

Discourse Features of Chinese-Speaking Seniors with and without Alzheimer's Disease*

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Empirical studies on the discourse of persons with Alzheimer's disease (AD) have revealed that appropriate language usage in context becomes more impaired and the communicative ability gradually deteriorates over the course of the disease. Despite the growing research interest in AD discourse patterns, there are still open questions. Up to the present time, few studies have addressed the predictive power of discourse features for the severity of Alzheimer's dementia. Also, little attention has been drawn to the linguistic features in Mandarin Chinese-speaking persons with AD's discourse. This study intends to describe discourse patterns produced by 20 AD participants and 20 healthy elderly controls in a Chinese-speaking society. Forty transcripts of interview style conversations were analyzed. Discourse patterns were examined in light of discourse-building features and discourse-impairing features. Semantic and pragmatic aspects in oral revisions are also discussed. Results indicate that fewer discourse-building features but more discourse-impairing features were found in conversations of the elderly with AD compared to the healthy controls. Discourse-impairing variables correlate significantly more with the degrees of dementia than with the discourse-building variables. Especially, revisions and no global coherence were significantly associated with the severity of Alzheimer's dementia for the Chinese-speaking population in Taiwan.

Key words: Alzheimer's disease, discourse features, Mandarin Chinese

1. Introduction

In past decades, persons with Alzheimer's disease (AD) have been characterized by multiple cognitive deficits. Among these deficits, semantic impairments and progressive memory loss are the most important and are widely examined (Brandt & Rich 1995; Heindel et al. 1993; Sebastian et al. 2001). Early psycholinguistic studies investigated qualitative differences in persons with AD's prose discourse (see Abeyasinghe et al. 1990; Ellis 1996; Kemper et al. 1993; Lyons et al. 1994). They demonstrated that these participants experienced semantic deficits in the early stages of AD.

Another direction to investigate possible cognitive impairments in persons with AD is discourse analysis of their conversations. As Cherney (1998) and Dijkstra et al. (2004) note, analyzing discourse performance in a specific clinical population, such as persons with AD, can provide important information as to how their linguistic abilities are affected. Discourse analysis aims to

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identify the underlying cognitive and linguistic processes that impair discourse. Hence, it is of great significance to examine persons with AD's abilities to communicate. According to Martin & McDonald (2003:451), this ability depends not only on an intact language system, but also on 'knowledge of the specific communicative context, knowledge about the co-conversant(s), and general knowledge of the world.' Lexical and syntactic skills alone cannot facilitate real conversation. To combine sentences into a coherent and meaningful discourse in conversations also requires 'knowledge of discourse structure and rules for appropriate language use' (Huppert et al. 1994:346). To maintain a coherent discourse relies more heavily upon cognitive resources or such facilitating strategies as conciseness, elaboration, coherence, and appropriate pronominal reference than upon lexical or syntactic skills (Dijkstra et al. 2002a, 2002b, 2004).

Earlier studies on the discourse of healthy older adults as opposed to that of older adults with dementia indicated a higher frequency of empty as well as indefinite words and aborted phrases in the AD group (see Hier et al. 1985; Kempler 1991; Ripich & Terrell 1988). Additionally, AD participants often make inappropriate use of pronouns (Kempler et al. 1995; Ulatowska et al. 1988). To use pronouns properly requires sufficient memory capacity to match with the earlier information in the discourse. This memory capacity and the semantic memory, however, are reported to be impaired in persons with dementia (Baddeley 1996; Orange & Purves 1996).

In recent years, Dijkstra et al. (2002a, 2002b, 2004) have undertaken a series of research projects on English-speaking AD discourse and described discourse performance in conversations according to two features: discourse-building features and discourse-impairing features. The former contribute to the continuation of conversation, while the latter hinder the communicative purpose of conversation. Dijkstra et al. (2002a, 2002b) regarded 'cohesion, coherence, and conciseness' as discourse-building features, but 'revisions, aborted phrases, empty phrases, repetitions, indefinite words, and disruptive topic shifts' as discourse-impairing features. Cohesion occurs when the interpretation of an element in discourse depends on that of another element (Ripich et al. 2000); it refers to surface indicators of relations within and between sentences, conjoining discourse elements in the form of references, substitutions, ellipsis, conjunctions, and lexical markers (Dijkstra et al. 2004; Liles & Coelho 1998). Coherence can be locally defined as an indication of how closely an utterance (sentence) is related in topic and content to the immediately preceding utterance. Coherence can also be globally defined as the close relation of an utterance to the general topic (Laine et al. 1998). With global coherence, the topic is perfectly maintained. Conciseness refers to the addition of information without redundancy. It indicates high information content, the efficiency of information (Shadden 1998b), and the relevance of discourse (Ripich & Terrell 1988; Shadden 1998a, 1998b; Tomoeda et al. 1996).

Contrary to the discourse-building features, discourse-impairing categories hinder the continuation of conversation through errors, vagueness, incompleteness, aborted phrases, empty phrases (phrases that have no meaning), repetitions, indefinite terms (words that are non-specific, such as 'thing' and 'stuff'), and disruptive topic shifts (Garcia & Joannette 1997). Repetitions, referring to inappropriate restatements of ideas or complete repetitions of words, are often observed in the discourse of persons with AD (Bayles & Tomoeda 1991). Disruptive topic shifts are tangents or digressions from a certain topic (Ulatowska & Chapman 1991). Dijkstra et al. (2004), for example, compared the English discourse profiles of 30 nursing home residents with AD and of 30 healthy older adults. A discourse analysis schema was used to analyze 60 transcripts of interview style

conversations. The results indicated a higher frequency of the discourse-building features, such as coherence and cohesion, for the healthy adults compared to the adults with dementia. Conversely, the discourse-impairing features, for instance, disruptive topic shifts and empty phrases, occurred more often in the AD conversations than in the healthy adults' conversations. Discourse features in the interview style in the persons with AD reflected a decline in their memory.

In an earlier study (Lai et al. 2009), we examined the linguistic patterns of Chinese-speaking persons with AD. Speech samples were collected from 30 persons with AD and 32 elderly controls. Conceptual-semantic as well as syntactic knowledge and errors were analyzed. Discussions were made from the perspectives of syntactic and semantic preservation. Major findings revealed that persons with AD, though conveying less information and making more semantic errors, remained structurally rich with similar syntactic structures as the controls. The results of the multiple regression analysis on the linguistic attributes and the severity of dementia showed that two semantic attributes (i.e. objects and external comments) and two syntactic attributes (i.e. conjoined sentences and unintelligible sentences) correlated significantly with the severity of dementia for the Chinese-speaking population in Taiwan.

