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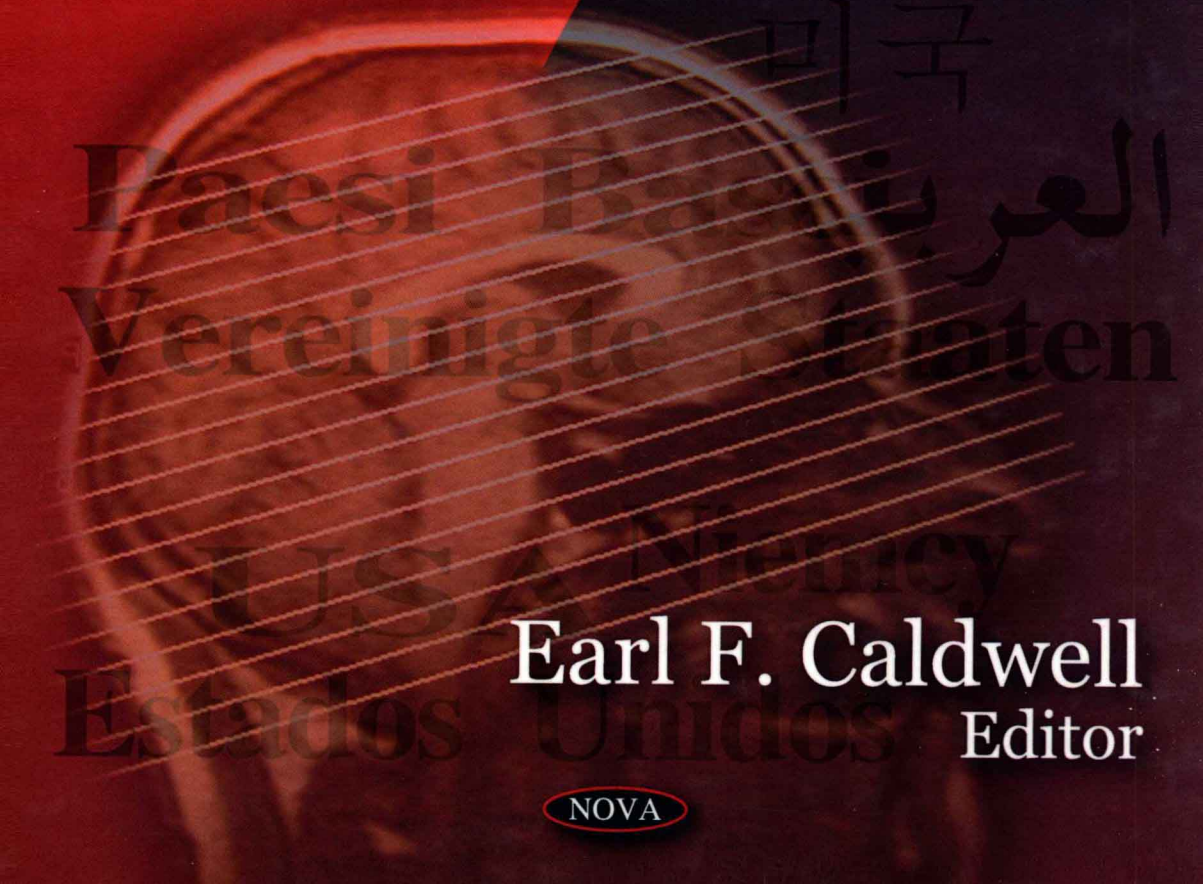

Earl F. Caldwell
Editor

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LANGUAGES AND LINGUISTICS SERIES

BILINGUALS: COGNITION, EDUCATION AND LANGUAGE PROCESSING

EARL F. CALDWELL
EDITOR

Nova Science Publishers, Inc.
New York

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Bilinguals : cognition, education and language processing / editor, Earl F. Caldwell.
p. cm.
Includes bibilographical references and index.
ISBN 978-1-60741-710-1 (hardcover)
1. Bilingualism. 2. Second language acquisition. I. Caldwell, Earl F.
P115.B555 2009
404'.2--dc22

2009032914

Published by Nova Science Publishers, Inc. † New York

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PREFACE

A bilingual person, in a broad definition, is one who can communicate in more than one language, be it actively (through speaking, writing, and/or signing) or passively (through listening, reading, and/or perceiving). More specifically, the terms bilingual and trilingual are used to describe comparable situations in which two or three languages are involved. A generic term for multilingual persons is polyglot.

