

科技部補助專題研究計畫成果報告 期末報告

漢語高功能自閉症兒童的敘事能力研究：高年級學齡兒童之口 語敘說與心智理論能力

計畫類別：個別型計畫
計畫編號：MOST 103-2410-H-004-074-
執行期間：103年08月01日至104年10月31日
執行單位：國立政治大學英國語文學系

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報告附件：出席國際會議研究心得報告及發表論文

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中華民國 104 年 12 月 23 日

中文摘要：自閉症「心智理論缺陷說」是探討自閉症障礙的核心論述。研究者指出自閉症與典型對照組的基本敘事能力相似，但自閉症之敘事較少運用心智語彙、鮮少提供人物行為的因果解釋、及未能顧及聽者需求。研究者推論這些均與心智理論缺陷有關。然多數研究未能直接測量心智理論能力，致無法釐清自閉症其心智理論與敘事表達之關係。此外，國內研究多以學齡前或國小低年級學齡兒童為研究對象，且受制於單一敘事文類，故而我們對較大年齡自閉症兒童的敘事能力所知有限，對其敘事能力與心智理論之關係亦無從得知。不同於國內類似性質之研究，本研究以國小高年級之高功能自閉症學童為實驗組，以典型發展兒童為對照組，兩組兒童就性別、語言、智商、心智理論等能力指標配對。我們以Frog, where are you?為題材，編碼量化敘事中有關情感、慾望、認知、感官等類別的詞彙，以分析兩組兒童心智語彙的使用狀況。本研究另一特點在直接測量敘事能力與心智理論能力。研究結果顯示：兩組兒童在語句總數、詞彙與句構豐富性等方面的表現均相仿。其於心智語彙的使用及心智理論能力亦未達顯著差異。此外，心智語彙的使用與心智理論能力、語言、智商等能力指標間均未呈現顯著相關。我們回溯比較參與兒童三年前的的心智語彙表現，檢驗結果呈現：隨年齡成長，兒童於敘事中使用心智語彙的能力亦隨之成長。本研究凸顯自閉症研究中追蹤其能力發展的重要性，並讓我們對漢語自閉症兒童使用心智語彙的能力有進一步認識。

中文關鍵詞：自閉症、漢語兒童、敘事能力、心智語彙、心智理論

英文摘要：Previous research has endeavored to examine internal state language (ISL) in narratives by English-speaking individuals with autism spectrum disorders (ASD); however, studies on the use of ISL by Mandarin-speaking individuals with ASD are relatively limited. This study investigates the ability of Mandarin-speaking children with ASD to use ISL in narratives. The data consist of narratives from school-aged children (5th and 6th grade) with ASD (Mage= 11.29) and 16 typically developing children (Mage: 10.01), matched on language and cognitive abilities. The narratives were elicited using Frog, where are you? Participants' use of ISL was assessed by focusing on lexical expressions referring to emotion, desire, and perception and cognition. In addition, the Chinese Theory of Mind Battery was used to measure participants' theory-of-mind (ToM) abilities. The results reveal no group differences in basic narrative measures or in ToM performance. The two groups of children were comparable in their overall use of ISL and in reference to individual type of internal states. In addition, our results displayed no specific association between the use of ISL and ToM abilities. Compared with their performances at their earlier ages, however, our participants displayed developmental advancement in making internal-state attribution. These findings are discussed in

relation to linguistic and cognitive factors in narrative construction.

英文關鍵詞：ASD, Mandarin-speaking children, narrative abilities, internal state language, theory-of-mind

Narrative production in older-school-age children with autism spectrum disorders: Internal state language and theory of mind abilities

I. Introduction

Individuals with autism spectrum disorders (ASD) are characterized by deficits in social communication and interaction, and restricted repetitive interests/behaviors (DSM-V; APA, 2013). Given that narrative abilities involve an integration of social-emotional, cognitive, and linguistic knowledge, assessment of narratives has been regarded as an important means not only to examine the connection between social cognition and language (Lorusso et al., 2007; Norbury, Gemmell, & Paul, 2014) but also to explore the social-cognitive abilities in individuals with ASD (for review, see Stirling, Douglas, Leekam, & Carey, 2014).

Previous studies reported that individuals with ASD have relatively unimpaired phonological (Ellawadi & Weismer, 2015; Kjelgaard & Tager-Flusberg, 2001) and syntactic abilities (Pierce & Bartolucci, 1977; Shulman & Guberman, 2007), but show limited narrative abilities (for review, see Stirling et al., 2014). Investigations of narratives and ASD further demonstrated that, when individuals with ASD and comparison groups were matched on language abilities, few quantitative differences were found in basic narrative measures such as story length and syntactic complexity (Colle, Baron-Cohen, Wheelwright, & van der Lely, 2008; Diehl, Bennetto, & Young, 2006; Sah & Torng, 2015); however, differences in other aspects of narratives have been reported. For instance, individuals with ASD show limited use of causal language (Losh & Capps, 2003), and have difficulties maintaining topics and integrating narrative events (Jolliffe & Baron-Cohen, 2000; Landa, 2000). It has also been suggested that they tend to produce poorer high-point macrostructure (McCabe, Hillier, & Shapiro, 2013) and are more likely to have pragmatic violations (Loveland & Tunali, 1993). Such deficits in narrative performance have been related to the social impairments in individuals with ASD, and, in particular, considered to reflect their insensitivity to other minds (Colle et al., 2008; Tager-Flusberg & Sullivan, 1995).

