comprehender's knowledge about the characteristics or beliefs of the interlocutor affects the perception of the message being communicated (Barr, 2008; Brown-Schmidt, Gunlogson, & Tanenhaus, 2008; Hanna & Brennan, 2007; Hanna & Tanenhaus, 2004; Hanna, 2003; Horton & Keysar, 1996; Leuthold, Filik, Murphy, & Mackenzie, 2012; Nadig & Sadivy, 2002; Regal, Coulson, & Gunter, 2010; see Holtgraves & Kashima, 2008; Van Berkum, 2009 for reviews). Since the social status

of the interlocutor constrains how this person is expected to communicate (Brown, 2006; Halliday, 2007), any deviation from the expected usage of language forms (i.e., pragmatic violation) could be immediately detected and dealt with by the comprehension system.

In many languages, such as Japanese, French or Spanish, one way to convey the social status (or social distance) information during verbal communication is to use honorific forms (Agha, 2007). In Mandarin Chinese, for example, the social status of the addressee can be reflected in the respectfulness of the second-person singular pronoun, *you/your* (Lee-Wong, 2000). A speaker with lower social status is expected to use the more respectful form (*nin/nin-de*) to show deference or respect towards the addressee with higher status, and a speaker with higher social status may use the less respectful form (*ni/ni-de*) to address the addressee with lower status to show social dominance or to implement command (Leech, 1983; Lee-Wong, 2000; Zhou, 2008). Other factors, particularly the social distance (including familiarity and intimacy), the attitude of the speaker towards the

addressee, and the formality of the communication settings, also affect the usage of the second-person pronoun (Chao, 1956; Hong, 1985). With only one exception (Momo, Sakai, & Sakai, 2008), however, the brain activity associated with the processing of honorific forms during verbal communication has not been investigated.

Offline behavioral studies suggest that the comprehender employs pragmatic knowledge concerning social status information when interpreting sentences or utterances. The implicit causality of the verb in sentences like "A praised B because he …" would normally make the reader initially interpret "he" as referring to B, yet this tendency can be overridden with the provision of social status information, for instance, in a sentence such as "The son praised his father because he…" (Garvey & Caramazza, 1974; Garvey, Caramazza, & Yates, 1975). Perception of the status hierarchy between conversants also helps to facilitate the understanding of the pragmatic intent (e.g., *giving an order*) in situations where a speaker of higher status than the listener makes an indirect request (e.g., "It′s so cold in here…"), as compared with the situation in which the speaker and listener are of equal status (Holtgraves, 1986, 1992, 1994; Holtgraves & Yang, 1992). Status hierarchy between the speaker and addressee also plays into a third party′s assessment of the appropriateness of responses of the addressee in indirect speech (Holtgraves, 1986).

Online event-related potential (ERP) studies (Van Berkum, Van den Brink, Tesink, Kos, & Hagoort, 2008; Van den brink et al., 2012) have investigated the neural responses to mismatches between the content of utterance and the social identity of the speaker. A more negative-going N400 is observed when the target word in an utterance is incongruent with the speaker′s social identity (i.e., age, gender, or status) as inferred from the prosodic features of the utterance (e.g., "I have a tattoo on my back", spoken with an upper-class accent), suggesting that a semantic unification process takes place linking the linguistic item with the social pragmatic context (Tesink et al., 2008; Van Berkum, 2009). However, when the listener has lower empathic ability, the mismatch elicits a late mono-phasic positivity (P600; Van den brink et al., 2012); this effect has been observed for mismatches between the critical word and stereotypic information concerning the social identity of the speaker (e.g., biological gender, Lattner & Friederici, 2003; Van Berkum, Koornneef, Otten, & Nieuwland, 2007; stereotypical gender, Osterhout, Bersick, & McLaughlin, 1997) and for non-literal sentences as compared with literal sentences (e.g., irony, Regal et al., 2010; metaphor, Coulson & Van Petten, 2007; joke, Coulson & Williams, 2005; Coulson & Wu, 2005). Functional magnetic resonance imaging (fMRI) also reveals activations for such mismatches in the inferior frontal gyrus and left middle temporal gyrus, the regions that are involved in semantic processing (Tesink et al., 2008).

