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Management of Topic in the Spoken Discourse of Persons Living with Mild Cognitive Impairment and Alzheimer's Dementia

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Abstract

Analyses of elicited spoken discourse can identify mild cognitive impairment (MCI) and Alzheimer's dementia (AD). Topic management, one feature of discourse defined as acts that maintain or terminate an established topic, can be measured via global coherence measures. Little is known, however, about whether analyses of topic management can distinguish spoken discourse performances of persons living with MCI (PLwMCI) vs. persons living with AD (PLwAD). The current study investigated whether there are differences in topic management in the spoken discourse performances of PLwMCI vs. PLwAD. Analyses were conducted on 120 transcripts of spoken sequenced story picture descriptions of PLwMCI (n=83) and PLwAD (n=37). Diagnostic group performances were analyzed using average global coherence ratings. No significant group differences were found. Average global coherence ratings were not a predictor of diagnostic group membership. Findings highlight the need for further investigation of topic management in PLwMCI and PLwAD.

Keywords

Summary for Lay Audience

Mild cognitive impairment (MCI) is a condition that represents the stage between healthy aging and dementia. MCI can indicate that an individual is at greater risk of developing dementia. Dementia is a syndrome that impairs memory and thinking abilities. Alzheimer's dementia (AD) is the most common type of dementia. Persons living with MCI (PLwMCI) and persons living with AD (PLwAD) typically experience a declining ability to use language and communicate. For the purposes of this thesis, discourse is the production of spoken language and can be elicited using a picture stimulus. Language impairments in PLwMCI and PLwAD can be studied and analyzed using a spoken discourse sample. Discourse in PLwMCI and PLwAD is characterized by few words, limited ideas, frequent repetitions, and difficulty maintaining topic; often with PLwAD showing greater problems than PLwMCI. However, it is unknown whether the spoken discourse performance of PLwMCI vs. PLwAD can be distinguished based on topic management. Global coherence is a measure of how closely related an individual's spoken discourse performance is to the general topic at hand. This thesis examined the global coherence of spoken discourse samples in PLwMCI and PLwAD. Spoken discourse data from the Ontario Neurodegenerative Disease Research Initiative (ONDRI) were used in this analysis. These discourse samples involved participants using a sequence of six pictures to tell a story. The differences and relationships between participant groups were investigated. Findings show that group differences were not found. Thus, global coherence was not able to predict diagnostic group, and diagnostic group was not able to predict an average global coherence score. This thesis proposes various suggestions for why the findings contrast the available literature and highlights the need for continued research in this area.

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1 Introduction

1.1 Definition and Epidemiology of Mild Cognitive Impairment

Mild cognitive impairment (MCI) describes the transitional condition between healthy aging and dementia and can be indicative of a greater risk of developing dementia (McCullough et al., 2019; Winblad et al., 2004). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the following criteria are accepted to define MCI: (1) modest cognitive decline from prior performance is evident in one or more cognitive domains (e.g., complex attention, executive ability, learning and memory, language, perceptual-motor, social cognition); this must be based on concern of the individual, a knowledgeable informant, or clinician and a decline in cognitive performance with specified performance cut-offs on standardized neuropsychological testing; and (2) cognitive deficits do not interfere with one's ability to carry out activities of daily living (ADLs) independently (e.g., feeding, dressing, bathing, toileting) (American Psychiatric Association, 2013). There are four different subtypes of MCI: (1) amnestic MCI-single domain (a-MCI-sd); (2) non-amnestic MCI-single domain (na-MCI-sd); (3) amnestic MCI-multiple domain (a-MCI-md); and (4) non-amnestic MCI-multiple domain (na-MCI-md) (Key-DeLyria, 2013). Memory impairment is observed in a-MCI-sd and a-MCI-md. However, what differentiates the two are the presence of other cognitive impairments in a-MCI-md (Albert et al., 2011; Key-DeLyria, 2013; Litvan et al., 2011; Nelson & O'Connor, 2008; Petersen & Negash, 2008; Reinvang et al., 2012). Memory remains unimpaired in both na-MCI-sd and na-MCI-md. A single cognitive impairment is present in na-MCI-sd and more than one cognitive impairment is present in na-MCI-md (Albert et al., 2011; DeLyria, 2013; Litvan et al., 2011; Nelson & O'Connor, 2008; Petersen & Nevash, 2008; Reinvang et al., 2012).

MCI is of importance because of its high prevalence among adults and older adults and the growing number of older adults worldwide. MCI rates for Canadians 65 years of age and older were reported to be 10% in 2011 (Fitzpatrick-Lewis et al., 2015). Approximately 10 to 20% of people aged 65 or older are currently living with MCI (Hanninen et al., 2002; Lopez et al., 2003; Petersen et al., 2010).

1.2 Primary Features of Mild Cognitive Impairment

The degree of cognitive impairment in MCI is not normal for an individual's age and is characterized by modest cognitive decline with deficits that do not interfere with ADLs (American Psychiatric Association, 2013). Individuals with MCI can experience a variety of declines in any cognitive domain (Fleming, 2013). However, memory is the domain that most individuals notice and report (Fleming, 2013). Most commonly, MCI presents as changes in cognition, impairment in one or more cognitive domains, preservation of independence in functional abilities, and the individual is not demented (Fleming, 2013).

MCI can be differentiated from normal cognitive aging and from Alzheimer's dementia (AD) on the basis of language ability (Fleming & Harris, 2008; Taler & Phillips, 2008). Individuals with MCI experience impairments in naming and word retrieval, verbal fluency, language comprehension, discourse processing and production, picture description, the ability to define words, and during repetition tasks (Bayles, McCullough, and Tomoeda, 2020). Linguistic changes, specifically fewer semantic units, are reported in the preclinical phase of AD (i.e., presumably MCI) on picture-description tasks (Cuetos et al., 2007). Individuals with MCI versus those with normal cognition produced shorter samples with poorer quality during a complex

discourse production task (Fleming & Harris, 2008). Moreover, individuals with MCI also demonstrated an overall lack of thematic concepts during the complex elicited discourse production task (Fleming & Harris, 2008). Taler and Phillips (2008) concluded that language deficits are similar in individuals with MCI and individuals with AD, with individuals with MCI being to a lesser extent. Specifically, the individuals with MCI had difficulty with verbal fluency, confrontational naming, reaction time in language comprehension tasks, and syntactic reasoning (Taler & Phillips, 2008).

1.3 Definition, Types, and Epidemiology of Dementia

Dementia is a progressive neurodegenerative syndrome that refers to a collection of symptoms including cognitive decline and changes in language and communication that significantly interfere with an individual's ability to continue with their ADLs (American Psychiatric Association, 2013). Often, dementia progression is described according to three clinical stages: early, middle, and late (Alzheimer Society of Canada, 2022b). In the early clinical stage of dementia, many individuals remain independent and only require a small degree of assistance with activities of daily living (i.e., bathing, dressing toileting, and eating) (Alzheimer Society of Canada, 2022b). Common symptoms include, but are not limited to, memory problems, difficulty with planning, complex decision-making, or problem-solving, word-finding difficulties, language and communication problems, poor orientation, visual-perceptual challenges, and changes in mood or emotion (Alzheimer Society of Canada, 2022b). The middle clinical stage of dementia often is characterized by symptoms becoming more noticeable and by the increase in support needed for ADLs (Alzheimer Society of Canada, 2022b). Symptoms that were present in the early clinical stage tend to worsen, and changes in behaviour become increasingly prevalent (Alzheimer Society of Canada, 2022b). Additionally, delusions, paranoia,

or hallucinations can occur, and symptoms of apathy, depression, and anxiety also can be present. Finally, in the late clinical stage of dementia, severe impacts will be present in most aspects of an individual's life, with symptoms being varied and profound often leading to full-time care and support (Alzheimer Society of Canada, 2022b). There are several different types of dementia. According to the World Health Organization (2023), the major types of dementia are vascular dementia, dementia with Lewy bodies, and frontotemporal dementia. However, the most common type is Alzheimer's dementia (World Health Organization, 2023).

It is estimated that more than 55 million people worldwide are currently living with dementia (World Health Organization, 2023). The number is expected to continue to rise substantially over the next few decades due to increases in overall number of older adults (World Health Organization, 2023). The rise in the population of older adults can be attributed to increases in life expectancy and improvements in healthcare (World Health Organization, 2022). Thus, individuals are living longer with comorbid conditions, including dementia (World Health Organization, 2022). Additionally, age is a crucial risk factor for dementia, which means increases in life expectancy results in individuals being more susceptible.