To account for such deficits in reasoning other minds, the theory of mind (ToM) hypothesis of autism is probably the most-documented theoretical construct (Baron-Cohen, 1995; Baron-Cohen, Leslie, & Frith, 1986). ToM refers to individuals' abilities to attribute internal states—such as desires, emotions, beliefs and intentions—to themselves and others so as to explain and predict behavior. ToM abilities are considered essential to narrative construction, for a successful narrator relies on this ability not only to elaborate the internal states of story characters to account for their actions, but also to take account of listeners' knowledge and perspectives (Tager-Flusberg & Sullivan, 1995).

Internal state language in narratives

To explore the relationships with ToM abilities and narrative performance in ASD, a

variety of research has endeavored to examine to what extent individuals with ASD can use internal state language (ISL), which includes expressions about internal states (Stirling et al., 2014). The employment of ISL is important for narrative construction because it provides narratives the 'landscape of consciousness' (Bruner, 1986, p.14). While using ISL in fictional narratives, in particular, a narrator needs to go beyond him-/her-self to interpret the story character's internal states so as to provide psychological motivations to account for the actions of the character (Chafe, 1994). And such a shift between the narrator's own stance and the story character's perspective requires ToM abilities. Moreover, as Daiute and Nelson (1997) suggested, children's use of ISL is indicative of their attempts not only at sense making, but at considering multiple perspectives on events.

One recent finding about the use of ISL in ASD is suggestive (Bang, Burns, & Nadig, 2013). According to Bang et al., narrative tasks are a more sensitive means than spontaneous conversations to reveal the autistic individuals' difficulties in talking about internal states. Several studies have examined the use of ISL in narratives produced by individuals with ASD. To begin with, based on a picture sequencing task, Baron-Cohen et al. (1986), found that children with autism were less likely to refer to cognitive internal states in their narratives than the matched controls. The finding of reduced ISL in ASD was replicated by several studies (Begeer, Malle, Nieuwland, & Keysar, 2010; Pearlman-Avni & Eviatar, 2002). Other studies, however, found no differences in the use of ISL between ASD and comparison groups (Beaumont & Newcombe, 2006; Capps, Losh, & Thurber, 2000; Colle et al., 2008; Norbury & Bishop, 2003; Tager-Flusberg, 1995). It is worth noting that an uneven pattern is revealed in Tager-Flusberg's (1992) research in which children with ASD were found specifically impaired in referring to cognitive internal states, though they were comparable to the control children in using emotion, desire, and perception expressions. A somewhat different pattern, however, has been revealed by Siller et al.'s recent study (Siller, Swanson, Serlin, & Teachworth, 2014). According to them, children with ASD were less likely to use emotion terms than the matched controls; in contrast, the ASD and control groups were similar in their use of cognitive terms. The inconsistencies in previous findings about the use of ISL in ASD may be attributed to poor matching procedures. Thus, more investigations with rigorous matching of comparison groups are advocated to present a clearer picture of autistic children's ability in this regard (Siller et al., 2014; Stirling et al., 2014; Tager-Flusberg & Sullivan, 1995).

Given the significant role of ToM abilities in narrative construction, four observational studies have particularly investigated relationships between ToM abilities and the use of ISL in narratives produced by English-speaking individuals with ASD. To begin with, Tager-Flusberg and Sullivan (1995) detected significantly positive correlation between ToM performances and the narrative measures such as emotion and cognitive expressions and story length. This connection is also evident in the study by Capps et al. (2000), in which ToM abilities were found positively correlated with the use of ISL in children with ASD. Despite the ToM deficits

in ASD, Capps et al. reckoned that individuals with ASD may have limited, but not entirely absent, appreciation about the need to engage listeners in narrative discourse. On the contrary, Losh and Capps's (2003) research failed to demonstrate significant association between children's use of internal state terms and ToM abilities. Finally, in a recent study, Siller, et al. (2014) revealed an association between the use of emotion terms and ToM performances in children with ASD, but reported no association between cognitive terms and ToM abilities. As seen above, to date, an inconsistent picture has been presented regarding the relationship between ToM and ISL in narratives.