The only study that has specifically addressed the neural activity associated with the processing of honorific forms (Momo et al., 2008) used Japanese sentences in which the honorific markers (subject-honorific *ni-naru* or object-honorific *suru*) are attached to verbs as morpho-syntactic suffixes when the human subject or object possesses a higher social status. The critical sentences included the first-person pronoun (typically in lower status), the second-person pronoun (typically in higher status), the sentence-ending verb, and the direct object preceding the verb. A mismatching, disrespectful use of the object honorific marker engendered stronger activation in the triangular part of left inferior frontal gyrus and the left lateral premotor cortex, the regions also activated for simple morpho-syntactic violation in this study and in other studies (see Friederici, 2011; Sakai, 2005 for reviews).

The present study aims to investigate the brain activity associated with the pragmatic processing of social status information during utterance comprehension. To this end, we focused on the Mandarin Chinese second-person pronoun, the usage of which is strongly constrained by the social status of the speaker and the addressee. As we pointed out earlier, in Mandarin Chinese the second-person pronoun (*you/your*) has a respectful form (*nin/nin-de*) when the addressee is of relatively higher status, and a less respectful or less formal form (*ni/ni-de*) when the addressee is of relatively lower status. This distinction is maintained in conversation in order to foster smooth social interactions, to avoid violation of social norms, or to avoid social misunderstanding (Lee-Wong, 2000; Zhou, 2008). The misuse of the second-person pronoun results in either an over-respectful or a disrespectful meaning. According to the pragmatic Relevance Theory (Wilson & Sperber, 2004), this confusion can be interpreted in different ways by the addressee (and third-party observers) depending on the context.

As pointed out by the Relevance Theory, a communicator provides evidence for the intention of conveying a certain meaning, which is inferred by the audience on the basis of the evidence provided. A speaker′s intention (a communicative implication) is derived when it is relevant to the addressee (Sperber & Wilson, 1995; Wilson & Sperber, 2004). An input achieves relevance when its processing in a context of available assumptions yields a "positive cognitive effect" (e.g., leading to or strengthening an implication rather than revising or suppressing an implication), or when the processing effort is less-demanding (e.g., the derivation of implication engages less inferential effort within certain context). Thus, in terms of the availability of a pragmatic implication derived in the misuse of the second person pronoun, the Relevance Theory would have different predictions regarding the over-respectful and disrespectful use of pronouns. For example, if President Liu said to Assistant Zhang that "I'm very worried about your (*nin-de*, the respectful form) health", then this over-respectful use of the second-person pronoun would most likely be interpreted by Assistant Zhang or by any third-party persons knowing their status as President Liu joking or being sarcastic with Assistant Zhang. Such pragmatic implication is very unlikely when a lower-status speaker addresses a higher-status addressee because it is threatening the addressee′s "face" (Chao, 1956; Mao, 2003). However, in a reversed situation in which Assistant Zhang addressed President Liu with the less respectful form, without appropriate context, this usage would lead to a misrepresentation and probably *not* be interpreted as Assistant Zhang being intentionally impolite to President Liu (Brown & Levinson, 1987; Kuo, 2002). On the other hand, it has been suggested that when the conversants are of equal social status, the usage of the second person pronoun is also constrained by factors related to social distance between the two persons (Mao, 2003). For example, when the conversants are of equal but high status, the use of the respectful form is expected not only due to the high status of the addressee (as compared with others not in the conversation) but also due to a relatively distant relationship between the speaker and the addressee, as inferred from the status information (i.e., persons at superior positions in an organization are not expected to have close, familiar relationships).

We created conversational scenarios describing a speaker and an addressee of equal or different social status. The utterance made by the speaker began with either a respectful version of the second person pronoun (*nin-de*) or a less respectful version (*ni-de*). For each version, the pronoun was either consistent or inconsistent with the relative social status of the speaker and the addressee (see Table 1). The inconsistent condition was realized by reversing the social status of the speaker and the addressee. Previous studies have shown that inconsistency between the critical pronoun and stereotypic information concerning the gender of the antecedent in the sentence context typically elicits a P600 effect (Lattner & Friederici, 2003; Osterhout et al., 1997). Hence we might expect a P600 effect for the two status-inconsistent conditions in Table 1. However, previous studies have also shown that inconsistency between the critical word in an utterance and world knowledge or the social identity of the speaker elicits an N400 effect on the critical word with no evidence of a