The overall number of older adults in Canada continues to increase with 1 in 5 Canadians now being 65 years of age and older (Statistics Canada, 2022a). In Canada, more than 500,000 individuals living with dementia today and it is estimated that this number will reach one million in less than a decade (Alzheimer's Society of Canada, 2022a). On average in 2022, more than 350 people were diagnosed with dementia (Alzheimer's Society of Canada, 2022a). An estimated 0.8% of Canadians aged 45 or older living in private households had a diagnosis of

dementia in 2016, with the prevalence rising with age (Wong et al., 2016). The prevalence rose

to as much as 5% at age 80 and above (Wong et al., 2016).

1.4 Primary Features of Dementia

There is a wide range of cognitive or behavioural symptoms that signal the onset of dementia.

These vary from mild to severe depending on the clinical stage of dementia (McKhann et al.,

2011). McKhann et al. (2011) outlined that the cognitive or behavioural impairment upon

dementia diagnosis must involve minimally "two of the following domains: (a) impaired ability

to acquire and remember new information, (b) impaired reasoning and handling of complex

tasks, poor judgment, (c) impaired visuospatial abilities, (d) impaired language functions

(speaking, reading, writing), (e) changes in personality, behaviour, or comportment" (p. 3).

The syndrome of dementia includes the hallmark feature of disrupted language (Hall et al.,

2018). Language and communication changes in dementia are type-specific and summarizing the

language and communication profile of all types is beyond the scope of this thesis. Rather, the

language and communication of persons living with Alzheimer's dementia (PLwAD) will be

reviewed as this type of dementia is the focus of my study.

1.5 Definition and Epidemiology of Alzheimer's Dementia

Alzheimer's dementia (AD) refers to the clinical manifestation of a progressive

neurodegenerative disease that destroys brain cells, causing cognitive and memory decline over

time (Alzheimer Society of Canada, n.d.). The neurodegenerative disease, Alzheimer's disease,

is identified typically by plaques and tangles identified through neuropathologic examination

(Jack et al., 2018). Typically, AD gradually progresses in three clinical stages: mild or early,

moderate or middle, and severe or late (Bayles, McCullough, & Tomoeda, 2020). In the mild

stage, individuals may function and perform ADLs independently (Bayles, McCullough, & Tomoeda, 2020). However, individuals and their care providers may notice memory lapses and difficulties; although mild, symptoms would be identifiable using diagnostic tools at this stage (Bayles, McCullough, & Tomoeda, 2020). During the moderate stage of AD, the level of care and assistance individuals require increases, and the most dramatic changes are seen during this stage (Bayles, McCullough, & Tomoeda, 2020). Along with personality and behavioural symptoms becoming prominent at this stage, individuals may now also require assistance with ADLs (Bayles, McCullough, & Tomoeda, 2020). This usually begins with instrumental ADLs (i.e., taking messages, managing finances) and progresses to basic ADLs during the latter portion of middle stage AD (i.e., incontinence; Bayles, McCullough, & Tomoeda, 2020). In the final stage of AD, symptoms are severe, and the individual is often disoriented for person, place, and time (Bayles, McCullough, & Tomoeda, 2020). At this stage, individuals often require extensive care with full-time assistance (Alzheimer Society of Canada, 2022b).

AD is the most common form of dementia. AD accounts for 60 to 70% of total dementia cases (World Health Organization, 2023). AD is typically associated with older age, with most cases consisting of individuals 65 years of age or older (National Institute on Aging, 2019). More than 747,000 Canadians are currently living with Alzheimer's or other types of dementia (Alzheimer's Association, n.d.). Worldwide there are at least 44 million individuals living with AD (Alzheimer's Association, n.d.).

1.6 Primary Features of Alzheimer's Dementia

Memory loss often is the initial and most common manifestation associated with AD, although symptoms vary from person to person (National Institute on Aging, 2019). As the disease

progresses, other symptoms manifest, such as disorientation, confusion, behavioural changes, and communication difficulties (Alzheimer's Association, 2021). As described by McKhann et al. (2011), the core clinical criteria for probable Alzheimer's disease dementia include (1) criteria for dementia; (2) gradual onset; (3) declining cognition clearly reported or observed in patient history; and (4) amnestic presentation (i.e., impairment in learning and recall) or non-amnestic presentations (i.e., language presentation, visuospatial presentation, executive dysfunction).

Language deficits in AD often manifest as empty spoken language (Nicholas et al.,1985) characterized by circumlocutions, nonspecific terms (e.g., thing, stuff, that), and limited ideas conveyed in a lot of other non-specific words (Mueller et al., 2018a). During the moderate and severe clinical stages of AD, deficits often are apparent in both production (Kemper, Marquis, & Thompson, 2001) and comprehension of language (Bickel et al., 2000; Grossman et al., 1996; MacDonald et al., 2001; Martin & Fedio, 1983; Mueller et al., 2018a). During these two stages, everyday interactions may be filled with communication breakdowns (Savundranayagam & Orange, 2014; Mueller et al., 2018a). Severe stage AD language and communication is characterized by a complete lack of verbal communication often resulting in the individual becoming socially disengaged (Blair et al., 2000; Frisoni et al., 1999; Hart et al., 2003; Ripich & Terrell, 1988; Mueller et al., 2018a).

1.7 Discourse, Types of Discourse, and Discourse Analysis

Discourse is defined in many ways depending on the theoretical structure or philosophy an individual conducts for their study. According to Brown and Yule (1983), discourse is what the language is used for, and therefore it can be described at several levels of structure (i.e., syntax, semantics, stylistics, and rhetoric). For the purposes of this study, the definition of discourse was

adopted from Fleming and Harris (2008) and incorporated elements from the definitions of

Brookshire (1997), Brownell et al. (1983), and Patry and Nespoulous, (1990) as, "a naturally

occurring linguistic unit that entails the use of suprasential, generative language, and requires

complex ideation that involves planning, organization, and cognitive flexibility" (p. 730).

Discourse, an element of language that can be disrupted in persons living with dementia (PLwD),

is the production of written or spoken communication that is structured by context and goals

(Alexander, 2006; Ash et al., 2006; Ellis et al., 2016). Connected language refers to spoken

language used in a continuous sequence (e.g., everyday conversation). It can also be referred to

as connected speech, spontaneous speech, or discourse (Mueller et al., 2018b). The study of self-

generated discourse can be referred to as connected language analysis and involves interactions

within a variety of cognitive processes such as semantic storage and retrieval, executive

functions and working memory (Mueller et al., 2018a).

1.7.1 Types of Discourse

There are several different types of discourse, including narrative, procedural, expository,

argumentative, and conversation. Narrative discourse, the type of discourse chosen for this

thesis, involves real or imagined events and is used to evaluate how well individuals are able to

structure and describe a series of events. In order to appreciate performance differences in

discourse tasks that can occur with aging, researchers suggested that the tasks must be

cognitively demanding and challenging (Cannizzaro & Coelho, 2013; North et al., 1986;

Ultaowska et al., 1986). Narrative discourse elicitation using a visual stimulus is useful for

analyzing language in older adults with cognitive decline, including individuals with a-MCI and

PLwAD (Drummond et al., 2015).

1.7.2 Discourse Analysis

From the perspective of discourse analysis, discourse can be defined as instances of communicative action in the form of language (Blommaert, 2005). Discourse production and understanding discourse are thought to represent a complex, functional, and socially relevant form of communication (Coannizzar & Coelho, 2013; Ska et al., 2009). Discourse analysis has been a method of expressive language performance evaluation for several decades (Bloom et al., 1975; Botting, 2002; Brown, 1973, Evans & Craig, 1992; Mueller et al., 2018a). Particularly in the last two decades, connected language has received increased attention as a source of data from which to measure changes in language among individuals with cognitive decline because connected language closely approximates a functional communication skill (Kemper et al., 1990; Mueller et al., 2018a). Discourse production can be analyzed by focusing on micro-structures (i.e., words, phrases, sentences) and macro-structures (i.e., meaning and reference; Seixas-Lima et al., 2020). Spontaneous language production involves a variety of cognitive and physiological processes, such as semantic, episodic, and working memory and sustained and divided attention (Barbeau et al., 2012; Carter et al., 1998; Hartsuiker and Barkhuysen, 2006; Mueller et al., 2018b). Thus, connected language analysis may be able to detect early cognitive changes and provide a more representative performance-based measure in comparison to standardized language and cognitive testing (Mueller et al., 2018b).