Use of internal state language in Mandarin-speaking children with ASD

While extensive research has examined internal state attribution in English-speaking individuals with ASD (Baron-Cohen, 1991; Baron-Cohen et al., 1986; Beaumont & Newcombe, 2006; Begeer et al., 2010; Pearlman-Avnion & Eviatar, 2002; Tager-Flusberg, 1992; Tager-Flusberg & Sullivan, 1995), studies on the use of ISL by Mandarin-speaking children with ASD are relatively limited (Chen, 2007; Chen & Chang, 2005; Lin & Chang, 2015; Tsao, Tsai, Wang, & Lu, 2012; Tsou & Cheung, 2007; Yang, 2011). Most studies on the production of ISL in Chinese ASD find no significant differences between ASD and comparison groups. A careful analysis of the literature, however, reveals variation in the ways ISL were measured and computed across studies. For instance, Chen and Chang (2005) used a metric based solely on references to emotional internal states, while Yang (2011) tallied various kinds of internal state words to yield a composite score. Researchers like Lin and Chang (2015) scored the component of internal response within the story-grammar framework based on the presence of emotional or cognitive expressions, without analyzing the total number or proportion of such expressions used in stories. In addition, though Chen (2007) found that the ASD and control groups were comparable in using ISL, she neither stated clearly how ISL were identified nor provided details of the data, which makes it difficult for subsequent research to replicate her findings. It is notable that recent research on English-speaking children's use of ISL suggested that expressions related to cognitive and emotional aspects be examined separately (Babar et al., 2013; Rumpf et al., 2012). With regard to Mandarin-speaking children with ASD, however, only Tsao and colleagues' (2012) and Tsou and Cheung's (2007) studies investigated cognitive and emotional state terms separately. Both studies failed to find differences between ASD and comparison groups on measures of either cognitive or emotional state terms. Despite that, Tsou and Cheung's study was limited to preschool children with ASD. It will be illuminating to investigate school-aged children's ability in this aspect, given the fact that children's overall narrative skills and competence in internal state terms undergo substantial developments from preschool years through middle-childhood (Gamannossi & Pinto, 2014; Mäkinen, Loukusa, Nieminen, Leinonen, & Kunnari, 2014). Though Tsao et al. tapped the use of ISL of school-aged children with ASD, their inclusion of expressions for cognitive states seems not

comprehensive enough. Moreover, their analyses mainly focused on the relationship between ToM and narrative performances rather than on the use of ISL per se. As seen above, we still do not have enough knowledge about the ability of Mandarin-speaking children with ASD to use ISL in narratives.

To date, only two studies on Mandarin-speaking children with ASD have investigated relationships between narrative performance and ToM abilities. Although Tsou and Cheung (2007) did not specifically examine the relationship between ToM and ISL per se, they revealed a significant correlation between ToM and the composite scores of evaluative devices.¹ The researchers pointed out the limitations in the false belief tasks they used and suggested more challenging test batteries involving diverse concepts be applied in future research to more adequately capture children's ToM abilities. In the other study, Tsao et al. (2012) found a significantly positive correlation between ToM scores and the ratio of correctly attributed internal states. Among various narrative indices measured in Tsao et al.'s study, the analysis about ISL was limited to this ratio of accuracy. Thus, more investigations will be needed to gain a more comprehensive picture about the relationship between the use ISL and ToM abilities.

The present study was thus an attempt to address these concerns by strictly matching groups of participants, applying a more challenging ToM battery, and examining the use of ISL in a more comprehensive way. One central question to ask was whether Mandarin-speaking school-aged children with ASD are comparable to typically-developing (TD) children in using ISL in narratives. The other major goal was to explore the relationships between the use of ISL and ToM abilities. To these ends, we based our analyses on ISL, which includes lexical expressions referring to emotion, desire, cognition and perception, to address the following research questions:

- (1) Is there any difference between Mandarin-speaking children with ASD and TD children in basic narrative measures?
- (2) Is there any difference between the two groups of children in the use of ISL?
- (3) What is the relationship between the use of ISL and ToM abilities?

II. Method

Participants

All the participants were male and were older elementary school students (5th and 6th grade). Children with ASD were referred by special education teachers in Taipei City and New

¹ ISL is one of the evaluative devices used in narratives. In Chang's (2001) study on the narrative development of Mandarin-speaking preschoolers, among the six evaluative devices examined, ISL is the only evaluative device progressing steadily in her language sample.

Taipei City. Their diagnoses were established from school records and clinical judgment by qualified clinicians. All the children with ASD met DSM-IV (APA, 1994) criteria for Autistic Disorder based on the Autism Diagnostic Interview--Revised (ADI-R; Lord, Rutter & LeCouteur, 1994); they were all high-functioning with Full Scale IQs (FSIQs) above 80 on the WISC-III (Chinese version) (Chen, 1997), and with sufficient language abilities to produce narratives.