Multilingual speakers have acquired and maintained at least one language during childhood, the so-called first language. The first language (sometimes also referred to as the mother tongue). This new book gathers the latest research from around the globe in this field.

Recent cross-cultural research on various cognitive functions found clear cultural influence on how we perceive our world. Likewise, neuroimaging research has found significant influence of culture / language in theory of mind (ToM) – ability to understand mental states of others – and self-construal (which is related to ToM) in the neural level. In Chapter 1, cross-cultural and brain imaging research on ToM and related social cognition are selectively reviewed. I discuss the roles of medial prefrontal cortex (mPFC) and temporo-parietal junction (TPJ) that have been consistently implicated in ToM and perspective-taking (or distinguishing "self" from "other"). These structures may be particularly important for culturally unique ways of social cognition related to ToM and self-construal. Next, I briefly review current developmental theories of ToM, and discuss whether or not the recent findings from neuroimaging studies of ToM in children support these theories. Functional relationship between "language regions" and ToM will also be reviewed along with these discussions. Lastly, I present two models of culture / language-dependent and independent ToM development.

Recent research suggests differences between bimodal bilinguals, who are fluent in a spoken and a signed language, and unimodal bilinguals, who are fluent in two spoken languages, in regard to the architecture and processing patterns within the bilingual language system. In Chapter 2, we discuss ways in which sign languages are represented and processed and examine recent research on bimodal bilingualism. It is suggested that sign languages display processing characteristics similar to spoken languages, such as the existence of a sign counterpart to phonological priming and the existence of a visual-spatial loop analogous to a phonological loop in working memory. Given the similarities between spoken and signed languages, we consider how they may interact in bimodal bilinguals, whose two languages differ in modality. Specifically, we consider the way in which bimodal bilingual studies may inform current knowledge of the bilingual language processing system, with a particular focus

on top-down influences, and the fast integration of information from separate modalities. Research from studies looking at both production and perception suggests that bimodal bilinguals, like unimodal bilinguals, process their languages in parallel, with simultaneous access to both lexical and morphosyntactic elements. However, given the lack of overlap at the phonological level (the presumed initial locus of parallel activation in unimodal studies) in bimodal bilinguals' two languages, we conclude that there are key differences in processing patterns and architecture between unimodal and bimodal language systems. The differences and similarities between unimodal and bimodal bilinguals are placed in the context of current models of bilingual language processing, which are evaluated on the basis of their ability to explain the patterns observed in bimodal bilingual studies. We propose ways in which current models of bilingual language processing may be altered in order to accommodate results from bimodal bilingualism. We conclude that bimodal bilingualism can inform the development of models of bilingual language processing, and provide unique insights into the interactive nature of the bilingual language system in general.

A variety of concepts/types of bilingualism and bilingual programs in U.S.A./Europe are presented. The cognitive benefits of bilingual education across several languages are reviewed. Diagnosis and intervention issues in bilingual children with Specific Language Impairment (SLI) / Typical Language Development (TLD) are discussed, including some behavioral and neurophysiology findings concerning language processes.

A cross-cultural study was done by comparing children from U.S.A. (with SLI/TLD) and children from Spain (with SLI/TLD), who were involved in a larger project (Girbau & Schwartz, 2007, 2008). Forty-four sequential bilingual children (7;6-10;11 years old), with L1 = Spanish and L2 = English/Catalan, participated. The psycholinguistic abilities in any bilingual group with TLD were significantly higher than in any bilingual group with SLI (Spanish-English/Spanish-Catalan). The similarities of the cross-cultural profiles are discussed.