In spite of the growing research interest in the AD discourse patterns, there are still open questions. Few studies have addressed the association between discourse features and the severity of Alzheimer's dementia. In what way and to what degree discourse variables can differentiate healthy aging from mild Alzheimer's dementia would benefit from investigation. Also, little attention has been drawn to the cognitive mechanism in Mandarin Chinese-speaking persons with AD's discourse. Up to the present time, the discourse patterns for this particular population, Mandarin Chinese-speaking AD seniors, remain unclear. To describe their discourse patterns of impairment and retained abilities will also be of great assistance in suggesting advice to Chinese families or formal caregivers. Therefore, the present study aims (a) to examine discourse patterns in Mandarin Chinese-speaking seniors with or without Alzheimer's dementia, and (b) to investigate the association between the discourse features and the severity of Alzheimer's dementia.

2. Method

This section introduces the design of the current research. The subjects, procedures and data analysis are also explicitly described.

2.1 Subjects

Twenty persons with AD and 20 healthy individuals participated in the study. The participants were all born in Taiwan and are native speakers of Mandarin Chinese. All of the participants with AD were recruited through memory clinics. They were diagnosed as having probable AD as defined by Kaohsiung Veterans General Hospital (KVGH), Taiwan, where they were examined in many kinds of laboratory tests. These laboratory tests included complete blood count (CBC), GOT/GPT/BUN/Creatine (tests on the function of the liver), B12/folic acid, TSH/Free T4 (test on the function of the thyroid gland), venereal disease research laboratory (VDRL), computer tomography (CT), and magnetic resonance imaging (MRI). In KVGH, clinical diagnosis of probable AD was made in a multidisciplinary consensus meeting at a memory clinic according to the NINCDS-ADRDA criteria

(McKhann et al. 1984) after standardized dementia assessment, including medical history, informant-based history, physical and neurological examination, laboratory tests, neuropsychiatric tests, and neuroimaging. From the reports of these laboratory tests, the AD participants included in this paper were indeed clinically-diagnosed as suffering from probable AD, not from mixed disease entities.

In addition to the laboratory tests, the AD participants took one neuropsychological test, the Clinical Dementia Rating Scale (CDR: Hughes et al. 1982; Morris 1993; Morris et al. 1997) in the Chinese version. The CDR was developed to evaluate the staging of the severity of dementia, especially in persons with dementia of the Alzheimer type. Six domains are used to construct the overall CDR, inclusive of (a) memory; (b) orientation; (c) judgment; (d) problem solving; (e) community affairs, home, hobbies; and, (f) personal care. With a five-point scale, CDR=0 connotes no cognitive impairment, and the remaining four points are CDR=0.5, 1, 2, 3, respectively indicate very mild, mild, moderate, and severe dementia.

The group of control participants consisted of 20 healthy community-dwelling volunteers with no history of cognitive decline, all of whom were schooled in Taiwan. The participants were recruited through senior citizen centers and other services for the elderly. Table 1 presents relevant demographic data for these two groups of participants. The AD participants and the healthy controls did not differ significantly in their age ($t = -0.81$) or education ($t = -0.62$) in order to minimize the effects of these two factors.

A significant difference between the AD participants and the healthy controls was observed in the CDR scores. In the CDR scores, all the controls obtained zero points, demonstrating that they were diagnosed without any degree of dementia. For the AD participants, the CDR scores ranged from 0.5 to 3 (CDR=0.5: $n = 2$; CDR=1: $n = 12$; CDR=2: $n = 5$; CDR=3: $n = 1$)¹ (mean score = 1.30), indicating their mild to serious severity of dementia. These AD participants differed significantly from the controls in their CDR scores ($t = -9.13$, *** $p < .001$).

2.2 Procedures

The conversational sample was an interview between the researcher and the subject (timed with a countdown timer). The author directed the subject to talk about his or her family, life, and day,

Table 1: Demographic information of the AD and control groups

Group	AD ($N = 20$)	Control ($N = 20$)
Mean age	72.8 (5.22)	68.2 (3.79)
Age range	63~79	63~77
Mean education (in years)	9.7 (3.86)	13.7 (3.16)
Range of education	6~16	6~16
Mean CDR scores	1.30 (0.63)	0.00 (0.00)

N: number of subjects.

Note: Standard deviations are in parentheses.

¹ It has been suggested by an anonymous reviewer that in future only mild and moderate persons with AD be used in a study so as to avoid extreme cases which could skew results.

and how s/he spent some national holidays (e.g. Tomb Sweeping Day, Moon Festival, or Mid-Autumn Festival). Only such a prompt as ‘tell me more’ was offered. While responding to a question, a participant would be directed to the next question if he or she paused for more than 30 seconds. Each interview took approximately 8 minutes.

2.3 Data analysis

The recorded speech samples were transcribed by two linguists, one of whom is the author. AD and control participants respectively generated a total of 8,748 words and 23,177 words. Transcripts in the conversational sample were segmented into utterances following conversational boundaries and intonation contour (Cherney et al. 1998; Lyons et al. 1994). Incomplete sentences, sentence fragments, and revisions of a previous utterance were viewed as separate utterances. Then, the transcripts were coded on the basis of the discourse-building and discourse-impairing features (Cherney et al. 1998; Dijkstra et al. 2002a, 2002b). All speech transcripts were coded independently by these trained examiners. Any disagreements were discussed and resolved. One hundred percent agreement was reached for the protocol.

Discourse-building features, contributing to the continuation of conversation, include clear information units, cohesion, local coherence, global coherence, correct pronouns, and appropriate conjunctions. Information units are identified when participants’ utterances have clear contents, such as actors, action, places, or objects. Cohesion refers to the surface indicators of relations within and between sentences, including referential cohesion, temporal cohesion, and causal cohesion. Local coherence concerns how closely an utterance is related to the immediately preceding one. Global coherence is indicated when an utterance is closely associated with the general topic. It resembles the idea of topic maintenance, in which topic is maintained when speech is continued. In each utterance, correct pronouns and appropriate conjunctions are also counted as discourse-building variables. Specific examples of the discourse-building features are listed in Table 2.

Discourse-impairing features, conversely, hinder the communicative purposes of conversation. Examples are word-finding difficulty, repetitions, revisions, indefinite words, empty phrases, no cohesion, no local coherence, and no global coherence. Pauses for a certain term are instances of word-finding difficulties. Repetitions occur when participants immediately repeat a word or a phrase. Indefinite words refer to any non-specific words, such as ‘thing’ or ‘stuff.’ Empty phrases are any utterances that have little or no content. The absence of referential cohesion, temporal cohesion, and causal cohesion is viewed as examples of no cohesion. No local coherence is identified when the meanings or themes of two consecutive sentences are not coherently related. No global coherence is marked when an utterance is not related to the topic. This is also interpreted as disruptive topic shifts (Ulatowska & Chapman 1991), in which speakers produce tangents or digressions from the topic. Each discourse-impairing variable is illustrated in Table 3.