The control group comprised TD children, with no concerns about ASD, learning disabilities or language delays. The two groups of participants were matched on verbal (VIQ), non-verbal (PIQ), and full-scale (FSIQs) cognitive abilities using WISC-III, and on receptive language scores from the Language Impairment Checklist for School Children-Revised (LICSC-R²; Lin, Huang, Huang, & Xuang, 2009). Participants' intelligence and language abilities were evaluated by a multidisciplinary team consisting of speech-language pathologists and clinical psychologists.

A *t* test showed that children with ASD were significantly older than TD children. A repeated measures analysis of covariance (ANCOVA), with age as the covariate, detected no significant differences between groups on intelligence quotient and language abilities. In addition to this, the two groups of children performed similarly on the ToM battery.³ Details about the participants are shown in Table 1.

Table 1. Group Characteristics

	ASD (N=9) M (SD)	TD (N=13) M (SD)	<i>t</i> or <i>F</i>	<i>p</i>
Chronological Age	11.29 (0.61)	10.01 (0.41)	29.81***	
Verbal IQ	114.1 (13.29)	105.9 (9.38)	0.17	.68
Performance IQ	115 (16.89)	105.2 (15.5)	0.03	.88
Full-Scale IQ	115.8 (14.19)	105.8 (12.57)	0.08	.78
Receptive Language	36.7 (1.94)	36.6 (1.71)	1.44	.25
Theory of Mind	54 (5.15)	58 (3.29)	4.51	.05

*** *p* < .001

Material

This study aimed to replicate prior research by using the wordless picture book *Frog*,

² LICSC-R (Lin et al., 2009) is a comprehensive language assessment instrument frequently used in Taiwan for the identification, diagnosis, and follow-up evaluation of language deficits in school-age children. As an individually administered test, LICSC-R assesses receptive and expressive language abilities for children aged 6 years through 12 years.

³ The Chinese Theory of Mind Battery was developed by Yeh, Hua, and Liu (2009). This battery not only contains typical first-order false-belief tasks, but also includes the more challenging second-order false-belief tasks, as well as other test items such as Faux Pas, implication stories, and non-verbal tasks.

where are you? (Mayer, 1969). The frog story is a typical children's story depicting a readily understood plot with a hero, a problem, a series of actions following the problem, and a happy ending. It is regarded as a valuable tool for tapping narrative abilities of both typically- and atypically-developing children (Berman & Slobin, 1994; Colle et al., 2008; Diehl et al., 2006; Losh & Capps, 2003; Yang, 2011). In the story, protagonists encounter many obstacles within an elaborate series of events, which provide many opportunities for narrators to infer the characters' internal states; it is, therefore, suitable for our research goal.

Data Collection

Rapport was first established in the observation period. The interviews were carried out individually with each participant, and consisted of an initial warm-up conversation followed by a narrative task based on *Frog, Where are You*. Prior to the story-telling, the experimenter explicitly said to the participants that she had no knowledge about this particular story book. Then, the participants were first asked to look through the entire book on their own and to tell a story while looking at the pictures. The entire interviews were audio- and video-taped and subsequently transcribed.

Data Analysis

Basic narrative measures. Participants' basic narrative measures include narrative length, variety of words, and syntactic complexity. Clauses were used to quantify story length. A clause consists of a verb and its arguments, and corresponds roughly to a single event. The total number of clauses in each narrative was tallied to quantify narrative length. The variety of words was analyzed in terms of the total number of different words used in each narrative. The syntactic complexity was indexed based on the frequency of complex sentences used in each story, which was yielded by dividing the total number of complex sentences in each story by the total number of clauses in that story. Complex sentences include four types of sentences: coordinate sentences, subordinate sentences, the *ba* construction, and the *bei* construction (Cheung, 2006; Yang, 2011).

Internal state language. Recent research on children's use of ISL suggests that expressions related to cognitive and emotional aspects be examined separately (Babar et al., 2013; Rumpf et al., 2012). Additionally, research has also indicated that individuals with ASD are selectively impaired in their knowledge about different categories of internal states (Baron-Cohen, 1991; Tager-Flusberg, 1992). In light of these, we adapted from previous research (Bartsch & Wellman, 1989; Bang et al., 2013; Bretherton & Beeghly, 1982; Tager-Flusberg, 1992; Tsou & Cheung, 2007; Wellman et al., 2000) the taxonomies and definitions for four kinds of mental expressions: namely, references to the internal states such as emotion, desire, cognition, and perception. By so doing, comparison of results with earlier findings is rendered feasible, and more comprehensive knowledge about the ability to use ISL

in ASD can thus be gained.

