RELATIONSHIPS BETWEEN WORKING MEMORY, THEORY OF MIND, AND VERBAL ABILITY AMONG IRANIAN PRESCHOOL CHILDREN

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RELATIONSHIPS BETWEEN WORKING MEMORY, THEORY OF MIND, AND VERBAL ABILITY AMONG IRANIAN PRESCHOOL CHILDREN

By

MOKHTAR FARHADIAN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malasia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

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DEDICATION

To my dear mother, Haji Bobani and my late father, Ali Farhadian, who I will never forget him and to all my brothers for their true love, and encouragement, and most important to my beloved wife for all her understanding, patience, and support during all difficulties of my study and to my father-in-law, Ali Gazanizad and mother-in-law, Azizeh Faraji.
A corelational study was carried out to investigate the relationship between working memory (WM), theory of mind (ToM), and verbal ability (VA) among Iranian preschool children. Stratified random sampling method was utilized to identify respondents for the study. One hundred and sixty-three preschool children were selected as respondents in this study. Ninety eight (62%) children were bilingual and 65 (38%) were monolingual children. Data were collected by using a questionnaire and three standardized instruments which included Automated Working Memory Assessment (AWMA), false beliefs tasks and McCarthy Scales of children’s ability and a questionnaire. The result revealed that the mean scores of bilingual children in working memory, verbal ability, and theory of mind were significantly higher than those of monolingual children. Pearson Product Moment Correlation statistically significant positive correlation were found between working memory and theory of mind (r = .436, p<.05), working memory and verbal ability (r = .426, p<.05) as well as theory of mind and verbal ability (r = .578, p<.05). The result supported a positive relationship between the working memory as well as verbal ability on children’s
theory of mind. Hierarchical regression analysis showed that controlling for age, verbal ability, and working memory, language status did not explain the variance in children’s theory of mind. The findings suggest that it would be vital for the teachers in preschool age group and also school age to screen working memory capacity among children and apply the appropriate methods to enhance working memory regardless of the kind of language that the children are speaking with.
PERKAITAN ANTARAN INGATAN KERJA, KEUPAYAAN PERTUTURAN, DAN TEORI MINDA DI KALANGAN KANAK-KANAK PRASEKOLAH DI IRAN

Oleh

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Satu kajian korelasi telah dijalankan untuk menyelidik hubungan di antara Ingatan Kerja, Keupayaan Pertuturan dan Teori Minda di kalangan kanak-kanak prasekolah berbangsa Iran. Kaedah persampelan berlapis telah digunakan untuk mengenalpasti responden dalam kajian ini. Sejumlah 164 kanak-kanak prasekolah telah dipilih sebagai responden untuk kajian ini. Sebanyak 98 (62%) adalah kanak-kanak yang boleh bertutur dalam dwibahasa dan 65 (38%) adalah kanak-kanak yang hanya boleh bertutur dalam satu bahasa sahaja.

antara Ingatan Kerja dan Teori Minda (r = .436, p<.05), Ingatan Kerja dan Keupayaan Pertuturan (r = .426, p<.05) dan juga Teori Minda dan Keupayaan Pertuturan (r = .578, p<.05).

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I would like also to thank the management of all kindergartens in Sananjaj city, for their cooperation during data collection. I also wish express my appreciation to all children who had participated in this research.

My heartfelt thanks to my dear mother and late father, who instilled upon me the values of learning and education. I am grateful to my wife and all my brothers for all their support, encouragement and love they gave me and for raising me the way I am today.
This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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Date: 15 July 2010
DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

__________________________
MOKHTAR FARHADIAN
Date: 30 May 2010
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<td>WM</td>
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<td>VA</td>
<td>Verbal ability</td>
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<td>PL</td>
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INTRODUCTION

The Kurds are a people of Indo-European stock who have lived in a geographically cohesive area that is called Kurdistan, and who make a nation with a distinct language and culture. The children are exposed to the second language (Persian language) from the birth and the language of education from kindergarten to higher education is Persian language and also in most of the time the language of media, is Persian language. First language of Kurdish children is Kurdish. The official language of Kurdish children is Persian. And the Kurdish children can talk in two languages as well.