Revision, though being classified as one discourse-impairing feature in Dijkstra et al. (2002b), has not received much attention or discussion in previous studies. In the current investigation, revision is frequently made when participants monitor their utterances, detect problems, and correct ideas or rephrase words by themselves. Revision in the current analysis refers to ‘self-revision’ (adapted from ‘self-repair’ by Levelt 1983). Revision frequently occurs when a speaker monitors his/her utterances, detects a problem, and makes corrections. Revision is made not merely to replace

Table 2: Examples of discourse-building features

Feature	Example
Information units	(a) actors: 兒子 'son'; (b) places: 台北 'Taipei'; (c) objects: 春捲 'spring roll'; (d) actions: 跑步 'to run'.
Cohesion	(Causal cohesion) 因為我們家是住透天的，所以呢因為面積太大這個打掃起來非常的頭痛。 <i>Our house is a townhouse. So, it's very troublesome to clean the house because of its big space.</i>
Local coherence	(When asked, 'What do you usually eat?') 午餐晚餐都正常，但是盡量不要吃太多油膩的東西。 <i>(I) have lunch and dinner regularly, but don't eat too much greasy food.</i>
Global coherence	(When asked, 'What do you usually eat?') 我們家吃的方面大多自己煮比較多啦。有時後忙了累了都會外食，那我們吃主要是魚，魚是主食。 <i>For the choice of food in our family, mostly, we cook. Sometimes, (we) got busy or tired; we eat take-out. Our staple is fish.</i>
Correct pronouns	喔...一生...現在一直還在回憶的就是說我媽媽...老媽媽的過世，她對我的影響很大。 <i>Oh, my life... Till now, what (I) cannot forget is my mother... old mother's death. She had a great influence on me.</i>
Appropriate conjunctions	雖然中間有苦樂，但是蠻祥和的，蠻平順的。 <i>Although there are happiness and bitterness in the process, it's quite peaceful and smooth.</i>

an error, but to achieve the appropriateness and clarity of the message. To further probe the differences in the revised patterns of these two groups, revised forms in the current analysis are further analyzed into two linguistic categories, 'semantic aspects' (Geluykens 1994) and 'pragmatic aspects' (Slobin 1975). In the semantic aspects, revision is mainly derived from replacement, broadening and narrowing.² As for the pragmatic aspects, revision usually follows two principles: the Clarity Principle and the Expressivity Principle (Slobin 1975).³ The former includes the purposes of clarification, confirmation, and explanation, which pleads the clarity and intelligibility of a message. The latter deals with the expressive and aesthetic aspects of the message, involving the purposes of agreement, emphasis, and disagreement.

² According to Fromkin et al. (2010), semantic aspects mainly include: broadening (when the meaning becomes more encompassing), narrowing (when the meaning becomes less encompassing), and replacement (when there is a shift in meaning).

³ To demonstrate how people use language, Slobin (1975) proposed four principles: the Clarity Principle (to be clear), the Expressivity Principle (to be expressive), the Processibility Principle (to be humanly processible in ongoing time), and the Economy Principle (to be quick and easy). In the current analysis, only the Clarity Principle and the Expressivity Principle are discussed in further detail as these two are the main principles in examining conversations (Wei 2003).

Table 3: Examples of discourse-impairing features

Feature	Example
Word-finding difficulty	月什麼、月什麼… <i>moon ... moon ...</i>
Repetitions	消遣嘛有…ㄟ年紀大了嘛就喜歡運動…運動嘛。 <i>Speaking of (my) recreation, (I) am of old age and like to exercise ... exercise ...</i>
Revisions	清明節就是要吃春捲啊！潤餅就是春捲啊！ <i>One is bound to eat spring rolls on Tomb Sweeping Day!</i> <i>The Chinese Burrito is the spring roll!</i>
Indefinite words	清明節就是拜拜什麼，那個什麼好像…那個我講不出來…那個什麼東西。 <i>On Tomb Sweeping Day, (we) worship ... what ... that one is like ... I forget its name. That ... that thing ...</i>
Empty phrases	(When asked, ‘What do you often eat on Moon Festival?’) 我 XXXX。 <i>I XXXX</i>
No cohesion	我們家就吼，那都是聯絡我先生是回去這樣吼，阿所以吼才自己一個還有一些妹子孫子在家裡。 <i>Speaking of my family, (I) always contact my husband to go home. So, (I) have some sisters and grandsons at home.</i>
No local coherence	(When asked, ‘What do you usually eat?’) 沒有可以無意見…就是也還沒有結婚嘛。 <i>(I) have no comment ... that is ... (I) haven't got married yet.</i>
No global coherence	(When asked, ‘What is your preference in dressing?’) 衣著上就是輕鬆的，輕…輕輕輕輕，輕輕鬆的衣服， …像我在家裡啊，因為年齡已經都超過退伍的年齡了。 <i>(I) like to wear comfortable clothes. ... comfortable clothes ... just as I am at home ... because (I) am beyond the age of being discharged from military services.</i>

One-way analysis of variance (ANOVA) was performed to examine group differences in the spoken discourse. How trouble in a discourse was signaled and how it was repaired were investigated. Factors concerning the severity of Alzheimer’s dementia or cognitive impairments (from the results of CDR) were also discussed. In this way, the general assumption that older adults with AD display different patterns of discourse-building and discourse-impairing features in comparison to healthy older adults could be empirically tested. Additionally, the multiple regression analysis was conducted by using discourse variables (e.g. frequency of discourse-building features and frequency of discourse-impairing features) as predictors of the CDR score. This was to determine whether these discourse variables could significantly predict or explain the degree of severity of Alzheimer’s dementia. Finally, a suggested classification equation for the AD seniors was stipulated and the best predictor of all variables was demonstrated.

3. Results

Discourse features are analyzed and discussed in terms of discourse-building features and discourse-impairing features. Frequency and types of discourse-building features between the AD participants and the healthy controls are first examined by ANOVA (i.e. 2 groups \times 7 measures). Table 4 presents the statistical results with Group (i.e. AD versus Control) as the variant in relation to the seven types of features (i.e. information units, cohesion, local coherence, global coherence, correct pronouns, appropriate conjunctions, and total features).