1.8 Age-Related Changes and Changes Related to Dementia

Discourse involves a cognitive component because it relies on an individual's executive functioning (i.e., intent, planning, and task persistence) to assemble utterances (Alexander, 2006; Ash et al., 2006; Ellis et al., 2016). Generally, there are declines in discourse comprehension abilities with age (McGinnins et al., 2008; Tye-Murray et al. 2008, Wright et al., 2011) that are

thought to be influenced by changes in age-related executive function (Cannizzaro & Coelho, 2012; Fleming 2009; Obler et al. 1994). Communication efficiency, which refers to the amount of information communicated over time, also declines with age (Le Dorze and Bédard, 1998; MacKenzie, 2000; Shewan and Henderson, 1988). Other age-related declines in discourse production, specifically picture description, include slower speaking rates, longer pause times, increased variation in filler word usage, greater repeated comments, and word-finding difficulties (Cooper, 1990; Le Dorze & Bédard, 1998; Shewan & Henderson, 1988). Mueller et al. (2018b) aimed to determine if declines in connected spoken language used in a continuous sequence were present in individuals with early, subclinical memory declines. Their findings suggested that subclinical declines in memory and execution function were associated with connected language changes (Mueller ert al., 2018b).

PLwD often exhibit limited vocabulary, word-finding difficulties, tangentiality, repetition of ideas and phrases, and problems maintaining the topic and the coherent flow of discourse (Bayles, 1985; Bayles and Tomoeda, 2014; Dijkstra et al., 2004; Hall et al., 2018; Kempler, 1991). These deficits are dependent on several factors, including the type and severity of dementia (Dijkstra et al., 2004). Everyday interactions with PLwD are known to be influenced by dementia-related language and memory impairments (Hall et al., 2018). Particularly, performing ADLs and maintaining relationships becomes increasingly difficult as communication skills decline (Hall et al., 2018). This highlights the importance of analyzing language changes related to dementia. An analysis of an individual's performance within a specific discourse type can provide information about their linguistic abilities and the functioning of their executive skills (Dijkstra et al., 2004). For example, narrative discourse tasks can provide important information about the linguistic profiles of PLwMCI and PLwAD.

1.9 Discourse in MCI and AD

Discourse processing and production in PLwMCI is being researched substantively. Discourse in MCI is characterized by fewer words and core elements, restricted vocabulary, impaired processing, fewer semantic units, and low idea density (Bayles, McCullough, and Tomoeda, 2020). Deficits in verbal fluency and connected language are present in individuals considered to be living with "early" MCI (Johnson et al., 2017; McCullough et al., 2018; Mueller et al., 2015, 2016). Chapman et al. (2002) found performance differences when examining discourse processing in early normal controls, MCI, and AD which suggests linguistic deficits are present in PLwMCI. Moreover, these preliminary differences provide a rationale for determining additional subtle linguistic markers that profile the discourse of PLwMCI (Fleming & Harris, 2008). During a spoken discourse task, Harris et al., (2008) found PLwMCI are more verbose, included more irrelevant comments, and produce less thematic information versus healthy young adults and healthy older adults. PLwMCI also produced fewer words and core elements when compared to healthy older adults during a spoken discourse task (Fleming & Harris, 2008). Drummond et al. (2015) found that individuals with a-MCI perform worse than normal older adults but better than PLwAD on a spoken picture description task. More recently, in comparison to cognitively healthy individuals, PLwMCI demonstrated a more rapid cognitive decline in semantic and fluency features of connected language (Mueller et al., 2018b). The current published literature provides ample evidence that discourse is impaired in PLwMCI and provides a rationale for further research into the specific impairments.

Discourse in AD is characterized by frequent repetitions, the use of empty and indefinite words, aborted phrases, and inappropriate use of pronouns, inappropriate topic shifts and maintenance of

topic, hesitations, and abnormal semantic content (Dijkstra et al., 2004; Garcia & Joanette, 1997). Moreover, features of impaired discourse in PLwAD include impacted coherence, which can include topic management (Dijkstra et al., 2004). Poor topic maintenance, reference errors, sentence fragments, difficulty formulating and remembering sentence content, circumlocutions, preservation, and revisions also are common problems exhibited by PLwAD on discourse tasks (Azuma & Bayles, 1997; Bayles et al., 1985; Carlomagno et al., 2005; Ehrlich et al., 1997; Fleming & Harris, 2008; Forbes-McKay et al., 2013; Teten et al., 2015). PLwAD typically produce less information overall and are less effective communicators than healthy older adults (Drummond et al., 2015). Other major expressive discourse difficulties among PLwAD include few propositions, difficulty reporting a sequence of events, information gaps hindering overall meaning, poor ratings of cohesion and coherence, and difficulty making inferences (Ash et al., 2007; Brandão and Parente, 2011; Chapman et al., 2002; Drummond et al., 2015; Mansur et al., 2005; Mar 2004; Ska and Duong, 2005).

Language assessment, which more closely approximates everyday language production in comparison to standardized testing, is sensitive to detecting early cognitive change for both MCI and AD, particularly for the analysis of connected language (Taler & Phillips, 2008; Mueller et al., 2018b). A few retrospective analyses (Ahmed et al., 2013; Berisha et al., 2015; Garrard et al., 2005) have revealed changes in PLwMCI or even earlier (Mueller et al., 2018b). However, most research on connected language analysis has focused on individuals in the mild to moderate clinical stages of AD. Laske et al. (2015) stated connected language analyses as "the most promising state-of-the-art diagnostic measures for MCI and AD" (Mueller et al., 2018b, p. 12). Szatloczki et al.,(2015) reviewed the literature on language performance deficits in PLwMCI and

individuals with early AD; they concluded language performance deficits are present in PLwMCI and should play a significant role in early detection.

1.10 Predictive Markers in Spoken Discourse

Given the significant literature on discourse in PLwMCI and PLwAD, it is logical to consider the predictive relationship between markers in spoken discourse and cognitive status (i.e., MCI or AD). Ahmed et al. (2013) used a picture description task to conclude that group membership to AD could be predicted based on fewer verbs in the discourse sample. Mueller et al. (2018b) examined the relationship between cognitive status and connected language factors. They found significant differences between time and cognitive status for fluency factor scores (i.e., the flow of speaking). They also found that living with early MCI is a significant predictor of poorer scores on speech fluency. Yeung et al. (2021) applied exploratory factor analysis to spoken discourse for controls, PLwMCI, and PLwAD to explore common factors between variables for speech characteristics. Calzà et al. (2019) aimed to quantify and describe alterations of linguistic features due to cognitive decline by looking at spontaneous speech tasks in healthy controls, PLwMCI, and individuals living with early dementia. Currently, the need for markers of disease-specific language impairment remains high in prodromal (i.e., PLwMCI) and diagnosed AD (Forbes-McKay & Venneri, 2005; Yeung et al., 2021).

1.11 Rationale for Spoken Picture Description Analysis

Picture description provides discourse data such as grammatical use, amount, type, and efficiency of information conveyed, topic and organization of the narrative (Mackenzie et al., 2007). Utilizing picture description tasks also helps minimize memory and sustained attention demands since a consistent referent is used (Mackenzie et al., 2007). Picture description tasks

have been proven useful in obtaining connected language samples, detecting differences in

semantic processing, syntactic complexity, pragmatic language use, and speech and voice

parameters between healthy older adults and PLwAD (Mueller et al., 2018a). Compared to other

types of discourse (i.e., autobiographical) picture description offers increased objectivity and

reproducibility (Drummond et al., 2015). There are fewer published studies on the picture

description discourse performances of individuals living with MCI than in PLwAD (Mueller et

al., 2018a). Still, findings indicate subtle changes can be detected in speech production and

language performances (Mueller et al., 2018a). Spoken discourse is a sensitive and specific

measure when elicited using picture stimuli, especially for detecting cognitive change in

neurodegenerative disorders and dementia (Roberts et al., 2019). Moreover, spoken discourse

tasks have proven the ability to indicate prodromal disease in AD (Duong et al., 2003; Fleming

& Harris, 2008; Roberts et al., 2019). Thus, behaviours demonstrated during an elicited discourse

sample provide a robust source for various analyses, such as assessing the cognitive-

communicative abilities of PLwMCI and PLwAD (Fleming & Harris, 2008).

Investigating narrative performance using sequenced story picture description tasks rather than

single-scene stimuli (e.g., "Cookie Theft" from the Boston Diagnostic Aphasia Examination)

requires individuals to integrate facts and scenes, as well as establish relationships between

events (Drummond et al., 2015). Structured discourse tasks are of considerably greater value in

understanding language and cognitive impairments in comparison to single words or sentences

(Roberts et al., 2017. Lemme et al. (1984) investigated types of narrative tasks (i.e., a set of toy

dolls, a single-picture stimulus, and a sequence picture stimulus). They found that the sequence

picture stimulus elicited longer, more complete narratives (Lemme et al., 1984). For the present

analysis, language samples were obtained from the "Argument" picture sequence stimuli from

Nicholas and Brookshire (1993). This is a standardized stimulus which has been well reported on

and used for language sampling in neurodegenerative disorders (Murray, 2000; Murray & Lenz,

2001; Roberts & Post, 2018; Roberts et al., 2021).