In our coding scheme, the elaboration for emotional state includes the expressions *happy*, *sad*, *worried*, *anxious*, etc., while words like *want*, *wish*, and *try* were classified as references to desire. The lexical expressions judged to refer to internal state of cognition include *belief*, *know*, *think*, *understand*, *wonder*, etc. Finally, words such as *look*, *hear*, *feel*, *smell*, *taste*, etc. belong to the category of perception. Following previous research (Bang et al., 2013; Capps et al., 2000; Norbury et al., 2014; Tager-Flusberg, 1992; Tsou & Cheung, 2007), this study used proportion scores as indices to report the use of ISL. To obtain the proportion scores, internal state terms in each participant's story were coded for each of the four categories and then divided by the total number of clauses in that story. Examples for the four categories of internal state terms are given below:

- (1) Reference to *emotion*
xiǎo nánhái jiù hěn shāngxīn
'The little boy is very sad.'
- (2) Reference to *desire*
xiǎo nánhái xiǎngyào yīgè chǒngwù
'The little boy wants to have a pet.'
- (3) Reference to *cognitive state*
tā xiāngxìn xiǎo qīngwā hái zài fùjìn
'He believes that the little frog is still around.'
xiǎo nánhái yǐwéi xiǎo qīngwā shuì zhe le
'The little boy thought the little frog was asleep.'
- (4) Reference to *perception*
xiǎo nánhái kàndào tā de xiǎo qīngwā
'The little boy saw his little frog.'

Reliability. 25% of the narratives were randomly chosen and coded by a second coder for reliability. Inter-rater agreement for all measures ranged between 90% and 95% (Cohen's Kappa coefficient).

III. Results

The first research question pertains to participants' basic narrative measures, including narrative length, variety of words and syntactic complexity. A *t* test showed that children with ASD were significantly older than TD controls; results were therefore analyzed using age as a covariate. A repeated measures analysis of covariance (ANCOVA) detected no significant differences between groups regarding basic narrative measures (Table 2).

Table 2. Number of clauses, number of different words, and proportion of complex sentences

	ASD (N=9) M (SD)	TD (N=13) M (SD)	F	<i>p</i>
Number of clauses	64 (12.83)	63.38 (10.75)	0.003	.96
Number of different words	159.22 (29.02)	148.31 (27.50)	0.30	.59
Proportion of complex sentences	23.61 (6.27)	24.95 (8.90)	0.003	.96

* $p < .05$

The second research question focuses on the use of ISL. Table 3 provides the mean number of expressions referring to emotion, desire, cognition, and perception, respectively. ANCOVA, with age as the covariate, showed no significant difference between groups with respect to the total number of internal state terms produced, $F(1, 19) = 0.77, p = .39$. To compare with results of previous research (Bang et al., 2013; Norbury et al., 2014; Tager-Flusberg, 1992; Tsou & Cheung, 2007), we used proportion scores as indices to report participants' use of internal state terms. Because the data were in percentages, arc sine transformations were carried out on the percentage data to normalize the distribution. After that, ANCOVA was performed on the data, with age as the covariate. This analysis revealed no group main effect for the proportion of total internal state terms used in narratives⁴ ($F(1, 19) = 1.00, p = .33$), suggesting that children with ASD had no difficulty with the overall use of ISL. Similarly, further inspection of data revealed no significant group differences in any type of internal state terms, suggesting that the two groups of children spoke equally about these internal states (Figure 1).

Table 3. Means of different lexical categories of internal state terms

	ASD (N=9) M (SD)	TD (N=13) M (SD)	F	<i>p</i>
Emotion	1.11 (1.45)	1.23 (1.01)	1.75	.20
Desire	0.66 (1.41)	1.15 (1.14)	1.20	.29
Cognition	2.56 (1.88)	1.38 (1.19)	1.19	.29
Perception	4.56 (3.40)	5 (3.58)	0.01	.91

The third research question examines the relationships between the use of ISL and ToM abilities. To this end, our analysis based on the total token of internal state terms and ToM scores. The results did not yield significant correlation between these two variables within both groups of children. Further inspections were carried out to understand the interrelationships between ISL performance and cognitive or linguistic abilities. As shown in Table 4, no

⁴ All instances of internal state words were summed and divided by the total number of clauses to obtain a proportion score, which was used as an overall index of ISL.

significant correlation was obtained between the ISL indices and cognitive, language, or ToM abilities.