In Table 4, the participants with AD and healthy controls differed significantly in uttering discourse-building features. In total, the AD group ($M = 5.38$) provided significantly fewer discourse-building features than the control group ($M = 11.67$), as revealed in ($F(1, 38) = 11.22$, $**p < .01$). Especially, the AD participants ($M = 22.40$) produced significantly fewer information units than did the controls ($M = 15.05$) ($F(1, 38) = 4.45$, $*p < .05$). This finding was similar to Croisile et al. (1996), Goodglass & Kaplan (1983), Kavé & Levy (2003), Lai et al. (2009), and Nicholas et al. (1985), in which the persons with AD offered fewer information units than did the controls when asked to describe pictures. In oral conversations, the persons with AD differed from the control participants in the number of information units they provided. It could be argued that this task was more demanding for them and that their speech became less informative.

Significant differences were also observed in other discourse-building features, for example, cohesion, local coherence, global coherence, correct pronouns, and appropriate conjunctions, in which

Table 4: Discourse-building features made by the control and AD groups

Feature	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>F</i>
Information units	Control	20	22.40	14.15	4.45*
	AD	20	15.05	6.51	
Cohesion	Control	20	5.50	6.74	10.00**
	AD	20	0.65	1.27	
Local coherence	Control	20	9.90	9.59	13.19**
	AD	20	1.60	3.53	
Global coherence	Control	20	20.80	12.41	4.31*
	AD	20	14.05	7.56	
Correct pronouns	Control	20	3.20	4.89	7.36*
	AD	20	0.20	0.69	
Appropriate conjunctions	Control	20	8.20	9.91	11.29**
	AD	20	0.70	1.17	
Total	Control	20	70.00	7.65	11.22**
	AD	20	32.25	3.24	

N: number of subjects; *M*: mean; *SD*: standard deviations. The *F* value is the statistical result of the One-way analysis of variance (ANOVA).

* $p < .05$; ** $p < .01$.

the AD participants reached remarkably lower means. Generally, they produced discourse with less cohesion ($M = 0.65$), less local coherence ($M = 1.60$), less global coherence ($M = 14.05$), fewer correct pronouns ($M = 0.20$), and fewer appropriate conjunctions ($M = 0.70$). Sometimes, their utterance was not closely related to the immediately preceding utterance. By contrast, the control discourse was made with more cohesion ($M = 5.50$), more local coherence ($M = 9.90$), more global coherence ($M = 20.80$), more correct pronouns ($M = 3.20$), and more appropriate conjunctions ($M = 8.20$). Typical examples of global coherence and correct pronouns in the control discourse are presented with co-texts below.

(1) *Example of global coherence in the control discourse*

Q: 平常 常 吃 些 什麼 東西?
pingchang chang chi xie shenme dongxi
normally often eat some what stuff

A: 我們 家 吃 的 方面 大多 自己 煮
women jia chi de fangmian daduo ziji zhu
IPL family eat DE aspect mostly self cook

比較 多 啦 有時候 忙 了
bijiao duo la youshihou mang le
comparatively more PRT sometimes busy PRT

累 了 都 會 外食 那 我們 最主要 是 魚
lei le dou hui waishi na women zuizhuyao shi yu
tired PRT all will take-out then IPL primarily COP fish

魚 是 主食
yu shi zhushi
fish COP staple

Q: 'What do (you) usually eat?'

A: 'For the choice of food in our family, mostly, we cook. Sometimes, (we) get busy or tired; we eat take-out. Our staple is fish.'

(2) *Example of correct pronouns in the control discourse*

Q: 您的 一生 到 目前 為止 有 沒 有
ninde yisheng dao muqian weizhi you mei you
your life till now end have NEG have

值得 驕傲 或 回憶 的 事?
zhide jiaobao huo huiyi de shi
worth pride or remember DE thing

A: 喔 一生... 現在 一直 還在 回憶 的
o yisheng xianzai yizhi haizai huiyi de
oh life now all-the-time still remember DE

就是 說 我 媽媽... 老 媽媽 的 過世
jiushi shuo wo mama lao mama de guoshi
that-is say IPS mother old mother DE pass-away

她 對 我 的 影 響 很 大
 ta dui wo de yingxiang hen da
 3PS to 1PS DE influence very great

Q: 'Is there anything in your life you feel proud of or you remember the most?'

A: 'Oh, my life ... Till now, what (I) cannot forget is my mother ... old mother's death. She had a great influence on me.'

Global coherence in the control discourse is illustrated in Example (1). When asked 'What do (you) usually eat?', one control participant answered '我們家吃的方面大多自己煮比較多啦, 有時候忙了累了都會外食, 那我們最主要是魚, 魚是主食' ('For the choice of food in our family, mostly, we cook. Sometimes, (we) get busy or tired; we eat take-out. Our staple is fish.'). Each utterance produced by this control participant was closely associated with the general topic 'food.' It is also interpreted as topic maintenance, because the topic is logically maintained in the speech. Example (2) offers an instance of correct pronouns in the control discourse. When asked about one thing that s/he felt proud of or remembered the most in his/her lifetime, one control participant replied '...我媽媽...老媽媽的過世, 她對我的影響很大' ('... my mother ... old mother's death. She had a great influence on me.'). In this example, this participant properly used the pronoun '她' ('she') to refer to the antecedent '我媽媽' ('my mother'), which required sufficient memory capacity to match with the earlier information in his/her discourse.

Following the discussion on discourse-building features, frequency and types of discourse-impairing features used by the AD participants and the healthy controls are also analyzed by ANOVA (i.e. 2 groups \times 9 measures). These measures include word-finding difficulty, repetitions, revisions, indefinite words, empty phrases, no cohesion, no local coherence, no global coherence, and total features. Statistical results of discourse-impairing features made by the AD participants and the healthy controls are indicated in Table 5.

According to Table 5, a statistically significant difference was observed between the persons with AD and the healthy controls in the total number of discourse-impairing features ($F(1, 38) = 9.16$, $**p < .01$). Individual significant findings were identified in terms of revisions ($F(1, 38) = 7.80$, $**p < .01$), indefinite words ($F(1, 38) = 8.48$, $**p < .01$), and no global coherence ($F(1, 38) = 6.36$, $*p < .05$). Indefinite words refer to such non-specific words as 'thing' or 'stuff.' When talking about the food he had, one AD participant mentioned '... na-ge shen-me hao-xiang ... na-ge dong-xi ... wo jiang-bu-chu-lai ...' ('那個什麼好像...那個東西我講不出來...那個什麼東西...') ('... that one is like ... I forget its name. That ... that thing ...'). The AD participants had a tendency to replace the specific terms with such indefinite words as '東西' ('thing' or 'stuff'). Also, judging from the mean scores, it was obvious that the persons with AD ($M = 6.30$) suffered more from word-finding difficulties than the healthy controls did ($M = 4.50$). One example of common word-finding difficulties was '... shi ... nage shi' ('...是...那個是...') ('... is ... that is ...'). Another example of AD word-finding difficulty with co-texts is detailed below.