1.12 Topic Management

A thorough review of the literature on topic management in the spoken discourse of PLwMCI

and PLwAD was completed. See Appendix A for a summary of the databases included in the

review and the criteria used. Dijkstra et al. (2004) defined discourse topic as "what are

conversations about and how does it change as interaction proceeds" (p. 277). The ability to

manage topic effectively in discourse is reliant on our memory systems (Dijkstra et al., 2004).

An individual's executive functioning skills and memory systems must be intact to maintain

topic during discourse (Dijkstra et al., 2004).

Coherence can be thought of as the appropriate maintenance of topic during discourse (Halliday

& Hasan, 2014; Mueller et al., 2018a). That is, a sample of coherent discourse is one in which a

communicator effectively shares information relevant to the immediately preceding talk and the

overall topic (Hall et al., 2018). Discourse coherence reflects the interpretability of the overall

meaning a speaker conveys during a discourse sample and can be conceptualized as a global

topic or a local topic (Wright et al., 2013). Coherence is measured using thematic relation(s) of

an utterance to the immediately preceding utterance (i.e., local coherence) and by how close the

relation of an utterance is to the general topic at hand (i.e., global coherence) (Laine et al., 1998;

Mueller et al., 2018a). For the purposes of the current study, the primary investigator (SAD) was

concerned with global coherence, which is described by Wright et al. (2013) as "how the

measured units of discourse (i.e., utterance, proposition, verbalization and sentence) maintain the

overall topic" (p. 250). Coherent discourse in the present study was defined as a c-unit that is evidently related to the stimulus by inclusion of information that is significant to the main details of the picture sequences (Wright et al., 2010, 2013). Maintaining global coherence during a discourse task requires individuals to organize information in a hierarchical manner, integrate facts and concepts, and coordinate a plan that leads to an overall communicative goal; the individual must do so while maintaining the listener's perspective (Seixas-Lima et al., 2020). Changes in maintenance of coherence of discourse have been found to exist throughout an individual's lifespan (Reese et al., 2011; Seixas-Lima et al., 2020). These findings suggest there is a peak in coherence performance during adulthood, then a decline in late middle age (Reese et al., 2011; Seixas-Lima et al., 2020).

1.12.1 Topic Management in Discourse in Mild Cognitive Impairment

There are relatively few studies on topic management performances of PLwMCI during narrative discourse. The available literature suggests that difficulties in the global understanding of narratives might be exhibited in PLwMCI (Chapman et al., 2002; Drummond et al., 2015). Specifically, the performance of PLwMCI is likely to be worse than that of healthy, older adults and similar to PLwAD (Chapman et al., 2002; Drummond et al., 2015).

Individuals with MCI show reduced global coherence of discourse, low discourse efficiency, few words in sentences, simple sentence structure usage, and insufficient content (Drummond et al., 2015; Kim et al., 2019a, 2019b; Seixas-Lima et al., 2020). Drummond et al. (2015) found performance differences in global coherence between healthy controls and PLwMCI versus PLwAD on a picture sequence elicitation stimulus. The performance of PLwMCI was found to represent and intermediary stage between the performances of healthy older adults and PLwAD,

with the PLwAD displaying the worst performance (Drummond et al., 2015). PLwMCI were

better able to establish the global coherence of the picture sequence story and produced a more

effective discourse sample than PLwAD (Drummond et al., 2015). Similar deficiencies have

been found in studies of connected language in PLwMCI and PLwAD, specifically in semantic

content and semantic processing (Mueller et al., 2018a). Seixas-Lima et al. (2020) investigated

coherence scores in healthy, older adults and PLwMCI. They found significant group differences

between the groups with PLwMCI receiving lower coherence scores during the production of

episodic and semantic information (Seixas-Lima et al., 2020). Kim et al. (2019a) compared

global coherence (i.e., topic maintenance) in healthy, older adults and PLwMCI (a-MCI and na-

MCI) and found lower scores in PLwMCI. Topic management in PLwMCI has been less

frequently reported on than PLwAD. The studies that have analyzed discourse production of

PLwMCI have more commonly been based on single-scene picture description narratives (e.g.,

"Cookie Theft"; Forbes-McKay and Venneri, 2005; Tsantali et al., 2013). Additionally, many of

the available studies have compared older, healthy adults and PLwMCI as opposed to PLwMCI

and PLwAD, suggesting the need for further research.

1.12.2 Topic Management in Discourse in Alzheimer's Dementia

Topic management impairments have been well-reported among individuals with AD (Dijkstra

et al., 2004; Garcia & Joannette, 1994, 1997; Hall et al., 2018; Mentis et al., 1995). Existing

literature on topic management in PLwAD showed their difficulty maintaining topic in discourse

when compared with normal healthy adults (Garcia & Joanette, 1997; Teten et al., 2015).

Dijkstra et al. (2004) found that elaborations on topic, global coherence, and topic maintenance

occurred more often in healthy, older adults than in PLwAD. Additionally, empty phrases and

disruptive topic shifts were found to occur less often in healthy, older adults than in PLwAD

(Dijkstra et al., 2004). When compared to healthy, older adults, PLwAD have been observed to

have breakdowns in topic maintenance, global coherence, and reduced informativeness during

conversational discourse (Dijkstra et al., 2004; Laine et al., 1998). Similarly, Garcia and Joanette

(1997) investigated healthy, older adults and individuals with dementia of the Alzheimer type.

They reported greater numbers of topic initiations and unexpected topic shifts in PLwAD (Garcia

& Joanette, 1997). Individuals with AD have also demonstrated significant impairment with

global coherence relative to normal healthy adults (Glosser and Deser, 1991; Arkin and

Mahendra, 2001, Teten et al., 2015). Other reported problems exhibited in PLwAD during

discourse include poor topic maintenance, fewer inclusions of core elements of the topic, errors

with referencing, sentence fragments, trouble composing sentence content, as well as greater

numbers of circumlocutions and revisions (Azuma & Bayles, 1997; Bayles et al., 1985;

Carlomagno et al., 2005; de Lira et al., 2011; Elrich, Obler, & Clark, 1997; Fleming & Harris,

2008; Forbes-McKay, Shanks, & Venneri, 2013; Teten et al., 2015).

1.13 Statement of the Problem

Analyses of elicited spoken discourse can identify MCI and AD (Duong et al., 2003; Fleming &

Harris, 2008). The spoken discourse of PLwAD have most often been compared to the

performances of normal, healthy older adults (Dijkstra et al., 2004; Garcia & Joanette, 1997).

One unique distinguishing feature of AD compared to healthy controls is difficulty maintaining

topic in spoken discourse among PLwAD (Dijkstra et al., 2004; Garcia & Joanette, 1997). Based

on the primary features of AD (e.g., memory problems, naming or word-finding difficulties,

difficulties with narrative discourse, less effective communication) and the functioning

requirements to produce and to comprehend discourse, it is logical that PLwAD would struggle

with topic management during discourse (Ash et al., 2007; Blonder et al., 1994; Drummond et al., 2015; Henry and Crawford, 2004).

Currently, there are few published studies regarding which specific spoken discourse features, specifically topic management, distinguish PLwMCI or PLwAD. Previous research shows how topic management in PLwMCI compares to healthy older adults and how topic management in PLwAD compares to healthy older adults. However, what remains unknown is whether the spoken discourse performance of PLwMCI vs. PLwAD can be distinguished based on topic management features, specifically global coherence, during picture sequence elicitation stimuli.

1.14   Aims and Research Questions

The purpose of the present study was to investigate whether there are differences in topic management in the spoken sequenced-picture story description narratives of PLwMCI and PLwAD. The aim of the present study was to understand whether there is a difference in topic management in the discourse comparison of participants with MCI vs. PLwAD. More specifically, the research questions for the current study were: 1. Are there differences in topic management in the spoken sequenced-picture story description discourse between persons living with MCI vs. AD? 2a. Which diagnostic group (e.g., MCI or AD) best predicts which topic management performance measures? 2b. Which topic management performance measure(s) predict diagnostic group membership (MCI vs. AD)?