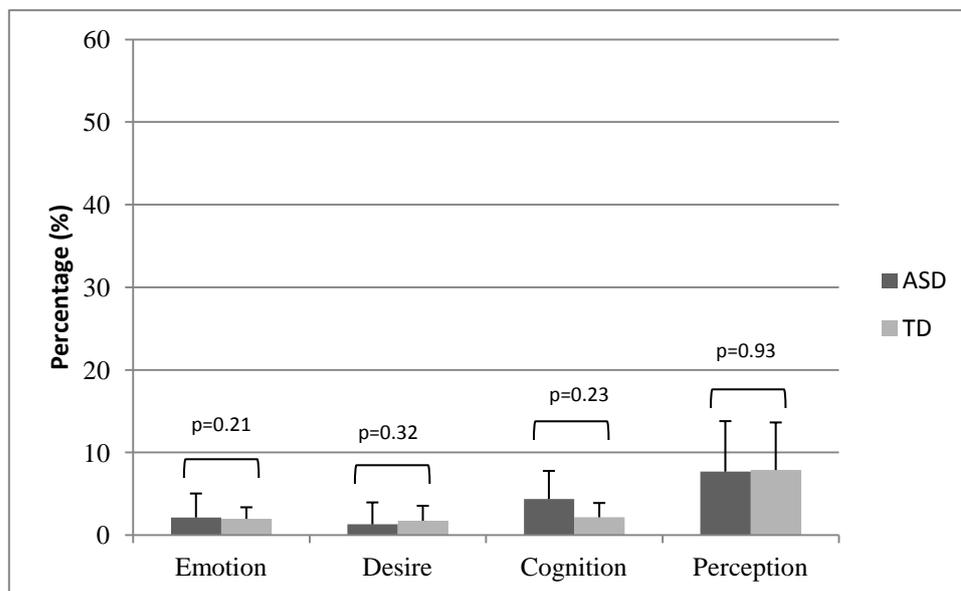


Figure 1. Comparisons between groups for different categories of internal state terms.

Significance level: * $p < .05$

Table 4. Correlation matrix for ISL indices, cognitive, linguistic, and ToM abilities

TD	VIQ	PIQ	FIQ	RLA	ToM
TISE	.19	.06	.13	.35	.17
EMO	-.22	-.06	-.14	-.38	-.30
DES	-.04	.19	.09	.16	.11
COG	.03	.01	.02	.08	-.27
PCP	.29	.02	.15	.44	.33
ASD	VIQ	PIQ	FIQ	RLA	ToM
TISE	-.23	-.14	-.24	-.27	.16
EMO	.004	-.06	-.05	.06	.54
DES	-.49	-.26	-.45	-.46	-.38
COG	.16	-.15	-.03	.00	.45
PCP	-.15	.02	-.08	-.18	.03

TISE, total internal-state expressions; EMO, emotion terms;

DES, desire terms; COG, cognition terms; PCP, perception terms;

VIQ, verbal IQ; PIQ, performance IQ, FIQ, full-scale IQ;

RLA, receptive language ability; ToM, ToM abilities

Significance level: * $p < .05$

IV. Discussion and conclusion

This study examined the ability of Mandarin-speaking children with ASD to use ISL within narrative contexts. Consistent with prior research, no significant group differences were found in story length, variety of words or syntactic complexity. This replicates earlier findings about the intact performance in basic narrative measures in individuals with ASD within similar storybook contexts, in which ASD groups were matched with comparison groups on language abilities and on verbal or full-scale IQ (Diehl et al., 2006; Losh & Capps, 2003; Tager-Flusberg & Sullivan, 1995; Tsou & Cheung, 2007; Yang, 2011).

In line with previous findings (Bang et al., 2013; Capps et al., 2000; Norbury et al., 2014; Yang, 2011), our results for proportions of total internal-state references in the language samples suggest that the overall use of ISL did not differ between children with ASD and TD controls. Similarly, no significant group differences were found for any of the four categories of internal state terms. It is worth noting that in the study based on the same participant pool at their earlier ages (1st and 2nd graders), Sah and Torng (2013) displayed the strengths and weaknesses in children with ASD relative to TD children in their references to different type of internal states. In this earlier study, the two groups of children performed comparably in the overall use of internal state terms and in using desire and cognition terms. In addition, the ASD group used more emotion terms than the TD group, and a reverse pattern was revealed for the use of perception terms. Using the similar fine-grained taxonomy, somewhat surprisingly, the present study found that, with increasing age, the two groups of children were comparable in all these aspects pertaining to ISL. The comparable performances in the present study may be attributed to these older autistic children's developmental gains in the ability to reason and talk about internal states, as suggested by Tager-Flusberg and Sullivan (1995).

With respect to the relationship between the use of ISL and ToM abilities, our results displayed no specific association between these variables, which supports Losh and Capps (2003) previous finding. On the other hand, the results are inconsistent with the findings of other studies. The inconsistencies in research findings may be attributed to methodological issues. The first issue is concerned with coverage of participants with different ages, which is likely to increase the heterogeneity of participants. A further issue is about the wide variation across studies in matching variables: some studies relied on only language abilities, while others considered both cognitive and language abilities as matching variables. For instance, though both Siller et al. (2014) and the present study matched participants based on their language and cognitive abilities, the participants in the two studies belong to different cognitive stages of development (Piaget, 1952). In addition, the former study relied on vocabulary test to measure language abilities, while the language battery used in the present study seems comparatively more complicated and challenging. In view of all these, firm conclusions are still unable to be drawn regarding the relationship between ISL and ToM abilities in ASD, and more investigations with

rigorous matching of comparison groups are thus advocated to present a clearer picture in this regard.