(3) *Example of word-finding difficulty in the AD discourse*

Q: 大部分 的 台灣 人 在 清明節
 dabufen de Taiwan ren zai qingmingjie
 most ASS Taiwan people on Tomb Sweeping Day

Table 5: Discourse-impairing features made by the control and AD groups

Feature	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>F</i>
Word-finding difficulty	Control	20	4.50	3.03	3.12
	AD	20	6.30	3.40	
Repetitions	Control	20	4.60	2.96	1.51
	AD	20	6.20	5.02	
Revisions	Control	20	1.25	1.41	7.80**
	AD	20	0.30	0.57	
Indefinite words	Control	20	4.25	2.95	8.48**
	AD	20	7.25	3.54	
Empty phrases	Control	20	3.05	2.54	1.85
	AD	20	4.75	4.97	
No cohesion	Control	20	4.60	1.98	2.73
	AD	20	6.50	4.74	
No local coherence	Control	20	3.40	2.23	0.99
	AD	20	4.35	3.65	
No global coherence	Control	20	0.80	0.95	6.36*
	AD	20	2.95	3.69	
Total	Control	20	3.31	1.29	9.16**
	AD	20	4.83	1.83	

N: number of subjects; *M*: mean; *SD*: standard deviations. The *F* value is the statistical result of the One-way analysis of variance (ANOVA).

* $p < .05$; ** $p < .01$.

都 是 做 什麼樣 的 活動?
 dou shi zuo shenmeyang de huodong
 all COP do what DE activity

A: 清明節 就是 拜拜 什麼,
 Qingmingjie jiushi baibai shenme
 Tomb Sweeping Day that-is worship what

那個 什麼 好像 那個 我 講 不 出來
 nage shenme haoxiang nage wo jiang bu chulai
 that what be-like that 1PS say NEG out

那個 什麼 東西
 nage shenme dongxi
 that what stuff

Q: 'What kind of activities do most Taiwanese do on Tomb Sweeping Day?'

A: 'On Tomb Sweeping Day, (we) worship what . . . that one is like . . . I forget its name. That . . . that thing . . .'

But, it should be noted that no significant distinction emerged in word-finding difficulties between the AD discourse and the control discourse. Word-finding difficulties have frequently occurred in studies on persons with AD's picture description. Lai et al. (2009), for instance, examined the picture descriptions made by Chinese-speaking AD participants, revealing that they encountered a serious problem in finding appropriate words to describe the test picture. This is probably a result of the different genres under investigation. In Lai et al. (2009), participants were asked to describe a picture and they had to utter specific terms for the targets in the picture. The participants in the current study, however, were free to narrate their life and they might have chosen to talk about something they were more familiar with. Therefore, non-significant distinction in word-finding difficulties was observed in the present AD discourse and control discourse.

Moreover, utterances without global coherence were made with significantly more frequency by the AD group ($M = 2.95$) than by the control group ($M = 0.80$). When being asked about the color of clothes he preferred, one AD participant answered '沒有啦! 台北的交通都很亂!' ('No ... Traffic in Taipei is always messy.'). This finding was in line with the researchers' previous report (Lai et al. 2009) that Chinese-speaking persons with AD produced a significantly higher mean of external comments than did the control individuals. Though being syntactically correct, these irrelevant details were inappropriate statements foreign to the topic, which has often been indicated in the narrative discourse of subjects with dementia (Croisile et al. 1996; Ulatowska & Chapman 1991). Examples of no local coherence and no global coherence with surrounding co-texts are provided next.

(4) *Example of no local coherence in the AD discourse*

Q: 平常 常 吃 些 什麼 東西?
pingchang chang chi xie shenme dongxi
normally often eat some what stuff

A: 沒 有 可以 無 意見 就是... 也
mei you keyi wu yijian jiushi ye
NEG have can NEG comment that-is also

還沒 有 結婚 嘛
haimei you jiehun ma
not-yet have marry PRT

Q: 'What do (you) usually eat?'

A: '(I) have no comment ... that is ... (I) haven't got married yet.'

(5) *Example of no global coherence in the AD discourse*

Q: 你的 衣著 喜好 呢?
nide yizhuo xihao ne
your dressing preference PRT

A: 衣著上 就是 輕鬆 的,
yizhuoshang jiushi qingsong de
dressing that-is relaxing ASS

輕...	輕輕輕輕，	輕輕鬆	的	衣服。			
qing	qing-qing-qing-qing	qing-qingsong	de	yifu			
relaxing	relaxing	very-relaxing	ASS	clothing			
像	我	在	家裡	啊，	因為	年齡	已經
xiang	wo	zai	jiali	a	yinwei	nianling	yijing
be-like	1PS	at	home	PRT	because	age	already
都	超過	退伍			的	年齡	了。
dou	chaoguo	tuiwu			de	nianling	le
all	over	discharged-from-the army			ASS	age	PRT

Q: 'What is your preference in dressing?'

A: '(I) like to wear comfortable clothes ... comfortable clothes ... just as I am at home ... because (I) am beyond the age of being discharged from military services.'

No local coherence in the AD discourse is illustrated in Example (4). The meanings or themes of these consecutive sentences '沒有可以無意見，就是也還沒有結婚嘛' ('*I have no comment ... that is ... (I) haven't got married yet*') were not coherently related. The utterance '沒有可以無意見' ('*I have no comment ...*') was not closely related in topic and content to the immediately preceding utterance '就是也還沒有結婚嘛' ('*that is ... (I) haven't got married yet.*'). No global coherence is marked in Example (5), where the AD utterance was not logically related to the topic. The utterance '因為年齡已經都超過退伍的年齡了' ('... *because (I) am beyond the age of being discharged from military services*') was not associated with the topic concerning his/her preference in dressing. It was also called disruptive topic shifts (Ulatowska & Chapman 1991) when tangents or digressions from the topic were produced.

Specifically, it is interesting to note that significantly more revisions were made by the control group ($M = 1.25$) than by the AD group ($M = 0.30$). One plausible account for this finding is that 'revision' requires a higher-level processing task. To make revisions orally, speakers have to become aware of the possible errors first, and then come up with other alternatives for repair. In other words, the processing burden in making revision is more complex; persons with AD who suffer from brain damage might fail to revise or repair their utterances in a successful way. Typical revised examples in the control discourse and in the AD discourse are listed in Table 6 (semantic aspects) and Table 7 (pragmatic aspects).