All the kindergartens are under the supervision of welfare organization. Almost, the children are educated by the unique programs in the kindergarten of Kurdistan, but each kindergarten’s manager can conduct their favorite programs as well. The fee for all the kindergarten is the same, but the extra activities. And also, various social backgrounds can be observed among parents of the children. For example, from lowers to highest monthly income and in terms of education attainment, the parents are ranging from low educational levels to higher education.

During the preschool years, young children make amazing progress in different aspects of development (Wellman, Cross, and Watson, 2001). They engage in cooperative play, enjoy responsibility, and can take the perspectives of others as well as manipulate others’ action. They also use speech and language that can make a dramatic
transformation during the preschool years. There are some reasons why researchers are interested in the study of preschoolers. Firstly, this early stage of development set the foundation in child psychosocial development. Secondly, preschoolers can answer to the simple question, describe events and also follow the instructions (Chan, 2004). Cognitive development during preschool years is marked by significant advance in both meta-cognitive and social understanding. Perhaps one of the most intriguing ability that begins to emerge is children’s capability to appreciate other individual as psychosocial agent; this developmental milestone is theory of mind (ToM).

Children learn to appreciate that everyday’s behavior are motivated by internal states such as desires, beliefs and intentions (Premack & Woodruff, 1978). ToM allows us to recognize two important things about how mental states relate to the world. First, mental states can differ from true reality, for example, someone can think something that is not true. Second, two people can have different mental states with respect to the same situation.

The phrase ToM was first introduced by Premark and Woodruff (Premack & Woodruff, 1978). The development of ToM is a long process that has been reported from infancy to adulthood. Wellman, Cross, and Watson’s (2001) meta analysis showed that most of the ToM researches have focused on the understanding of false belief that normally occurs between 3 to 5 years-old children. It is accepted that typically developing children by 4 years old can answer on false belief tasks correctly (Perner, Leekam, & Wimmer, 1987b; Surian & Leslie, 1999).
Baron-Cohen, Leslie and Frith (1985) stated that ToM is the understanding that persons have mental states, such as thought, desires and beliefs, that represent or misrepresent the phenomena of the world. ToM is also the ability to use these mental states to predict and explain people’s behavior. Astington (2001) and Wellman (1993) argued that ToM is measured by standard false belief tests for crediting a child with ToM that require the children to predict what a protagonist will do.

Another cognitive ability that needs to be discussed is working memory (WM). WM refers to the processes or structures that have relationship with elaboration, storage, and transformation, and this process caused WM a fundamental and basic for cognitive psychology and also WM is a system for temporary holding and manipulation cognitive information such as learning, reasoning and comprehension Baddely (2003). Baddeley believed that WM is responsible for relationship between executive skills and other abilities such as ToM.

There are several conceptualization of WM, but the design of the present study is based on the widely accepted WM model developed by Baddeley and Hitch (1974). Baddeley (1996) and Baddeley and Hitch, (1974) stated that WM includes a system for temporary storage and manipulation of information and has three components such as central executive and two systems including phonological loop and Visuo-spatial sketchpad. This model of WM has been supported by evidence from studies of children (Alloway, Gathercole, Willis, & Adams, 2004) and adult participants, neuropsychological patients (Baddeley, 1996a) as well as neuroimaging investigations reported by Vallar and Papagno (as cited in Alloway, et al. 2005).
Furthermore, verbal ability (VA) may account for some of the improvement in ToM development with age. It has been consistently demonstrated that success on the majority of ToM tasks is closely related to verbal or linguistic ability (Happe, 1995). In another study, Sparrevohn and Howie (1995) revealed that two groups of children with autism matched in every dimension except verbal ability. Those with higher verbal ability were more likely to acknowledge false belief. According to the above studies, a minimum of VA level necessary for ToM tasks success

In the present study, however, two groups of the children are assigned; one consists of monolinguals and the other group bilingual preschool children. Researchers in multiple disciplines (education, psychology, and linguistics) are interested in investigating the impact of acquiring second language on various aspect of development (cognitive ability). Moreover, one of the most central and enduring issues in cognitive science concerns the impact of access to language on cognitive development (Bloom & Keil, 2001; Carruthers, 2002; L. Siegal & Surian, 2004). Children are exposed to a wide range of language environments. Some children such as deaf children with hearing parents may not be exposed to language until they enter into contact with users of a sign language. In contrast, bilingual children are exposed early to more than one spoken language. Thus, the bilingual children such as those in this study have been exposed to the second language (Persian) from the birth (The first language of the bilingual children was Kurdish language and their second language was Persian language, and the monolinguals just could talk in Persian). If bilingual children are aware that they must pay attention to the linguistic knowledge of other people because their interlocutor sometimes don’t know the same language that they know, then bilingual children may
have advantage over monolingual children in understanding that other people have mental state that could differ from their own. Thus, the researcher realized that bilinguals are an interesting test case for this study.