It is notable that this is the first study to provide a comprehensive examination of each category of internal state terms used by older school-aged Mandarin-speaking children with high-functioning ASD. Our results displayed that the older school-aged children with ASD performed as equally well as the TD children in ToM tasks and in using ISL. Compared with their performances at their earlier ages, our participants displayed developmental advancement in making internal-state attribution. To understand the strengths and weaknesses about using ISL in ASD, more longitudinal research with larger sample size and more strictly matching criteria would be needed.

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本計畫相關之學生論文

本校語言學研究所之博士生葉侃或同學根據本研究計畫所收集的語料撰寫成會議論文，已發表於the 40th Boston University Conference on Language Development (BUCLD-40) 會議中。詳細資料如下：Yeh, K. (2015). Development of goal-plan in narratives of Mandarin-speaking children with high-functioning autism spectrum disorders. Paper presented at the 40th Boston University Conference on Language Development, Boston, MA, USA, November 13-15。該篇論文已受邀並將收錄於BUCLD-40會議論文集。

科技部補助專題研究計畫出席國際學術會議心得報告

日期：104年10月

計畫編號	MOST 103 - 2410 - H - 004 - 074		
計畫名稱	漢語高功能自閉症兒童的敘事能力研究：高年級學齡兒童之口語敘說與心智理論能力		
出國人員姓名	薩文蕙	服務機構及職稱	政大英文系副教授
會議時間	104年9月24日至 104年9月26日	會議地點	Stuttgart (斯圖加特)
會議名稱	The 9th International Conference of the European Association of Chinese Linguistics (EACL-9)		
發表題目	An investigation of narrative discourse of Chinese-speaking children with autism spectrum disorder: Relating narrative events		

一、參加會議經過與心得

每三年舉辦一次的International Conference of the European Association of Chinese Linguistics (EACL)為學術界一大盛事，也是漢語語言學研究領域中的重要國際學術會議。今年的會議中邀請Kai von Fintel (MIT Cambridge, MA)、Niina Ning Zhang (National Chung Cheng University)以及Barbara Meisterernst (Humboldt-University, Berlin)等知名學者發表論文或專題演說。與會學者來自歐洲、美國、澳洲、日本以及兩岸三地；會中獲選發表之論文涵蓋漢語語言學各個範疇之重要議題。涵蓋語言學各次領域的EACL，提供與會學者一交流討論的平台，讓來自世界各地的專家可交換研究心得。

今年該會除著重語法、音韻之結構或漢語方言演繹變化之探討，並加重實證研究(experimental study)之比重，此一作法恰與筆者研究取向契合。筆者由專題演說以及內容精彩的論文發表中領受許多啟發，累積了更多研究能量。而筆者針對台灣的漢語自閉症兒童敘事表現的研究，亦得到許多迴響。透過此次會議發表，筆者就研究心得與來自各地的專家交流討論，對研究結果的詮釋助益匪淺，對後續研究的進行亦有重大啟發。更重要的是，得以在許多語言學家專家聚集的會議中發表研究成果，不僅能增加本校乃至台灣於漢語兒童敘事方面研究的能見度，讓國際學界瞭解我國於自閉症兒童敘事能力研究的進展與投入。而藉由EACL會議發表論文的機會，筆者期盼能推動更多學者，從事漢語自閉症孩童敘事能力的相關研究，從而促成有關漢語自閉症兒童臨床介入治療與理論建構的實質進展。

二、建議

本屆大會針對漢語語言學各領域，提供與會學者一相互交流切磋的機會，不僅讓來自世界各地的專家可交換研究心得，並藉此推動漢語語言學界的整體進步。筆者認為國內可借鏡EACL的作法，兼重理論辯論與實證精神，廣邀世界各地的漢語語言學專家齊聚一堂，進行切磋交流，俾使能激盪出更宏觀、更具創意的角度以處理研究議題，促進語言學學門之整體發展。

三、發表論文摘要

Previous research on narrative and autism indicated that though individuals with autism spectrum disorder (ASD) and typical controls performed similarly on basic narrative measures such as story length and grammar, the former showed difficulty in connecting narrative information coherently by means of causal relations (Diehl et al., 2006; Sah & Torng, 2015). Relevant to this difficulty, neuropsychological research has shown that planning and organization are among the most impaired areas of functioning of this clinical population (Ozonoff, 2004).