As displayed in Table 6, a number of patterns could be summarized on the basis of the qualitative analysis of the revisions made by the AD participants (Total = 6) and the healthy controls (Total = 25). To start with, replacement ($F = 13$) and narrowing ($F = 12$) were the strategies most frequently used by the control participants within the semantic realm. Consider one example in Table 6: '清明節就是要吃春捲啊! 潤餅就是春捲啊!' ('*One is bound to eat spring rolls on Tomb Sweeping Day! The Chinese Burrito is the spring roll!*'). This control participant tried to replace '春捲' ('*spring roll*') with '潤餅' ('*Chinese Burrito*'), emphasizing that these two terms referred to the same item. A similar pattern occurred in the AD discourse, in which strategies of replacement ($F = 4$) and narrowing ($F = 2$) were utilized with higher frequency. One instance in Table 6 was that one AD participant substituted '碟' ('*dishes*') with '盤' ('*plates*'), while monitoring his speech. None of broadening strategy ($F = 0$), however, was adopted by these two groups.

Table 6: Semantic aspects in revisions made by the control and AD groups

Item	Group	Example
Replacement	Control (<i>F</i> = 13)	(a) 現在住的地方是大廈。不是啦，我是說：以前住在透天的啦，現在改成這個大廈。 <i>The place I am living now is a mansion. No ... I mean ... I used to live in a townhouse, but now I live in this mansion.</i> (b) 清明節就是要吃春捲啊！潤餅就是春捲啊！ <i>One is bound to eat spring rolls on Tomb Sweeping Day! The Chinese Burrito is the spring roll!</i>
	AD (<i>F</i> = 4)	(a) 我會用碟...盤...碟子啊！ <i>I use the dishes ... the plates ... the dishes!</i> (b) 這個是小孩！這個是小朋友！ <i>This is a child! This is a kid!</i>
Narrowing	Control (<i>F</i> = 12)	(a) 就是那種樓房啦！樓房就是透天大廈！ <i>It is that type of house! My house is the townhouse!</i> (b) 有看到人家那種那個玻璃...那個門窗啦！ <i>I saw the glass ... the window in the door!</i>
	AD (<i>F</i> = 2)	(a) 我們家是四樓的那個...公寓式的啦！ <i>My family is a four-storey ... apartment!</i> (b) 我這個是我自己蓋的房子...透天的房子！ <i>This is the house I built ... the townhouse!</i>

F: frequency.

As for the pragmatic realm (Table 7), the healthy controls revised their discourse with the function of clarification (*F* = 18) most frequently, followed by that of emphasis (*F* = 5) and of explanation (*F* = 2). The control participants made revisions often to achieve the clarity of the message. For example, one participant responded to the color s/he liked: ‘偏好的顏色比較不是那麼灰！大概就白色的比較多啦！’ (*The color I prefer tends not to be that gray! Probably I prefer white ones much better.*) (Table 7). This participant managed to clarify the meaning of ‘不是那麼灰’ (*not being that gray*) by adding ‘白色的比較多’ (*I much prefer the white one.*). This finding conformed to that in Wei (2003), who analyzed Mandarin conversations from the perspective of socio-pragmatic repair. In Wei (2003), Mandarin-speaking participants, whose ages ranged from 40 to 50, placed the function of clarification as the first priority.

Unlike the control discourse, the AD participants in the current study referred to the function of emphasis (*F* = 3) the most often and the function of clarification (*F* = 2) second. The function of explanation (*F* = 1) was the least frequently found in the AD discourse. According to Table 7, repetitions in examples ‘這個是小孩！這個是小朋友！’ (*This is a child! This is a kid!*) and ‘這些都是用具！就是器具嘛！’ (*These are utensils! Utensils!*) manifestly demonstrated that the AD participants focused more often on the emphatic and expressive aspects of the message.

Judging from the two pragmatic principles in revisions (Clarity versus Expressivity), the healthy controls made more use of the Clarity Principle (clarification = 18; explanation = 2) than of the Expressivity Principle (emphasis = 5). They revised more often to plead the clarity or intelligibility

Table 7: Pragmatic aspects in revisions made by the control and AD groups

Item	Group	Example
Clarification	Control (<i>F</i> = 18)	(a) 現在住的地方是大廈。不是啦，我是說：以前住在透天的啦，現在改成這個大廈。 <i>The place I am living now is a mansion. No ... I mean ... I used to live in a townhouse, but now I live in this mansion.</i>
		(b) 偏好的顏色比較不是那麼灰！大概就白色的比較多啦！ <i>The color I prefer tends not to be that gray! Probably I prefer white ones much better.</i>
	AD (<i>F</i> = 2)	(a) 我們家是四樓的那個...公寓式的啦！ <i>My family is a four-storey ... apartment!</i>
		(b) 我這個是我自己蓋的房子...透天的房子！ <i>This is the house I built ... the townhouse!</i>
Emphasis	Control (<i>F</i> = 5)	(a) 我的人生中，我有一個最好的家，那個就是我的家！就是現在的家喔！ <i>The sweetest home that I've ever had in my life is the one I have right now! The house I have right now!</i>
		(b) 清明節我吃春捲啊！就是春捲啦！ <i>I eat spring rolls on Tomb Sweeping Day! Spring rolls!</i>
	AD (<i>F</i> = 3)	(a) 這個是小孩！這個是小朋友！ <i>This is a child! This is a kid!</i>
		(b) 這些都是用具！就是器具嘛！ <i>These are utensils! Utensils!</i>
Explanation	Control (<i>F</i> = 2)	(a) 清明節就是要吃春捲啊！潤餅就是春捲啊！ <i>One is bound to eat spring rolls on Tomb Sweeping Day! The Chinese Burrito is the spring roll!</i>
		(b) 就是那種樓房啦！樓房就是透天大廈！ <i>It is that type of house! My house is the townhouse!</i>
	AD (<i>F</i> = 1)	義工！義工是義務服務...算志願的！ <i>The volunteer! The volunteer is doing voluntary services ... They are volunteering.</i>

F: frequency.

of a message. Clarification and explanation were used more frequently than emphasis in their revisions. A different pattern, however, was identified in the AD discourse. The AD seniors emphasized more often than they clarified or explained their utterances. It could be argued that the Expressivity Principle (emphasis = 3) was adopted with a slightly higher frequency than the Clarity Principle (clarification = 2; explanation = 1).