Only children with TLD from Spain produced significantly more correct non-words (in the Spanish Non-word Repetition Task) than children with TLD from U.S.A. (who were exposed to English phonetics). This cross-cultural difference was not found for children with SLI; they all performed poorly in U.S.A. and Spain. The Spanish task was a good marker for SLI in both countries. Our results support the phonological working memory deficit associated with SLI, which appears to be independent of the particular bilingual background. The English Non-word Repetition Task was not sensitive in identifying SLI in these Hispanic unbalanced bilinguals, since English was their L2; their phonotactic representations in L1 seem to determine their performance on the task.

The Spanish non-word repetition accuracy correlated significantly with the Auditory Association subtest from the Spanish ITPA, in children with SLI/TLD and in Spain/U.S.A. The task also correlated significantly with the Grammatical Integration subtest for children with SLI and in Spain/U.S.A. Both subtests involve auditory working memory, but the second one has also some visual support through pictures. Implications of the results for the cross-cultural identification of SLI in bilinguals are discussed in Chapter 3.

The 2006 PISA (Program for International Student Assessment) report of worldwide scholastic achievements showed that about 50% of Israeli Arabic students were found to exhibit the lowest reading achievement scores in the PISA tests (level 1 and below) as compared to the other participating groups. Also, the MEITZAV national testing program in Israel (2001–2002) showed an achievement gap in language skills (reading and reading

comprehension) between Arab students and Jewish students in the school systems. This gap was larger than those found in the other areas tested (mathematics, science and technology, and English). The aim of this chapter is to explore the cognitive basis of these difficulties, specifically the diglossic situation in Arabic. Furthermore, the chapter discusses the unique features of the Arabic language that might contribute to the inhibition and slowness of reading acquisition and might even hinder the acquisition of basic academic skills. Finally, a model with a comprehensive basis (cognitive and neurocognitive) will be built in order to explain the complex linguistic situation of beginning Arabic learners.

Chapter 4 is concerned with the cognitive evidence bearing on the nature of the mechanisms of language processing in Arabic which has critical linguistic characteristics and a *diglossic* factor. Additionally, other aspects, including a neurofunctional perspective, will be discussed.

The aim of Chapter 5 is to explore the neurocognitive basis of the difficulties that the Arabic-Hebrew bilingual encounters in processing the Arabic language as a result of the diglossic situation in Arabic (spoken Arabic and Modern Standard, or Literary Arabic). Furthermore, the chapter discusses the unique features of the Arabic language that might contribute to the inhibition and slowness of reading acquisition and might even hinder the acquisition of basic academic skills. In the first section, two case studies of Arabic-Hebrew aphasic patients (M.H. and M.M.) are presented, with different disturbances in the two languages, Arabic (L1) and Hebrew (L2). They exhibited a complementary pattern of severe impairment of either L1 (Arabic) or L2 (Hebrew) constituting a double dissociation. These results suggested that the principles governing the organization of lexical representations in the brain are not similar for the two languages. The second section focuses on the functional architecture of reading in Hebrew and in Arabic. The effects of characteristics of Arabic and Hebrew as Semitic languages on hemispheric functioning were systematically examined. These patterns are compared with the modal findings in the literature, which are usually based on English. Also, the effects of the absence of almost all vowel information, the orthographies of the two languages, and their non-concatenative morphological structure were investigated. It was shown that when languages make different types of demands upon the cognitive system, interhemispheric interaction is dynamic and is suited to these demands. In that regard, both Arabic and Hebrew require a higher level of interhemispheric interaction than does English.

Chapter 6 examined if visual word access varies according to language and bilingual status by comparing Spanish and English, priming two syllable CVCV words with bilingual children and monolingual children. The results suggest that lexical access in English is based on a larger phonological sub-lexical unit because of greater report of a unit bigger than the syllable, among both bilingual and monolingual subjects. In contrast, only weak evidence suggested that Spanish lexical access was based on the syllable because of greater report of that unit for bilinguals and monolinguals. Finally, monolingual or bilingual status of the reader did not have influence on English lexical access; however, Spanish bilinguals were influenced by the acquisition of English, suggesting that orthographically opaque languages can have an effect on transparent languages or that immersion, language dominance and literacy experience can influence reading in the other language.

