Psycholinguistic Studies of Language Processing in Japanese

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Introduction

Japanese scholarship has often followed an independent line of development in certain areas of scientific endeavor. The study of language and scientific approaches to primatology are two prime examples where the motivating intellectual force for research has been derived from specifically Japanese perspectives. It is fruitless to understand Japanese work in areas like psycholinguistics, natural language, and the structure of mental representations, without understanding the sources from which the relevant research questions are derived. At the same time, Japanese psycholinguistics has also been influenced from Anglo-American theoretical concerns.

This paper attempts to sketch a representative sub-section of the field of Japanese psycholinguistics, employing the topic of language processing as an illustration of theoretical approaches to questions of language behavior, and by extension, the degree to which linguistics and psychology collaborate in the actual practice of Japanese psycholinguistics. As a sample database, the research reported on here is derived from a representative survey of professional journals in linguistics and psychology, limited to research reported in the last twenty years.

Unlike Maclay’s (1973) useful classification of developmental steps in early psycholinguistics and Kess’ (1976, 1990, in press) historical overviews of the past century of activity, no such inventory as yet exists for Japanese psycholinguistics. Nor does the contribution of Japanese psycholinguistics figure at all in the comprehensive overviews that purport to cover the field of psycholinguistics for the Annual Review of Psychology. Indeed, these overviews are quite comprehensive, but are largely limited to reports of Anglo-American social science. In this respect, there is little difference between the first modern overview in the Annual Review of Psychology by Rubenstein and Aborn (1960), and later ones in the same Annual Review of Psychology by Ervin-Tripp and Slobin (1966), Fillenbaum (1971), Johnson-Laird (1974), and Danks and Glucksberg (1980). Even the current review by Foss (1988) contains no mention of Japanese pursuits.

The history of Anglo-American psycholinguistics over the past century is well-known. But the research paths of concern to Japanese psycho-
linguistics during this period are either ignored or are considerably less
transparent in the commonly accessible literature.¹ Questions like whether
there were independent developments, in contrast

Questions like whether there were independent developments, in contrast to
or in complementation to Anglo-American research goals, and even the
question of what is happening currently are only vaguely answered by
scanning the usual literature. The occasional promising title, as for exam-
ple, Jun Haga's (1988) fine Gengoshinrigaku Nyuuron [Introduction to Psy-
cholinguistics], does not overview Japanese psycholinguistics, but typically
presents the author's own work.

There is no question that fields related to psycholinguistic interests
have been particularly rich and more than occasionally serve as the subject
of overview articles. For example, Fukuzawa, Onose, Fukuda, and Nishitani
(1990) chronicle the directional trends in psychological studies of reading in
Japan from the 1960s through the 1990s, Takano, Okajima, Sakurai, and
Watanabe (1986) chart trends in educational psychology in Japan, and
Watanabe and Ohtsuka (1979) reflect the earlier fascination with cross-
cultural psychology in the 1960s and 1970s. Of course, the emphasis on
foreign language acquisition and the establishment of a sound language
pedagogy have always made Applied Linguistics a field of particular interest,
and this can be traced in the continuing emphasis in the literature (see, as an
example, Sasaki 1991), as well as the recent realization of the profes-
sional Japanese Association of Applied Linguistics (JAAL in JACET).

Psycholinguistic Studies of Language Processing

Certainly the most striking work in Japanese studies on language
processing has been in the area of kana-kanji processing. The orthographic
expression of phonological fact is carried by the two syllabic kana systems,
hiragana and katakana, and one expects that this will incur processing in the
left hemisphere. It is of course the left hemisphere which undertakes on-
line left-to-right sequential processing in space, as well as sequential pro-
cessing in time. But the Japanese writing system incorporates Chinese-
based kanji characters into the printed form of the language as well, making
for an orthographic system which incorporates both form-based and
meaning-based symbols into the decoding process. The general finding has
been, of course, that there is a left hemisphere advantage for linguistic
stimuli like kana and a right-hemisphere advantage for abstract configura-

¹ Unfortunately, this lack of knowledge is a general failing of Western
assessments of the theoretical and research directions in psychology and
related social sciences as intellectual enterprises developed within Asia.
See, for example, Shapiro's (1986) article for a lament on the general
neglect of Asian psychology in the United States, and Harris' book (cited
in Levine 1991) for even more specific commentary on The Cross-
cultural Challenge to Social Psychology.
tional stimuli like kanji (see Endo, Shimizu, and Hori 1978; Feldman and Tur
Nishikawa and Ninna 1981; Nomura 1981; Paradis, Hagiwara, and Hildebrandt
1985; Sasano, Itoh, Kobayashi, and Mori 1980; Sugishita, Iwata, Toyokura, Yoshioka, and Yamada 1978; Toma and Toshima 1989; Yokoyama, Imai, and Furukawa 1991. This result is consistent with hemi-
phric advantages in processing Chinese characters reported in logographic
writing systems like Chinese itself (see Keung and Hoosain 1989), and some
even make the claim that the right hemisphere is specialized for kanji pro-
cessing (see Hatta 1981a). It is of course certainly conceivable that the five
types of potential orthographies realized in hiragana, katakana, English
alphabetic, kanji, and pictographs each require their own processing system,
as Hatta (1985) has suggested. And indeed, others like Fujihara (1989) have
found processing differences for kana and numerals (see also Shimahara
1987). The notion of separate processing sub-systems, or modules, is per-
f ectly compatible with the modularity camp in the debate between modular-
variety of evidence has supported the possibility that the domain-specific
language processing system is encapsulated to deal with linguistic input
alone in the initial bottom-up analysis of the linguistic input, and it would
not be surprising to see the system further subdivided into smaller sub-
systems.