Currently, there is much debate as to the role of cognitive ability in children's ToM development (Fry & Hale, 1996; Perner, Stummer, & Lang, 1999; Zelazo, Jacqes, Burack, & Frye, 2002). The present study indicates a close association between certain aspect of cognitive development such as WM, VA and children's ToM development in bilingual and monolingual children. Since bilingualism is difficult to categorize, for the purposes of this study, the report of the parents and teachers were the basic criteria to determine the bilingualism and monolingualism children.

1.2 Problem statement

When a common meeting was arranged for the parents in the kindergartens of the Sanandaj city, many of the preschooler’s parents were feeling worry that obtaining second language might have negative effects on children’s learning. And most of the parents were trying to make the children as monolingual and just speak with official language to their children. This concern is probably increased by the incorrect belief that children are confused if they acquire two languages at the same time. It is the main concern that makes the researcher to do the study. Perhaps because of the bad experiences that many Kurdish people have had in speaking in the second language with bad accent at the high school or university among the monolinguals (Persian language speakers), it seems difficult for the parents to accept that it is possible to be a good
bilingual without experiencing any negative cognitive effects. Such broad-based fears calls for sound research that can address the true effect of bilingualism on preschool children.

While a great deal of attention has recently been paid to the content and structure of what has come to be called children's ToM (Astington, 1993; Barresi & Morre, 1996), less attention has been given to the information processing mechanism that makes that acquisition possible (Fodor, 1992), while this research tries to make it. The children who acquire ToM, more effective communication, interaction, and social understanding become possible, and opportunity to engage conflict resolution and pretend play with peers, and using strategy in games are probably increased (Astington, 2003; Cutting & Dunn, 1999). And it might be accompanied by heightened sensitivity to criticism (Dunn, 1995) or capacities for antisocial deception (Repacholi, Slaughter, Pritchard, & Gibbs, 2003). Children with ToM problem cannot differentiate between the reality and mental events and they consider what they see as true that it may be false. Researchers believed that limitation in information processing ability (Fodor, 1992), particularly WM is one of the factors that might underlie children’s development of an understanding of ToM and limitation in WM prevent children from understanding of false belief. However, it is hypothesized that if the ToM understanding was dependent upon the growth in WM capacity, then changes in ToM should be related directly to changes on WM performance.

Although, some studies have investigated the relationship between WM and ToM,
however, their findings are not unanimous (Davis & Pratt, 1995; Keenan, Olson, & Marini, 1998). Some researchers reported that there is a significant link between WM and ToM and others found no relationship. With such a mixed results were obtained on WM and ToM, the researcher tries to verify whether a significant link exits between WM and ToM. In addition, the researcher tries to clarify which subcomponents of WM have the highest link to ToM development. In addition, Keenan (2000) asserted that studies concerning WM and ToM are still limited, and more studies have to be done in this area.

Moreover, to the best knowledge of the author, no study has been done on WM and ToM on Iranian preschool bilingual and monolingual children. This study is the first study of its kind to examine the phenomena of WM and its subcomponents and the relationship of WM with ToM development in bilingual and monolingual preschool children. In the current study, the researcher seeks to uncover the link between WM and ToM development in bilingual and monolingual children. There is a knowledge gap in our understanding of the phenomena and several questions still remained to be answered such as, is there any significant relationship between WM and ToM between bilingual and monolinguals in the new population? Previous studies thus, have not provided a picture about the specifying the link between WM and ToM in bilinguals and monolinguals preschool children. This study, therefore, aims to investigate the phenomena. In addition, there is an urgent need to determine the relationship between the factors that might help to understand and clarify the phenomena and cover the gap of the previous studies.