While several alphabetic systems are in use, Chapter 7 focuses on the two Semitic alphabet languages—Arabic and Hebrew—especially in the orthography of the two languages. Semitic scripts are unique in that short vowels are represented as diacritics on

consonant letters. The unique characteristics of Arabic and Hebrew orthographies make them unique for investigations among Latin alphabets or even one among the other (Taouk and Coltheart 2004). Hebrew and Arabic are both read from right to left.

The aim of Chapter 8 is to discuss important methodological issues regarding research on neurologically preserved bilingual and multilingual populations. It includes the variables to be considered in methodological aspects ranging from individual characteristics to task design and presentation, among others.

Hispanic Americans as a group score 0.5*SD* below White Americans on intelligence test measures (administered in English) that emphasize language processing, but score similarly when visual-perceptual/visual-motor processing is required. The reason for this language decrement is unknown. Chapter 9 considers the possible contribution of bilingualism to this effect, as studies linking bilingualism and cognition (conducted with multiple ethnic groupings) have consistently shown a bilingual disadvantage compared to monolinguals on language processing tasks. Two data sets (older children and adults) of bilingual Hispanic American performance on various intelligence test measures administered in Spanish and English showed evidence of a visual-perceptual/visual-motor over language processing advantage of about 1*SD*. The size of the visual-perceptual/visual-motor over language advantage was similar in both languages suggesting it is bilingualism-related and not due to low English language proficiency. Bilingualism appears to be a potentially important factor in the Hispanic American language processing decrement seen on intelligence tests, although no direct study on the effect of this variable has yet been conducted.

Bilingualism is a fertile resource for studying facets of language development and brain plasticity that may not be apparent in monolinguals. Chapter 10 will summarize historical and contemporary findings in the literature, discuss methodological issues that influence their interpretation, and suggest future directions for examining the neural substrates of language development and the consequences of having two languages in one brain.

Chapter 11 examined the effects of using a revised, transparent spelling system SoundSpel, a phonetic reading tool, with learners of English as a Second Language. During 6 training sessions, 12 participants used unaltered material and 12 used SoundSpel texts, in parallel with standard English, when reading American elementary school material. They then answered multiple-choice comprehension questions. Both groups were pre-tested and post-tested on comprehension tests of similar elementary school material without SoundSpel. No group differences were found across tests or training (in quiz performance or reading time), suggesting no beneficial or harmful effects from using SoundSpel. A post hoc analysis suggested that SoundSpel would be most beneficial for students who learn to speak English before they learn to read it.

One of the main issues facing Cross Language Information Retrieval (CLIR) is untranslatable words, i.e., words not found in dictionaries, which are usually referred to as Out Of Vocabulary (OOV) words. Bilingual dictionaries in general do not cover most proper nouns (e.g., names of places, people, countries, etc.), which constitute a large proportion of OOV words. As they are often primary keys in a query, their correct translation is often necessary to maintain a good retrieval performance. Because they are spelling variants of each other in most languages, an approximate string matching technique against the target database index is usually used to find the target language correspondents of the original query key. The n-gram technique has proven to be the most effective among other approximate string matching techniques. A more complicated issue arises when the languages dealt with

have different alphabets. The approach usually taken is transliteration. It is applied based on phonetic similarities between the languages involved. However, transliteration by itself cannot guarantee the exact spelling of the transliterated words as found in the document collection. There are a variety of ways that a transliterated word can be spelled despite conventions that might exist. The fact that there is no one correct way of spelling a transliterated word shows the need for a technique that is capable of generating the different spellings found in the document collection. In Chapter 12, we chose to combine both transliteration and the n-gram technique in an English-Arabic CLIR system, in which Arabic documents were searched using English queries. We evaluated the effectiveness of this approach and compared it with other transliteration approaches. Experimental results showed the retrieval improvement gained using our transliteration approach over other existing approaches.