Chapter 2

2 Method

2.1 Design of Study

The data for the current study come from the prospective, longitudinal dataset of the Ontario

Neurodegenerative Disease Research Initiative (ONDRI). ONDRI is a longitudinal,

observational study that looks to advance our understanding of existing similarities and/or

differences within five cohorts of neurodegenerative disease: mild cognitive

impairment/Alzheimer's dementia, amyotrophic lateral sclerosis, frontotemporal dementia,

Parkinson's disease, and vascular cognitive impairment (Sunderland et al., 2022). ONDRI set a

goal to improve dementia diagnosis and treatment options (Sunderland et al., 2022).

2.2 Ethics

Ethics approval was obtained from each of the 13 participating data collection centres throughout

Ontario (Sunderland et al., 2022). Western University ethics approval for ONDRI included

approval to complete this study (Appendix B).

2.3 Participants

Baseline spoken sequenced-picture story description discourse data were used from the MCI and

AD participant groups in ONDRI. A total of N=520 ONDRI participants were recruited for

baseline measurements, of which n=126 were part of the MCI/AD cohort group (Sunderland et

al., 2022). The National Institute on Aging-Alzheimer's Association (NIA-AA) core clinical

criteria (Albert et al., 2011; McKhann et al., 2011) were used to categorize participants for

amnestic single or multiple domain MCI or probable AD (Farhan et al., 2017). MRI scans were

assessed by a research neuroradiologist for all recruited MCI/AD group participants prior to

enrolment to rule out non-AD causes of dementia by confirming the absence of significant pathology (Sunderland et al., 2022).

The age range for the MCI/AD cohort was 53.4-87.8 years of age, with a mean age of 71.03 years and standard deviation of 8.16. Participants obtained a minimum of 8 years of education and were proficient in spoken and written English. A minimal score of 7 on two questions on the Modified Language Experience and Proficiency Questionnaire (LEAP-Q) determined language proficiency (Marian, Blumenfeld, & Kaushanskaya, 2007; McLaughlin et al., 2021). Participants had geographic accessibility to the site to participate in the study (Farhan et al., 2017). The Montreal Cognitive Assessment (MoCA) was used to ensure a score greater than or equal to 18 was achieved by participants (Farhan et al., 2017). Participants were distinguished by diagnostic membership using the NIA-AA criteria for MCI (Albert et al., 2011) and AD (McKhann et al., 2011).

2.3.1 Inclusion and Exclusion Criteria

The following describes the inclusion and exclusion criteria used for the MCI/AD diagnostic cohort (Farhan et al., 2017).

2.3.1.1 Inclusion Criteria.

- Participant must be 45-90 years of age
- Informed consent must be written and documented
- Score $\geq$ 7 on two LEAP-Q questions
- Education level of $\geq$ grade 8
- MoCA score $\geq$ 18/30 (unless atypical AD: $\geq$ 14/30)
- Participant must have geographic access to study site

- Ability to walk with or without assistive aids

- NIA-AA core clinical criteria for probable AD dementia or amnestic single or multiple-domain MCI must be met

- Standardized work up for dementia (i.e., brain imaging and blood work) must be completed to rule out non-AD causes of dementia

- If late-onset depression ($\geq$ 55 years of age) is controlled by medication, participants will be included

- Participants with "pure" generalized anxiety disorder (GAD) will be included as long as there is no history of associated major depression

- Participants with attention deficit hyperactivity disorder (ADHD) will be included if the following applies:

  o Participant is not on treatment for ADHD

  o Disorder is mild enough as not to significantly affect cognitive performance (according to the judgement of the clinician)

Note: MRI screening may exclude participants due to findings detected through quality control.

2.3.1.2 Exclusion Criteria.

- Serious underlying disease and/or any disease which could lead to death within 3-5 years other than the disease being studied

- Participant has more than one of the five diseases of study interest

- History of drug and/or alcohol abuse – dependent on opinion of investigator

- Participant has any of the following:

  o Recent substance abuse (within past year), unstable cardiac, pulmonary, renal, hepatic, endocrine, hematologic, or active malignancy or infectious disease,

acquired immune deficiency syndrome (AIDS) or AIDS-related complex,

unstable psychosis or untreated major depression within 90 days of visit for

screening

- Current enrolment in any disease-modifying therapeutic trial or observation study – subject to Executive Committee review

- Usage of permanent assisted ventilation

- Usage of nasal intermittent positive pressure ventilation (> nocturnal requirements)

- Applicable to London, Toronto, and Ottawa study sites only:

  o Participant has one of the following: known glaucoma – clinical diagnosis, serious eye disease, treatment or eye surgery, history of optic neuritis or other optic neuropathy, or retinal laser therapy for diabetic retinopathy

  o Known multiple sclerosis diagnosis

  o Diabetes if poorly controlled (hemoglobin A1c $\geq$ 7.5%)

2.3.2 Demographic Data

The following ONDRI MCI and AD participant demographic data were uploaded to SeaFile by

Ontario Brain Institute (OBI) and ONDRI approved researchers used in the current study

(Appendix C for file names).

Demographic data for the MCI participants of the MCI/AD cohort who formed the participant

group for the present study are presented in Table 1. Of the total of 83 participants living with

MCI, 43 were male. The ages of the participants ranged from 53 to 87 years. The average age

was 70.3 years. The overwhelming majority of the participants self-identified as White (86.7%).

The educational levels of the participants were primarily undergraduate and graduate degrees

(68.7%). Right-handedness was the majority (90.4%). Finally, for PLwMCI, the average MoCA

score was 23.5 with a range of 18 to 30.

Table 1

Demographic Data for MCI Participants, Excluding Participants with Missing Data

Variable	N	%
Sex		
Male	43	51.8
Female	40	48.2
Age		
Mean (Range)	70.3 (53-87)	-
Ethnicity		
White	72	86.7
Black	3	3.6
South Asian	3	3.6
Jewish	1	1.2
Filipino	1	1.2
Hispanic	1	1.2
Arab	1	1.2
Multiple	1	1.2
Education		
< Highschool	1	1.2
Some Highschool	6	7.2
Highschool	6	7.2
GED or Equivalent	1	1.2
Some college	11	13.3
Associate Degree	13	15.7
Bachelor's Degree	17	20.5
Master's Degree	17	20.5
Professional School Degree	3	3.6
Doctoral Degree	7	8.4
Handedness		
Right	75	90.4
Left	6	7.2
Ambidextrous	2	2.4
Montreal Cognitive Assessment (MoCA) Score		
Mean (Range)	23.5 (18-30)	-

Demographic data for the AD participants of the MCI/AD cohort who formed the participant

group for the present study are presented in Table 2. Of the total of 37 participants living with

AD, 21 were male. The ages of the participants ranged from 54 to 87 years. The average age was

71.7 years. The overwhelming majority of the participants self-identified as White (83.8%). The educational levels of the participants were primarily undergraduate and graduate degrees (62.1%). Right-handedness was the majority (91.9%). Finally, for PLwAD, the average MoCA score was 22.0, ranging from 15 to 26.

Table 2

Demographic Data for AD Participants, Excluding Participants with Missing Data

Variable	N	%
Sex		
Male	21	56.8
Female	16	43.2
Age		
Mean (Range)	71.7 (54-87)	-
Ethnicity		
White	31	83.8
Jewish	2	5.4
South Asian	2	5.4
Filipino	1	2.7
Hispanic	1	2.7
Education		
Some Highschool	6	16.2
Highschool	3	8.1
Some college	5	13.5
Associate Degree	7	18.9
Bachelor's Degree	8	21.6
Master's Degree	4	10.8
Professional School Degree	2	5.4
Doctoral Degree	2	5.4
Handedness		
Right	34	91.9
Left	2	5.4
Ambidextrous	1	2.7
Montreal Cognitive Assessment (MoCA) Score		
Mean (Range)	22.0 (15-26)	-

Demographic data for individuals who were a part of the cohort, but not the present study due to missing data are presented in Table 3. Of the six participants, five were male. The ages of the participants ranged from 66 to 84 years. The average age was 75.4 years. Half of the participants

self-identified as White (50%), one self-identified as Black (16.7%), one self-identified as South

Asian (16.7%), and one self-identified as Other (16.7%). The overwhelming majority of

participants obtained undergraduate and graduate degrees (83.4%). All participants (100%) were

right-handed. The majority of participants were PLwAD (66.7%). Finally, for PLwMCI, the

average MoCA score was 22.5 with a range of 20 to 25. For PlwAD, the average MoCA score

was 18.0, ranging from 17 to 19.