Besides the significant distinction in the discourse-impairing and discourse-building features uttered by older persons with or without dementia, it was also of equal importance to explore which discourse variables were the most prominent in predicting the severity of Alzheimer's dementia, as measured by CDR. A step-wise linear multiple regression was performed to assess the predictive power of discourse-impairing variables (i.e. word-finding difficulty, repetitions, revisions, indefinite words, empty phrases, no cohesion, no local coherence, no global coherence, and total features) and

Table 8: Statistical results of the multiple regression analysis of CDR scores

Ranking for discourse-impairing features	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>F</i>	Beta
Revisions	.728	.530	.505	20.88	-.282
No global coherence	.769	.591	.557	17.37	.331

discourse-building variables (i.e. information units, cohesion, local coherence, global coherence, correct pronouns, appropriate conjunctions, and total features) on the degree of Alzheimer's dementia. The CDR score was the criterion variable, and discourse features were the predictive variables. The statistical results of this step-wise multiple regression analysis are summarized in Table 8.

Several findings can be drawn from Table 8 about the multiple regression analysis of one measure of dementia (i.e. CDR). First of all, two discourse-impairing variables (i.e. no global coherence and revisions) became statistically significant. The remaining discourse-impairing variables (e.g. word-finding difficulty, repetitions, empty phrases, no cohesion, no local coherence, no global coherence) and all of the discourse-building variables were of little statistical significance.

Secondly, the standardized regression coefficient (Beta) truly reflected the relationship between the significant discourse attributes and the severity of dementia. The value of Beta was positive for the feature 'no global coherence,' but negative for 'revisions.' The negative Beta values were indicative of the inverse relationship between the feature and the scores of dementia tests. That is, AD participants with lower CDR scores, also suffering from less severe Alzheimer's dementia,⁴ made significantly more revisions in their discourse so as to facilitate conversation with their conversation partners. Furthermore, AD participants with higher CDR scores, also suffering from greater degrees of dementia, made significantly more utterances without global coherence and tended to drift away from the intended topic. The standardized equation⁵ for the model of discourse features on the basis of CDR is as follows:

$$\text{Dementia (CDR) versus Discourse Features} = (-.282 \times \text{Revisions}) + (.331 \times \text{No global coherence})$$

The third finding concerns the overall predictive power of discourse features. Two discourse-impairing features, 'no global coherence' and 'revisions,' had 59.1% predictive power for the CDR scores, as shown in the overall multiple determination coefficient ($R^2 = .591$). As for the discourse-building variables, none of them were significantly related to the degree of dementia. Thus, it could be argued that the discourse-impairing variables in the present analysis correlated significantly more with the severity of Alzheimer's dementia than with the discourse-building variables.

⁴ CDR scores are in positive relation with the degree of dementia: the higher the CDR scores, the greater the extent of dementia.

⁵ The standardized equations are frequently adopted and interpreted in the noted journal, *Journal of Neurolinguistics*, for example, Lai et al. (2009) and Lai & Lin (2013).

In conclusion, the findings of the multiple regression analysis suggest that two discourse attributes (i.e. no global coherence and revisions) are significantly associated with the severity of Alzheimer's dementia for the Chinese-speaking population in Taiwan. The worse the AD performance of these discourse features, the more severely the speaker was apt to suffer from Alzheimer's dementia.

4. Discussion

The current study examines discourse patterns produced by 20 AD participants and 20 healthy senior controls in a Chinese-speaking society. Linguistic features in Chinese-speaking persons with AD's discourse are discussed in this section.

Chinese-speaking persons with AD performed similarly in a number of aspects as persons with AD in the western context. To begin with, the results in the present analysis indicated that fewer revisions but more discourse-impairing features were found in conversations of the elderly with dementia in comparison to the healthy controls. This finding echoed Dijkstra et al. (2004), who compared the discourse profiles of 30 AD older adults and 30 healthy controls. A higher frequency of the discourse-building features, for example, coherence and cohesion, was observed for the healthy adults than for those with dementia. By contrast, the discourse-impairing features, such as disruptive topic shifts and empty phrases, were adopted more often in the AD conversations than in the healthy adults' conversations. Discourse features in the AD discourse demonstrated a noticeable decline in their memory.

Second, the results in the current investigation of conversational discourse are in line with the findings in picture descriptions (see Croisile et al. 1996; Kavé & Levy 2003; Lai et al. 2009; Nicholas et al. 1985). Similar to these reports on picture descriptions, the present study on the analysis of conversations also shows that the persons with AD provided fewer information units than the controls did. The AD participants differed from the controls in the total number of information units they offered. It could be argued that this task was more demanding for them, making their speech less informative. In addition to fewer information units, the persons with AD produced utterances with less global coherence, by making more circumlocutionary comments, than the healthy controls. They appeared to drift away from the task at hand, and their speech seemed less concise or informative. This tendency might demonstrate a coping mechanism employed by these AD individuals to overcome the difficulties in testing situations or in communication tasks. Hence, they uttered more tangents or digressions from the topic, also interpreted as disruptive topic shifts (Ulatowska & Chapman 1991).

Third, Chinese-speaking AD seniors in the present analysis produced significantly more indefinite words, as previously demonstrated in western research (see Dijkstra et al. 2004; Nicholas et al. 1985; Ripich & Terrell 1988; Ulatowska et al. 1988). Inappropriate use of such empty words as '東西' ('thing') is commonly found in the Chinese-speaking AD discourse. This finding adds support to previous studies (see Hier et al. 1985; Kempler 1991; Ripich & Terrell 1988), which compared the discourse of healthy older adults and older adults with dementia. A higher frequency of empty as well as indefinite words and aborted phrases was observed in the AD group. Just as Tulving (1983) pinpoints, semantic memory consists of highly overlearned general knowledge and vocabulary. Discourse impairments reflect deficits in semantic and lexical memory (Orange & Purves

1996; Salmon et al. 1991). Semantic memory deficits provide an explanation of retrieval failures that lead to aborted phrases, empty words, and referential errors in AD participants' description of a picture (Hier et al. 1985; Tomoeda et al. 1996) or in their conversations (Hier et al. 1985; Kempler 1991; Liles & Coelho 1998; Tomoeda et al. 1996).