Chapter 13 reviews technical methods for enhancing effectiveness of cross-language information retrieval (CLIR), in which target documents are written in different languages from that used for representing a search request. As the Internet has spread since the 1990s, the importance of CLIR has grown, and the research community of information retrieval has been tackling various CLIR problems. The purpose of this article is to overview exhaustively CLIR techniques developed in the research efforts. The following research issues on CLIR are covered: (1) strategies for matching the query and documents written in different languages, e.g., automatic translation or transliteration techniques, (2) techniques for solving the problem of translation ambiguity, (3) formal retrieval models for CLIR such as application of the language modeling, (4) methods for searching a multilingual document collection in which two or more languages are used for writing documents, etc.

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In: Bilinguals: Cognition, Education and Language Processing ISBN: 978-1-60741-710-1
Editor: Earl F. Caldwell, pp. 1-33

Chapter 1

CULTURAL AND LINGUISTIC INFLUENCE ON DEVELOPMENTAL NEURAL BASIS OF THEORY OF MIND AND SELF-CONSTRUAL: WHORFIAN HYPOTHESIS REVISITED

Chiyoko Kobayashi Frank*
Respecialization in Clinical Psychology, Fielding Graduate University,
Santa Barbara, CA, USA

Abstract

Recent cross-cultural research on various cognitive functions found clear cultural influence on how we perceive our world. Likewise, neuroimaging research has found significant influence of culture / language in theory of mind (ToM) – ability to understand mental states of others – and self-construal (which is related to ToM) in the neural level. In this chapter, cross-cultural and brain imaging research on ToM and related social cognition are selectively reviewed. I discuss the roles of medial prefrontal cortex (mPFC) and temporo-parietal junction (TPJ) that have been consistently implicated in ToM and perspective-taking (or distinguishing "self" from "other"). These structures may be particularly important for culturally unique ways of social cognition related to ToM and self-construal. Next, I briefly review current developmental theories of ToM, and discuss whether or not the recent findings from neuroimaging studies of ToM in children support these theories. Functional relationship between "language regions" and ToM will also be reviewed along with these discussions. Lastly, I present two models of culture / language-dependent and independent ToM development.

Introduction

Whorf (1956) hypothesized that our language constrains our thoughts and reflects our culturally unique world view. Later, Vygotsky (1967) elaborated this hypothesis, positing that

* E-mail address: chiyokok@hotmail.com (Corresponding author)

human consciousness (or thoughts) has its basis in linguistic or historical contexts and is enabled only through the internalization of culture-specific symbols (i.e., language). From the late 1960s to mid 1990s, the so-called Sapir-Whorf hypothesis was discredited by cognitive scientists and linguists who emphasized universal and veridical ways of perceiving our world. Throughout these decades a view, which posited that universal linguistic [Chomsky, 1980] and cognitive developmental [Piaget, 1962; Sinclair, 1970] principles determine individuals' thoughts and cognition, dominated. Despite the long period of obloquy, the Whorfian hypothesis has recently been revived following several new findings from cross-cultural / linguistic studies that have shown some influences of culture / language on people's representations of conceptual properties [e.g., Boroditsky, 2001; Bowerman and Choi, 2003; Brown and Levinson, 1993; Choi and Bowerman, 1991; Lucy, 1992].

Theory of mind (ToM) is defined as the ability to attribute mental states to oneself or others, and to use such knowledge to make sense of and predict the behavior of agents (Dennett, 1980). Since the first experiment with the chimpanzee [Premack and Woodruff, 1978], various paradigms have been devised to test ToM in humans [Baron-Cohen, 2000]. Among those ToM tasks, a false-belief (FB) task has been the most commonly used for testing normally developing [Wimmer and Perner, 1983] as well as atypical pediatric populations [Baron-Cohen, Leslie, and Frith, 1985; 1986; see also Baron-Cohen, 2000]. In a typical FB task, two characters appear (e.g., Sally and Anne) in a scene. When one character, Sally, is present, Anne, the other character, puts a toy into a basket. Sally then disappears from the scene. While Sally is away, Anne takes the toy out of the basket and puts it into a box. The experimenter then asks the subject the critical false-belief question, "Where will Sally look for the toy?" Nearly universally observed results are that adults and children over 4 years of age correctly answer "basket" whereas younger children (as well as older children and adolescents with autism) fail the task by answering "box" [Baron-Cohen, Leslie, and Frith, 1985; 1986]. These failures reflect their lack of understanding that Sally's belief about the location of the toy is different from Anne's [Frith, 2003; Happé, 1993].