Table 3

Demographic Data for MCI/AD Missing Data Participants

Variable	N	%
Sex		
Female	1	16.7
Male	5	83.3
Age		
Mean (Range)	75.4 (66-84)	-
Ethnicity		
White	3	50.0
Black	1	16.7
South Asian	1	16.7
Other	1	16.7
Education		
Highschool	1	16.7
Bachelor's Degree	1	16.7
Master's Degree	2	33.3
Professional School Degree	1	16.7
Doctoral Degree	1	16.7
Handedness		
Right	6	100.0
Diagnostic Status		
Mild Cognitive Impairment	2	33.3
Alzheimer's Dementia	4	66.7
Montreal Cognitive Assessment (MoCA) Score		
Mild Cognitive Impairment: Mean (Range)	22.5 (20-25)	-
Alzheimer's Dementia: Mean (Range)	18.0 (17-19)	-

2.4 Procedures

The spoken sequenced-picture story description discourse task and data were a component of

ONDRI's neuropsychology platform. The neuropsychology electronic case report forms (eCRFs)

were housed on ONDRI's Brain-CODE. The MCI/AD ONDRI participants were deidentified

using only a study identification number. Their raw data were uploaded to Brain-CODE for safe

and confidential sharing. Extracted values from each dataset were subject to standards and

quality assurance (QA)/quality control (QC) processes (McLaughlin et al., 2021).

Neuropsychological test data were entered into REDcap as a central online database

(McLaughlin et al., 2021). Robust QA/QC methods were used consistently across all ONDRI

data collection platforms for data collection, scoring/processing, and entry processes (see

McLaughlin et al., 2021; Scott et al., 2020). Rigorous training was provided to all research staff

who were involved in the discourse analysis protocol; this included formal workshops, mentored

annotation, ongoing transcribing and coding fidelity and reliability checks, and targeted

retraining when necessary (Roberts et al., 2021).

2.4.1 Equipment

An AKG 520C head-worn microphone was used to digitally record discourse samples. The

microphone was positioned approximately 4-6 cm from the mouth opening, and a Scarlett 2i2

USB preamplifier connected the microphone to a PC laptop (Roberts et al., 2021). Audio files

were recorded as .wav files in Audacity at a sampling rate of 44,100 Hz (16-bit format) (Roberts

et al., 2021).

2.4.2 Spoken Sequenced-Picture Story Description Stimulus and Procedure

The spoken sequenced-picture story description discourse task and data for the current study

included the PLwMCI and PLwAD performances on the "Argument" sequence story stimuli by

Nicholas and Brookshire (1993; Figure 1). Participants were presented with the six-picture

black/white series on a single page (Roberts et al., 2021). The picture series illustrates a husband

and a wife having a disagreement presented in temporal chronological order (Roberts et al., 2021).
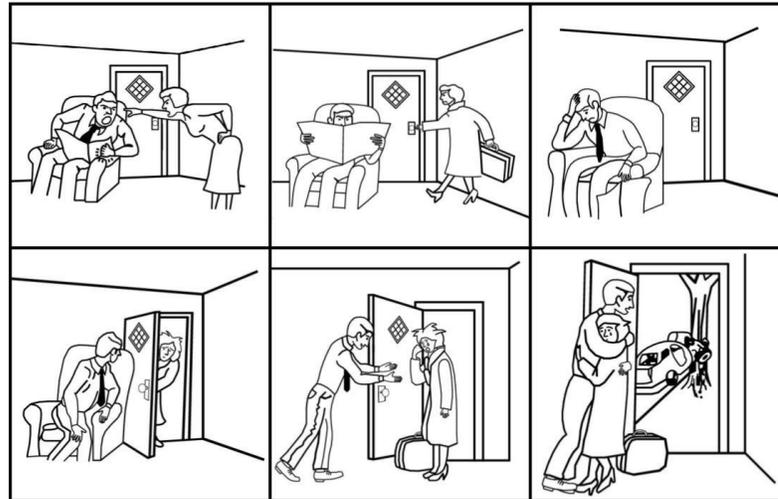
Figure 1. Argument Sequence Story Stimulus (Nicholas & Brookshire, 1993)

Participants were instructed as follows: 'I am going to ask you to tell a story. Look at this series of pictures to familiarize yourself with the story." Participants were allotted 60-90 seconds to preview the pictures and then asked to narrate the story starting at the beginning (Roberts et al., 2021). The examiner gave the instructions, "Now use these pictures to tell me a story in as much detail as you can" (Roberts et al., 2021). The instructions could be repeated once by the examiner if the participant requested or appeared to not understand the task (Roberts et al., 2021). Participants were not given a time limit and were allotted as much time as needed to complete the task (Roberts et al., 2021).

2.4.3 Transcription, Segmentation, and Annotation

The spoken discourse audio files were reviewed by trained ONDRI-supported research assistants (i.e., undergraduate and graduate students and external contractor) who were blinded to group allocation using the most current version of the software program Audacity (Audacity Team, 1999-2021). The trained research assistants transcribed orthographically and segmented the orthographic files according to the Systematic Analysis of Language Transcription (SALT Software LLC, 2016) C-unit conventions (Roberts et al., 2021). In the ONDRI data set, Roberts et al. (2021) defined a C-unit as "a main clause and its accompanying dependent clauses" (p. 84). All files were reviewed by an additional coder to ensure transcription and segmentation accuracy were upheld (Roberts et al., 2021). Agreement for transcription and segmentation into c-units for the ONDRI spoken sequenced-picture story description discourse task included review of all transcribed segmented files, 50 transcripts at a time, by a second gold standard coder for transcription and segmentation accuracy. Agreement scores of less than 80% necessitated a review of errors and resolution of mismatched coding.

2.4.4 Topic Management Coding

For the current study, the primary investigator (i.e., SAD) used codes for topic management using the existing literature to form the basis of the analyses (see Appendix A). After a robust literature search, a comprehensive, evidence-informed coding system (see Appendix D) for topic management was chosen and approved by members of the Thesis Advisory Committee. The global coherence rating scale developed by Wright et al., (2010) was pilot studied by the authors on participants with and without aphasia. The authors then extended their analyses to a larger group of cognitively healthy adults to conclude it is feasible based on acceptable measures of reliability and validity (Wright et al., 2013). The Wright et al. (2010, 2013) coding system was applied to the segmented and annotated MCI/AD cohort transcripts. Their coding system

consisted of categories based on a four-point global coherence rating scale where an individual

rating (i.e., G1, G2, G3, G4, NR) was assigned to each utterance. The average global coherence

rating was computed for each transcript to indicate the overall coherence of the discourse

samples. Average global coherence ratings were calculated as the total global coherence rating

divided by the total c-units scored (Wright at al., 2010, 2013). The descriptions for each rating

from Wright et al. (2010, 2013) are presented in Table 4 with examples.

Table 4

Global Coherence Rating Scale, Adopted from Wright et al. (2010, 2013)

Rating	Description	Examples
G1	The utterance is entirely unrelated to the stimulus/topic; the utterance may be a comment on the discourse or tangential information is solely used	P: Whatever anyways we'll move on [G1] P: Um I don't know what paper he's reading [G1] P: No I didn't notice that [G1]
G2	The utterance is only remotely related to the stimulus/topic, with possible inclusion of inappropriate egocentric information; may include tangential information or reference some element of the stimulus that is regarded as non- critical	P: She has shortish hair [G2] P: Now Peter and Marjorie have been married for years [G2] P: And he had just left all the chores to her [G2]
G3	The utterance is related to the stimulus or designated topic but with some inclusion of suppositional (extra) or tangential information that is relevant to the main details of the stimulus; *or* substantive information is not provided so that the topic must be inferred from the statement. *In recounts, appropriate elaborations that are not essential but related to the main topic should be scored a 3	P: And there she givin him hell about something [G3] P: And she gonna go home to momma [G3] P: But then the fifth picture I guess she was in a taxi [G3]
G4	The utterance is overtly related to the stimulus as defined by mention of actors/actions/objects present in the stimulus which are of significant importance to the main details of the stimulus. In the case of procedural descriptions and recounts when a designated topic acts as the	P: A man and a wife are fighting [G4] P: She got so mad that she said "I am leaving" [G4]

	stimulus, overt relation is defined by provision of substantive information related to the topic so that no inferencing is required by the listener	P: She's come back with her suitcase [G4]
NR	No Rating: not enough information in the C-unit to provide a global coherence rating, often abandoned utterances.	P: He was [NR] P: Then she says [NR] P: "Will she" [NR]

Note: **P** = Participant

2.4.5 Reliability

The primary investigator (SAD) and her academic supervisor (JBO) reviewed the Wright et al. (2010; 2013) coherence procedures then completed their three practice items independently. SAD then trained an inter-rater coder (i.e., graduate student, RGM) over two sessions to familiarize her with the project and the coherence coding procedures. The inter-rater coder holds a master's degree in health and aging and is enrolled in a professional graduate program of speech-language pathology at another Ontario university. Once SAD, RGM, and JBO were familiarized with the coding processes, all independently coded 3 randomly selected "Argument" transcripts from ONDRI Vascular Cognitive Impairment (VCI) participants. The VCI test transcripts were chosen as the ONDRI group that was estimated to mirror performance most closely to the MCI/AD cohort. A total of 71 utterances were coded across the three training transcripts. Their agreement scores on the three transcripts were 91.7%, 84.2%, and 97.5%. Based on these agreement scores, it was decided that SAD and RGM could begin coding the MCI/AD transcripts.