Fourth, the finding that Chinese-speaking persons with AD made significantly less use of correct pronouns is in agreement with several reports that persons with AD often adopted pronouns inappropriately (Kempler et al. 1995; Ulatowska et al. 1988). To make proper use of pronouns requires sufficient memory capacity to match the earlier information in the discourse. This memory capacity and the semantic memory, however, are reported to be impaired in persons with dementia (Baddeley 1996; Orange & Purves 1996). This finding further confirms the claim of the capacity theory of working memory (Almor et al. 1999; Baddeley 1996; Baddeley et al. 1991; Della Sala et al. 1992) that persons with AD often suffer more from processes that are more demanding of their cognitive resources. Working memory capacity is a key memory component that is affected in persons with AD (Baddeley 1996; Orange & Purves 1996). Baddeley (1986, 1996) argues that working memory requires the availability of cognitive resources to process incoming information or previously stored information, and to store new information. Research has indicated that persons with AD have shorter immediate memory spans (Almor et al. 1999; Baddeley 1996; Baddeley et al. 1991; Della Sala et al. 1992). The capacity theory helps to account for the consequences of high task demands on a person's capacity to perform a meaningful comprehension task (Just et al. 1996; Miyake et al. 1994). Findings in the present investigation are in line with the reports in the western context that AD participants frequently suffer from more demanding processes (i.e. more complex or requiring more attention) than less demanding ones.

Despite the above-discussed similarities, the present analysis reveals that Chinese-speaking AD seniors differed from those in the western reports in terms of 'revision.' In the current investigation, it is surprising to note that the controls revised with significantly higher frequency than did the persons with AD. This finding is somewhat inconsistent with that in Dijkstra et al. (2002b), in which 'revision' is viewed as one discourse-impairing category frequently observed in the AD discourse. The finding in the current study raises one further question: Is 'revision' a real discourse-impairing feature? It can be argued that revision, or repair (Paltridge 2006), is regarded as an important strategy speakers use in spoken discourse and that it is a higher-level processing task. To make revisions, speakers have to become aware of the possible errors first, and then come up with other alternatives for revision. Persons with AD who suffer from brain damage might fail to revise their utterance in a successful way, thus making significantly fewer repairs than healthy controls. Therefore, the current study supports that repair ability is impaired in the persons with AD in comparison to the healthy elderly (Bryan & Maxim 2006; Maxim 1991; McNamara et al. 1992).

In the further analysis of revised patterns, Chinese-speaking AD seniors semantically resembled the healthy controls in that replacement was an efficient and effective means of remedying problems like semantic vagueness or ambiguity. Narrowing was the second most common way to revise preceding utterances. Neither of these two groups adopted the strategy of broadening. From the pragmatic perspective, the Principle of Clarity (i.e. clarification and explanation) seemed to be the functional goal that the healthy controls aimed at. The function of clarification occurred most frequently in their discourse. This finding corresponds to that of Wei (2003), in that a stronger

preference for revisions was identified to conform to the Principle of Clarity than to the Principle of Expressivity. In other words, revisions are primarily made to maintain meaning clarity for Chinese-speaking seniors without AD. Different from this pattern, the Principle of Expressivity (i.e. emphasis) was much more favored in the AD discourse. Emphasis was the pragmatic function that received the first priority for these AD seniors.

Finally, the present study has the potential to add to the understanding of discourse in seniors with and without AD, and particularly to add a unique perspective by examining a population about which less is known. This study contributes significantly to the predictive power of discourse features for the severity of dementia, as measured by CDR. The results of the multiple regression analysis manifested that two discourse attributes (i.e. no global coherence and revisions) were significantly associated with the severity of Alzheimer's dementia for the Chinese-speaking population in Taiwan. The worse the AD participants' performance of these discourse features, the more severe their dementia tended to be. This further points out helpful directions for improving the discourse patterns in persons with AD. It is strongly suggested that conversational partners should be aware of the difficulties that persons with AD encounter, and help to improve the discourse features to facilitate communication.

5. Conclusion

This study describes and discusses discourse patterns produced by 20 AD seniors and 20 healthy elderly controls in a Chinese-speaking society. Their discourse patterns were examined in light of discourse-building features and discourse-impairing features. It was found that fewer discourse-building features but more discourse-impairing features occurred in the conversations of the AD seniors compared to the healthy controls. Also, the semantic and pragmatic aspects of oral revisions were discussed. The findings in the current study further argue for the nature of revision. Contributions were made to the views that revision should be regarded as an important strategy for speakers in spoken discourse, and that revision was a higher-level processing task. The ability to revise one's utterances was more seriously impaired in the AD seniors in comparison to the healthy elderly. Finally, this study demonstrates that two discourse variables (i.e. revisions and no global coherence) are significantly related to the severity of dementia for the Chinese-speaking population in Taiwan. In brief, this study offers a complementary tool for AD diagnosis, and the empirically-based interrogation of how repairs were presently theorized as an impediment to discourse was most contributive.

Several limitations, however, exist in the present research, despite some contributions regarding the discourse patterns produced by Chinese-speaking seniors with or without AD. Directions for further study are provided accordingly. Since this is an innovative study, having 20 participants per group is a good start. It is suggested that the number of subjects should be enlarged in future studies so as to generalize the patterns observed in the present research. Another limitation concerns the instruments adopted in the current research, by which only a brief interview with each participant was collected and analyzed. In collecting the AD oral discourse, different conversation partners, such as family members or care-givers, could be included in future studies to examine whether any significant discourse difference is displayed when conversing with different conversation partners.

Last but not least, it is highly recommended that future research addresses different qualitative degrees or extents of incoherence and revisions. The current investigation reveals the significant association between two discourse variables (i.e. revisions and no global coherence) and the severity of Alzheimer's dementia for the Chinese-speaking population in Taiwan. It follows that associating the prevalence of these attributes with dementia severity deserves further research.

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華語無失智年長者與阿茲海默失智年長者 言談特徵研究

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阿茲海默氏症失智年長者言談實證研究發現：隨著病程惡化，患者適當情境語言使用能力與溝通能力亦日趨受損。儘管相關研究日益增多，目前仍有待解問題，例如：鮮少有研究言談特徵於阿茲海默氏症失智程度之預測力與解釋力，再者，華語母語阿茲海默氏症失智年長者之言談特徵尚乏人問津。本研究意旨描述二十位華語母語阿茲海默氏症失智年長者與二十位無失智年長者之言談特徵，言談特徵細分為：言談助益特徵與言談阻礙特徵，並進一步討論語義與語用範疇之口語修正特徵。結果發現：與無失智年長者相較之下，華語母語阿茲海默氏症失智年長者口語表達呈現顯著較少言談助益特徵，但顯著較多言談阻礙特徵；其次，與言談助益變數相較，言談阻礙變數較能有效解釋阿茲海默氏症失智程度，尤其以修正和無整體連貫兩特徵與阿茲海默氏症失智程度顯著相關。

關鍵詞：言談特徵，華語，阿茲海默氏症