This study aimed to investigate the ability of Chinese-speaking children with ASD to relate narrative events. We examined narratives from 6 children with high-functioning ASD and 6 typically developing (TD) children strictly matched on age, linguistic and cognitive abilities. The narrative data were based on a picture book *Frog, where are you?* Participants' ability to relate narrative events was analyzed in terms of global story components, planning components, and goal-attempt-outcome (GAO) unit (Trabasso & Rodkin, 1994). Additionally, the 'deer episode' of the frog story, the most cognitively demanding episode, was chosen to tap participants' ability to relate a complex sequence of events. Given the clinical children's impairments in organizing narrative information, it was predicted that, compared with TD children, children with ASD would use less planning components and less GAO units and would be less likely to coherently integrate events of the deer episode.

The results revealed that, when strictly matched on age, linguistic and cognitive abilities, no significant group differences were found on basic narrative measures, such as story length, variety of words, syntactic complexity and evaluative devices. Consistent with our prediction, children with ASD encoded less planning components than did the TD group. However, the two groups of children performed comparably in encoding GAO units and in relating events for the deer episode. The findings are discussed in relation to linguistic and cognitive factors in narrative construction; the goal-plan knowledge, Gricean Maxims and theory-of-mind ability are also considered.

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科技部補助計畫衍生研發成果推廣資料表

日期:2015/12/23

科技部補助計畫	計畫名稱: 漢語高功能自閉症兒童的敘事能力研究: 高年級學齡兒童之口語敘說與心智理論能力
	計畫主持人: 薩文蕙
	計畫編號: 103-2410-H-004-074- 學門領域: 心理語言學
無研發成果推廣資料	

103年度專題研究計畫研究成果彙整表

計畫主持人：薩文蕙		計畫編號：103-2410-H-004-074-					
計畫名稱：漢語高功能自閉症兒童的敘事能力研究：高年級學齡兒童之口語敘說與心智理論能力							
成果項目		量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）	
		實際已達成數（被接受或已發表）	預期總達成數（含實際已達成數）	本計畫實際貢獻百分比			
國內	論文著作	期刊論文	0	1	100%	篇	
		研究報告/技術報告	1	1	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	1	1	100%	人次	
		博士生	1	1	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	1	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	2	2	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
其他成果 （無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。）		本校語言學研究所之博士生葉侃或同學根據本研究計畫所收集的語料撰寫成會議論文，已發表於the 40th Boston University Conference on Language Development (BUCLD-40)會議中。詳細資料如下：Yeh, K. (2015). Development of goal-plan in narratives of Mandarin-speaking children with high-functioning autism spectrum disorders. Paper presented at the 40th Boston University Conference on Language Development, Boston, MA, USA, November 13-15. 該篇論文已受邀並將收錄於BUCLD-40會議論文集。					

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與(閱聽)人數	0	

科技部補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

達成目標

未達成目標（請說明，以100字為限）

實驗失敗

因故實驗中斷

其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文： 已發表 未發表之文稿 撰寫中 無

專利： 已獲得 申請中 無

技轉： 已技轉 洽談中 無

其他：（以100字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以500字為限）

本世紀以來國內外自閉症的出現率迅速攀升，對自閉症之障礙與成因的研究，實有臨床與理論的迫切需要。國際學界認為敘事表達是觀察患者溝通障礙的重要窗口。然綜觀國內相關研究，多以學齡前或國小低年級學齡兒童為研究對象，致我們對較大年齡的自閉症兒童其敘事表達及使用心智語彙的能力仍無從得知。儘管「心智理論缺陷說」是探討自閉症溝通障礙的核心論述，然有關自閉症敘事表達的研究多未能直接測量心智理論能力，致無法釐清兩者間之關係。為進一步檢視國外研究及臨床觀察發現，本研究藉由跨領域合作的方式，同時測量高年級自閉症學童的心智理論能力與敘事能力，深入剖析漢語自閉症兒童運用心智語彙的能力。研究結果顯示：自閉症與正常發展兒童在心智語彙的使用及心智理論能力均未達顯著差異。此外，心智語彙的使用與心智理論能力、語言、智商等能力指標間亦未呈現顯著相關。另外，回溯比較參與兒童三年前的心智語彙表現，我們發現隨年齡成長，兒童於敘事中使用心智語彙的能力亦隨之成長。研究結果凸顯自閉症研究中追蹤其能力發展的重要性，為日後相關研究提供可參考的方向。本研究兼具臨床實務與理論探討的雙重意義：不僅採集整理國內國小高年級自閉症學齡兒童的珍貴語料(註一)，供臨床實務之參考；亦藉此研究結果作跨語文的比較，進而檢驗「心智理論缺陷說」在解釋自閉症兒童敘事表達上之適切性。

註一：本校語言學研究所之博士生已根據所收集的語料撰寫會議論文，發表於

the 40th Boston University Conference on Language Development 會議中
。詳細資料如下：Yeh, K. (2015). Development of goal-plan in
narratives of Mandarin-speaking children with high-functioning
autism spectrum disorders. Paper presented at the 40th Boston
University Conference on Language Development, Boston, MA, USA,
November 13-15.