Inter-rater reliability studies were conducted sequentially on a total of 60% of files over the duration of the study on the first three of five blocks of 24 files with a trained inter-rater coder

(RGM). The primary investigator (SAD) and the trained coder (RGM) completed independent coding on each block, tracked questions in a communal lab journal, and reviewed all coding disagreements before coding the next block. For each block of 24 files, reliability was determined using the correlation statistic, Pearson's correlation coefficient, before moving on to the next block of files. Any coding disagreements between SAD and RGM that could not be resolved were then reviewed by JBO for resolution. Correlation was determined using the R correlation test to provide Pearson's correlation coefficient. The correlation coefficients for the first three of give blocks are presented in Table 5. Once a correlation score $\geq$0.90 was achieved consistently for three consecutive blocks, the primary investigator (SAD) coded the remaining files independently with consultations with her supervisor (JBO). An intra-rater reliability study was conducted on 30% of randomly selected files (i.e., 36/120) with a correlation of 0.975. The primary investigator (SAD), her academic supervisor (JBO), and the trained inter-rater coder (RGM) were all blinded to diagnostic status of the participants during inter-rater coding, independent coding, coding consultations, and intra-rater coding.

Table 5

Inter-rater Reliability Coding Block Correlations

Block Number	Correlation Between SAD and RGM
1	0.99
2	0.97
3	0.99

2.5 Data Analyses

Once coding was completed and reviewed, the average global coherence ratings were analyzed for the three research questions. All statistical analyses for all research questions were performed using the statistical freeware called RStudio Version 2023.03.0+386 using the following

packages: R Base Package, R Datasets Package, R Graphics Package, R Graphics Devices and Support for Colours and Fonts, Formal Methods and Classes, R Stats Package, R utils Package (RStudio Team, 2020). Alpha was set at 0.05. Assumptions for normality of the data were tested using the Shapiro-Wilk normality test. The data did not meet normality assumptions.

2.5.1 Research Question 1

A non-parametric statistical analysis, Wilcoxon Rank Sum Test, was completed to determine whether there are significant group differences (i.e., PLwMCI vs. PLwAD). The Wilcoxon Rank Sum Test was deemed appropriate for this analysis because the data did not follow assumptions of normality.

2.5.2 Research Question 2a

The second research question, part a, was addressed using linear regression analysis to investigate which diagnostic group (e.g., MCI or AD) best predicts which topic management performance measures. A linear regression model was deemed appropriate for this analysis as the response (average global coherence ratings) is continuous. The linear regression model was run with and without the following covariates: sex, age, and education.

2.5.3 Research Question 2b

The second research question, part b, was addressed using logistic regression analysis to investigate which topic management performance measure(s) predict diagnostic group membership (e.g., MCI. A logistic regression model was deemed appropriate for this analysis as the response (diagnostic group) is binary. The logistic regression model was run with and without the following covariates: sex, age, and education.

Chapter 3

3 Results

3.1 Dataset

The ONDRI dataset for the MCI/AD diagnostic cohort consisted of n=126 participants. Six

participants did not have audio files or transcripts, so were not included in the analyses. Their

data were not included for the following reasons: participant was unable to do task (n=1), audio

file was corrupt and was not able to be transcribed (n=1), no audio file due to unknown (n=1),

insufficient time to complete the task (n=2), or participant was tired (n=1). There were a total of

n=83 transcripts for PLwMCI, n=33 for PLwAD, and n=4 for atypical AD. Measures of central

tendency for global coherence scores ratings for all three diagnostic groups showed nearly

identical values between the PLwAD group and those in the atypical AD group. For the purposes

of the analyses, the n=4 atypical participants were rolled into the PLwAD group (i.e., a total of

n=37 for PLwAD). All average global coherence ratings for each participant within each

diagnostic group are available in Appendix E. Diagnostic group comparisons were conducted

using average global coherence ratings. A plot showing the distribution of the scores, including

outliers, by diagnostic group is presented in Figure 2.
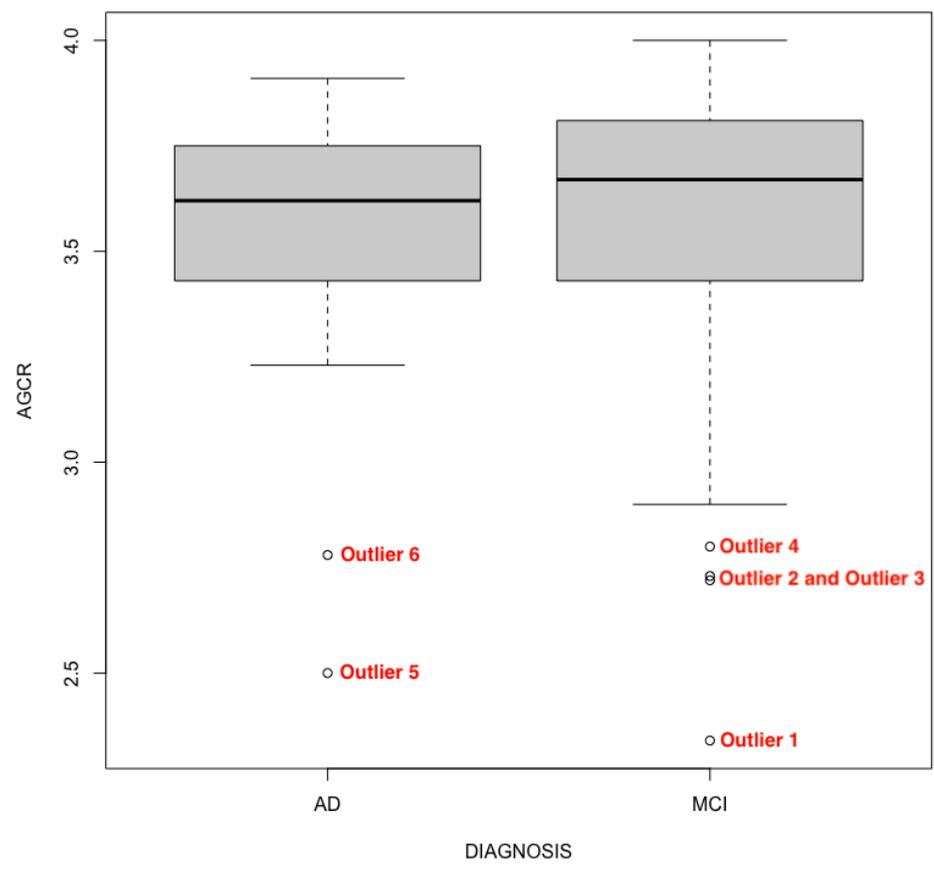
Figure 2. Box Plot of Distribution of Average Global Coherence Ratings by Diagnostic Group