A meta-analysis of more than 100 of studies indicated that across cultures children pass various FB style tasks between the first 2.5 and 5 years [Wellman et al., 2001]. However, as I will describe in this chapter, many studies that tested non-English speaking children found significant variability in the passing age of FB tasks (e.g., Chen and Lin, 1994; Goushiki, 1999; Naito, 2003; Naito and Koyama, 2006; Shatz et al., 2003; Vinden, 1996; Wahi and Johri, 1994). These studies have attributed the delays or advancements in the FB task performance in the non-English speaking children to either linguistic and / or cultural difference. For instance, Naito (2003) attributed the poor FB performance in Japanese children to differences in attribution style: Japanese / Asians tend to attribute behaviors / actions to external causes, while Americans / Europeans tend to attribute them to internal or dispositional causes [Nisbett, 2003].

The difference in the attribution style may be related to the difference in the self-construal. Social psychological research has found that Americans and Europeans maintain the independent self, yet Asians emphasize the relational or interdependent self [Heine, 2001; Markus and Kitayama, 1991]. Meanwhile, brain imaging research has found increasing evidence that the medial prefrontal cortex (mPFC) and temporo-parietal junction (TPJ) (see **Figure 1**), which have been consistently implicated in ToM [Frith and Frith, 2003; Saxe et al., 2004], are also related to distinguishing "self" from "other" [Blakemore and Frith, 2003; Jackson and Decety, 2004; see also Decety and Grézes, 2006]; the mPFC being more

important for self related judgment [Craik et al., 1999; Kelly et al., 2002; Lieberman et al., 2004; Ochsner et al., 2004; Ochsner et al., 2005] and TPJ being more critical for taking others' perspectives [D'Argembeau et al., 2007; David et al., 2006]. As I will describe in this chapter, my colleagues and I found significant difference in the ToM specific activity in the TPJ between American and Japanese groups [Kobayashi et al., 2006; 2007b]. When viewing the same ToM cartoons, American children showed greater activity in the TPJ than Japanese children. The difference in ToM-specific brain activity between the two groups may be associated with the cultural difference in self-construal style: i.e., Japanese' self-other distinction may be more blurred than Americans' due to Japanese' interpersonal self-construal style. Furthermore, as much as culture is inseparable from language [Vygotsky, 1967], it is reasonable to assume ToM and self-construal style influence (and are influenced by) language not only at the behavioral level but also at the neural level.