It is worth noting that a significant portion of the work with kana-
kanji processing and word recognition differences ascribed to the writing
system type overlaps and/or is derived from work with decremental loss of
such abilities in aphasics (see, for example, Hayashi, Ulatowska, and Sasano,
1985; Morinaga and Kiyoshi 1988; Paradis, Hagiwara, and Hildebrandt
1985; Sasano, Itoh, Kobayashi, and Mori 1980; Sugishita, Iwata, Toyokura, Yoshioka, and Yamada 1978), or is complementary to capi-
talizing on developmental abilities in children (see Steinberg, Isozaki, and

Differences in processing kanji, as well as the possibility of hemi-
phric advantages in processing kanji, have also been investigated (see Elman, Takahashi, and Tohsaku 1981; Endo, Shimimizu, and Hori 1978; Hatta
1977a, 1977b, 1981b, 1981c; Hayashi and Hatta 1978; Langman and Saito
1984; and Nomura 1979). The general finding is that kanji recognition is
facilitated by considerations of imagery and iconicity. Very simply, the
more concrete the kanji referent of the Chinese character, the quicker its
recognition; the greater the iconicity of the kanji form of the Chinese char-
acter, the more prototypical the kanji is perceived to be.

In turn, differences in representational models of kana (Itsukushima
1981) and differences in processing kana, as well as the possibility of hemi-
phric advantages in processing kana (see Hatta 1983, 1985; Hatta, Ohni-
shi, Yamamoto, and Ogura 1981) have also been investigated. In general,
there has been and continues to be tremendous interest in writing systems
and the possible processing systems that may be involved in lexical access
and comprehension (see Hatta 1985, 1986). A variety of experiments have been cross-orthographic by contrasting English (Hatta, Hatae, and Kirshner 1984), Korean hangul (Endo, Shimizu, and Nakamura 1981) and even numerals (Fujihara 1989; Itsukushima, Tozawa, and Itagaki 1990). Much of this work is reflective of the general interest in the uniqueness of the Japanese writing system, and by extension, in the possible uniqueness of the associated processing systems. There is no question that a case can be made for unique processing systems to deal with varying types of input, even if it is all in one domain, as for example, the orthographic domain (see Hatta 1985). Again, as suggested above, such a position is quite compatible with the modularity side of the debate between modularity and interactionism (see Fodor 1983, and Kess 1991a, 1991b, in press). And while some sound experimental work has been done on this topic (see Hatta and Dimond 1981), the presentation of the question can overlap the boundary into the larger introspective tradition abbreviated by the concept of Nihonjinron. For example, consider the recent popularization of the discussion about possible brain differences, as exemplified by the wide reception accorded Tsunoda's Nihonjin no Noo [The Japanese Brain] (see also Tsunoda 1984).

Although speech perception fits naturally within the domain of processing and comprehension of natural language, the literature here is so vast and specialized that it is beyond the scope of this paper except for mere mention. More traditional concerns are mirrored in some discussions, as for example, the use of the click monitoring paradigm to determine segmentation procedures (see Fukuda 1983). Sound symbolism (see Haga 1988), and the related notion of auditory speech images (see Inoue and Inoue 1986), have always have been a rich source of experimentation. But the real focus of current work in speech perception is related to industrial uses of acoustic principles for speech recognition devices. These have the potential to be attached to a range of industrial applications, encompassing their implementation in interactive devices ranging from language learning to virtual reality simulations.

Word recognition and lexical access is a focal topic in much Anglo-American contemporary psychological research, so much so that Foss' recent (1988) overview singles it out as the most productive area in psycholinguistics as practiced by psychologists. This emphasis is of course reflected in Japanese work, where familiar and reliable tasks like lexical decision and pronunciation tasks investigate the scope of factors like priming (see, for example, Harada 1987). Most word recognition studies by Western psychologists have focussed on aspects of written-word recognition, (see Kess in press); similarly, word recognition studies in Japanese also involve written-word recognition, and processing dimensions associated with kanji reading and/or recognition (see Kawaguchi 1987).

The implications of generative transformational grammar, and the resulting research paradigm which held sway for almost two decades between the 1960s and the 1980s, has had a ripple effect in both Japanese linguistics and psycholinguistics. With the sentence as the basic unit, and