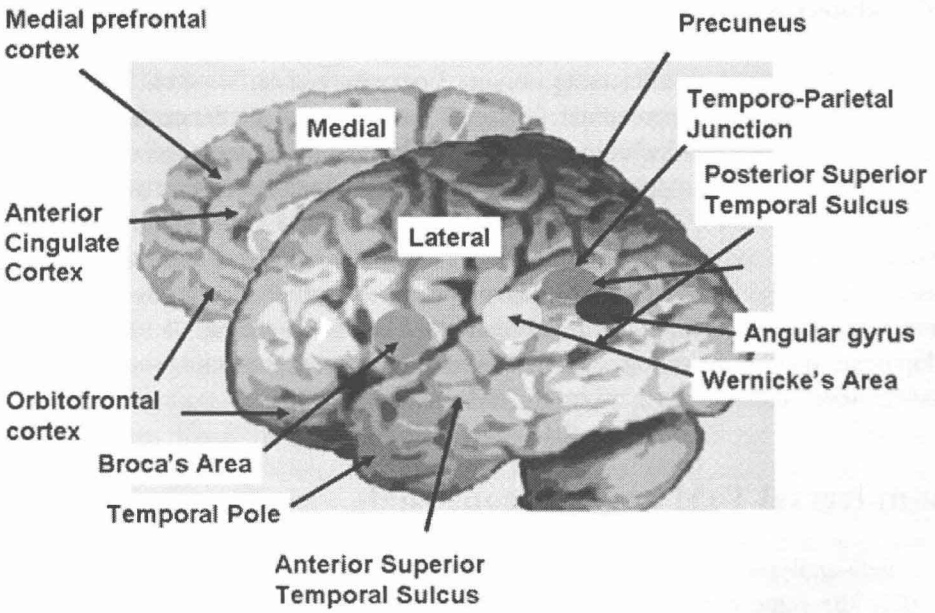

Figure 1. Brain diagram showing brain regions implicated in the ToM brain imaging studies. These include medial prefrontal cortex, anterior cingulate cortex, orbitofrontal cortex, and posterior superior temporal sulcus or temporo-parietal junction. Some of the "language regions" of the brain are shown in different colors.

Before I move on to the main body of this chapter, I briefly summarize three prominent theories of ToM development. The three main theories of ToM are "modular", "theory-theory", and "simulation". The modular theory posits that ToM development is a genetically determined innate process [Fodor, 1983; Leslie, 1994; Scholl and Leslie, 1999]. The modular theorists argue that all humans are born with a set of mentalistic concepts that are encapsulated and invulnerable to experience [Fodor, 1983]. In this highly nativistic framework there is no room for cultural variation in ToM. Another theory of ToM, theory-theory hypothesis claims that ToM development is like the development of a scientific theory and it relies on conceptual development. Unlike modularists, theory-theorists accept some role of experience [Gopnik and Wellman, 1992; Wellman et al., 2001]. The third theory of

ToM is called the simulation hypothesis [Harris, 1991; Harris and Gross, 1996], which, although it admits that ToM development depends upon conceptual development, argues that the concepts are derived from children's own direct experiences of such states, rather than through some abstract theorizing. These three prominent theories of ToM all predict universality at least in the early years. Even the least nativistic theory-theory assumes innate concepts of ToM which remains relatively resistant to socio-cultural influence throughout development [Wellman et al., 2001]. However, fortunately, the above three are not the only games in town. There is another theory of ToM that emphasizes the influence of the socio-cultural effects on ToM [Astington, 1996; Vinden, 1999; Tomasello, 2003; Naito, 2007]. This group of ToM researchers follow Vygotsky's theory [Vygotsky, 1967] and posit that it is the social-cognitive ability embedded in culture-specific symbolic systems (i.e., languages) that enables children's ToM. As I discuss below, evidence from both behavioral and neuroimaging studies seems to begin to support this last hypothesis of ToM development.

This chapter is divided into three main sections. The first part of the chapter considers results of cross-cultural behavioral studies on ToM and related social cognition and perception. The second part discusses universal or culture-specific neural basis of ToM and related social cognitive / perceptual functions based on the evidence from neuroimaging studies on these functions including ours. Particular emphasis is placed on the comparison between Asians and Anglo-American cultures. Neuroanatomically, my focus is on the comparison between mPFC and TPJ since my colleagues and I found significant difference in the ToM related activity in these regions between Japanese and Americans. The third part discusses main-stream theories of ToM development and whether or not recent findings from neuroimaging research support these theories. Finally, I present two models of ToM development; one representing universal and the other representing culture / language-dependent developmental mechanism of ToM.

Non-universal ToM and Self-construal

A meta-analysis over 100 studies found that developmental trajectory of ToM is essentially the same across cultures [Wellman et al., 2001]. Similarly, no difference was found between Canadian, Indian, Peruvian, Thai, and Samoan children in the onset of passing a single FB paradigm [Callaghan et al., 2005]. However, the universal ToM hypothesis has not been uncontested, as several ToM studies conducted outside the Anglo-American cultural or linguistic boundaries have obtained mixed results. Some of these cross-cultural / cross-linguistic studies have supported the universal developmental onset time of ToM [Avis and Harris, 1991; Collaghan et al., 2005; Lee et al., 1999; Naito et al., 1994; Tardiff and Wellman, 2000; Yazdi et al., 2005], whereas others found either delays [Chen and Lin, 1994; Goushiki, 1999; Liu et al., 2008; Louis, 1998; Naito, 2003; Naito and Koyama, 2006; Vinden, 1996] or advancements [Shatz et al., 2003] in ToM for non-English speaking children. For example, onset of FB understanding in Hong Kong children appeared 2 years later than that in Canadian children (Liu et al., 2008). Many of these authors have given linguistic or cultural differences as explanations for the poorer or better performance of the children living in non-Anglo-American countries. For instance, Junin Quechua children's poor ToM performance has been attributed to their lack of mental state verbs [Vinden, 1996]. In Lee et al.'s (1999) study with Mandarin-speaking children, even though the children's performance for the FB

task was overall comparable to Western children's performance, their performance was influenced by the choice of verbs (i.e., three verbs that all mean "think") used in the FB task. The Mandarin-speaking children performed significantly better when *yiwei* and *dang*, which connote that the belief referred to may be false, were used than when *xiang* (the more neutral verb) was used. The linguistic influence on ToM has also been noted in a few studies that found advanced performance in Turkish and Puerto Rican (PR) Spanish-speaking children [Shatz et al., 2003]. In this study, the Turkish or PR Spanish-speaking children, who have either a specific verb (Turkish) or a case marker (PR Spanish) available to make the false-belief mental state more explicit, performed better than Brazilian Portuguese or English-speaking children who do not have those lexicons.

As I mentioned earlier, Naito (2003) has attributed the below-chance ToM performance in 4- and 5-year-old Japanese children to differences between American / European and Asian cultural attribution styles: specifically, people raised in American / European cultures tend to attribute behaviors to internal causes (i.e., traits), while people raised in Asian cultures tend to attribute them to external or situational causes [Masuda and Nisbett, 2001; Nisbett, 2003].

These cultural differences may stem from an even greater difference between Asians and Americans / Europeans in the self-construal. Social psychologists have found that Easterners have a relational self (or inter-connected self with other people in the society) while Westerners have an individual self (or autonomous self separating from others) [Heine, 2001; Markus and Kitayama, 1991; Nisbett, 2003]. The difference in the self-construal presumably affects various human perceptions and cognitions including the causal reasoning. For instance, it has been shown that Westerners remember self-related adjectives better than intimate-other-related adjectives [Lord, 1980, Klein et al., 1989] whereas Chinese remember self-related adjectives no better than intimate-other-related adjectives [Zhu and Zhang, 2002]. According to the culture-dependent attentional hypothesis, a person in an interdependent culture might focus his / her attention on others and away from the self [Markus and Kitayama, 1991]. Cohen and Gunz (2002) tested Americans and Asians with an emotional perspective-taking task and found that when they were in the center of attention, Americans were more likely to take the first-person perspectives by projecting their own emotions onto others, while Asians were more likely to take the third-person perspectives. Similarly, in Wu and Keysar's (2007) perspective-taking experiment using eye-tracking, Chinese participants were more tuned into their partner's perspective than American participants were. Since perspective-taking is an important aspect of ToM [Decety and Chaminade, 2003; Samson et al., 2007], the difference between Asians (interdependent culture) and Americans (independent culture) in ToM may be attributed to the cultural difference in how "self" and "others" are construed.

Japanese Self-construal

Increasing evidence from socio-psychological studies suggests that Japanese and other Asian cultures encourage the use of "group-agency" more than individualistic "self-agency" to explain various kinds of human behaviors [Ames et al., 2001]. The priority of the group-agency over the self-agency in Japanese culture is reflected in the etymological meaning of self in Japanese; i.e., *jibun* or "my portion" [Nisbett, 2003]. While Indo-European language speakers may conceive an event based on the "action-agent" model [Werner and Kaplan,