Note: **AGCR** = Average Global Coherence Rating

A plot of all average global coherence ratings, including outliers, for each diagnostic group is presented in Figure 3.
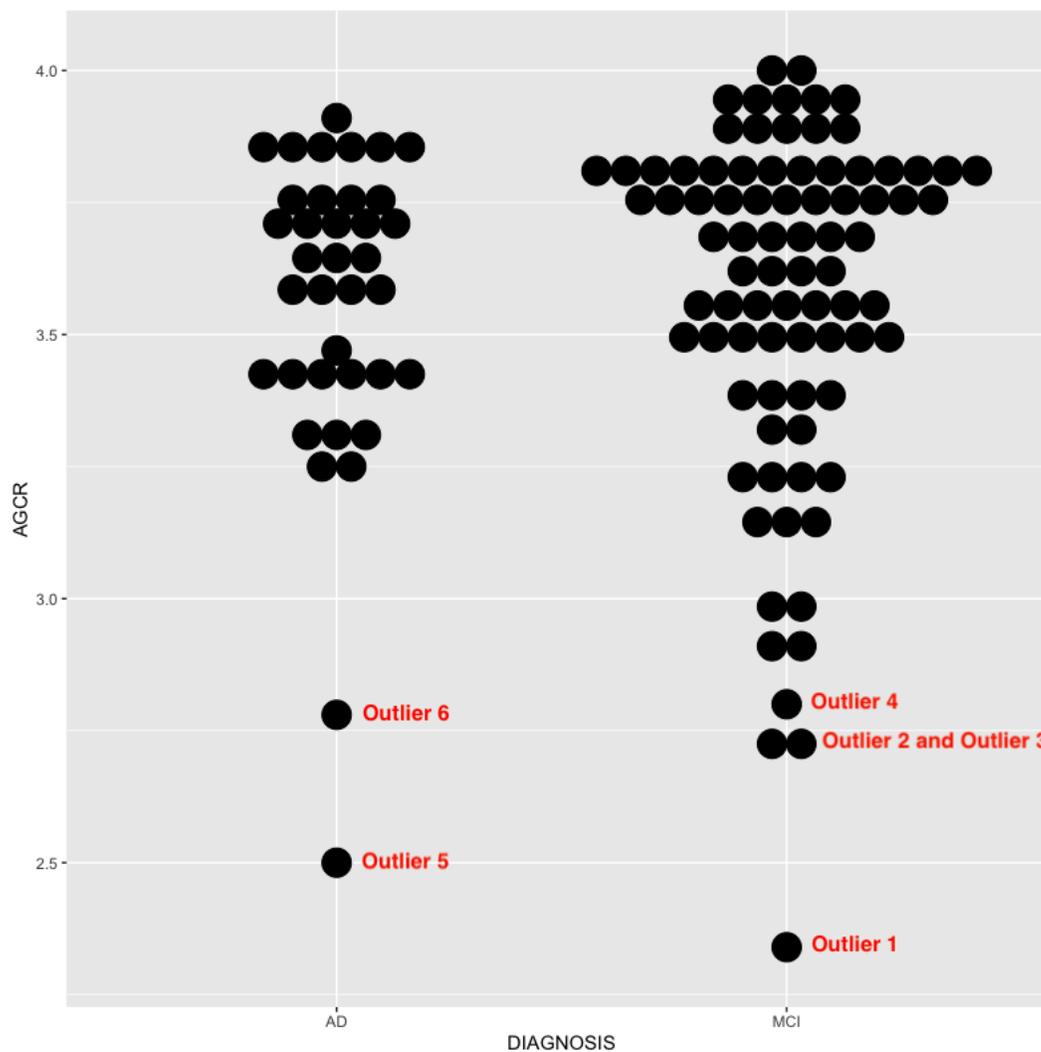
Figure 3. Plot of All Average Global Coherence Ratings by Diagnostic Group

Note: **AGCR** = Average Global Coherence Rating

3.2 Research Question 1

3.2.1 Data Analysis

Research question 1 addressed whether there are differences in topic management in the spoken

sequenced-picture story description discourse between PLwMCI and PLwAD. Assumptions of

normality were tested using the Shapiro-Wilk test on all data for the MCI and AD diagnostic

groups. MCI and AD average global coherence scores showed that W=0.89 and the p-value=$3.41e^{-8}$. It was concluded that both diagnostic groups' average global coherence ratings (agcr) violated assumptions of normality. The agcr data for both diagnostic groups were not normally distributed. Non-parametric Wilcoxon Rank Sum Tests were run.

The following measures of central tendency for both participant groups are presented in Table 6: range, mean, and standard deviation baseline scores for MCI and AD diagnostic groups.

Table 6

Measures of Central Tendency for Participant Groups With and Without Outliers

Measure	MCI	AD
Range (With Outliers)	2.34-4.00	2.50-3.91
Mean (SD) (With Outliers)	3.57 (0.34)	3.56 (0.30)
Range (Without Outliers)	2.90-4.00	3.23-3.91
Mean (SD) (Without Outliers)	3.61 (0.27)	3.61 (0.20)

Individual outliers were defined as those with an agcr >2 standard deviations from the mean agcr of the MCI and AD diagnostic group. There were six outliers identified using this criterion. The agcr and diagnostic group status are presented in Table 7. All statistical analyses were run with and without the outliers. The results did not differ. An example of a transcript from a participant whose agcr was categorized as an outlier is shown below.

Table 7

Outlier Average Global Coherence Ratings and Diagnostic Group Membership

Participant	Average Global Coherence Rating	Diagnostic Group
Outlier 1	2.34	MCI
Outlier 2	2.72	MCI
Outlier 3	2.73	MCI
Outlier 4	2.80	MCI
Outlier 5	2.50	AD
Outlier 6	2.78	AD

Example 1: Outlier Transcript

      P: Guy sitting in a chair [G4]
      P: Um and looks as though he's talking uh to his wife who is the door in the background [G3]
      P: Um and then somebody's coming in in the door with boots on [G2]
      P: Um I can't figure out what else is going on [G1]
      P: And then it looks as though they're talking to each other over the chesterfield [G3]
      P: The uh X [NR]
      P: Somebody's in a X [NR]
      P: Somebody's opening a door to come in [G3]
      P: I can't figure out what's over on the left [G1]
      P: And then the guy with the striped pants opens the door for the lady at the door [G4]
      P: And then I think she's driving away [G2]
      P: And he's standing there with his bag [G2]

Total: 25
Total number of C-units scored: 10
Average global coherence rating: 2.50

Note: **P** = Participant; **X** = An unintelligible utterance heard by ONDRI transcribers and coders;

NR = no rating; **G1, G2, G3, and G4** = reference to Wright et al. (2010; 2013) global coherence

categories

Analyses using the Wilcoxon Rank Sum Test indicated that the agcr for MCI was not statistically

significantly different than the agcr for AD (W=1419.5, *p*=0.51). It can be concluded that the

average global coherence rating for MCI is not significantly different from the average global

coherence rating for AD. Global coherence ratings for MCI and AD participants for each of the

four Wright et at. (2010, 2013) global coherence ratings are displayed in Table 8. The relative

proportions of each of the four categories also are shown for the two diagnostic groups.

Table 8

Frequency and Proportion of All Global Coherence Ratings by Diagnostic Group

Global Coherence Ratings	Frequency			Relative Proportions	
	MCI	AD	Outliers (MCI + AD)	MCI	AD
G1	42	13	30	0.03	0.02
G2	76	19	35	0.05	0.03
G3	415	147	36	0.25	0.24
G4	1099	422	43	0.67	0.70
Total	1631	601	144	-	-
No ratings	11	6	6		

Moreover, Table 9 highlights the proportional data of each of the four categories compared to

one another for the two diagnostic groups (e.g., the proportion of total G1s vs G4s for PLwMCI

and PLwAD).

Table 9

Global Coherence Rating Proportions by Diagnostic Group

Global Coherence Rating Proportions	Relative Proportions	
	MCI	AD
G1:G2	0.61	0.68
G1:G3	0.10	0.09
G1:G4	0.03	0.03
G2:G3	0.18	0.13
G2:G4	0.07	0.05
G3:G4	0.38	0.35

Examples of transcripts from a participant with MCI and a participant with AD with similar

average global coherence ratings are listed below. Both transcripts include the majority of c-units

overtly related to the stimulus (i.e., G4) or related to the stimulus with some suppositional

information (i.e., G3), resulting in an average global coherence rating very close to the mean

average global coherence ratings for both diagnostic groups.

Example 2: MCI Participant

      P: It's a a woman and man having an argument [G4]
      P: She's really ch reeming him out [G4]
      P: And she's kinda leave [G3]
      P: And she goes and gets her coat and her purse suitcase [G4]
      P: And away she goes [G4]
      P: And he's left [G3]
      P: And he sorta doesn't know what to do [G3]
      P: And all of a sudden she comes back through the door [G4]
      P: And he welcomes her back [G4]
      P: And uh you know all is fine [G3]
      P: But it looks like she b she busted the car [G4]
      P: Didn't get very far [G3]
      P: She ran the car into a tree [G4]

      Total: 47
      Total number of C-units scored: 13
      Average global coherence rating: 3.62

Note: **P** = Participant; **G1, G2, G3, and G4** = reference to Wright et al (2010; 2013) global

coherence categories

Example 3: AD Participant

      P: A a a wife is reprimanding her husband for sitting there [G4]
      P: Reading the paper [G4]
      P: And she's all set to go [G3]
      P: Uh and he's still reading the paper [G4]
      P: She's got out a suitcase [G4]
      P: And her coat on [G4]
      P: And then he puts the paper down [G4]
      P: And can't remember where they're going [G3]
      P: And then uh she opens the window [G2]
      P: And starts crying because he's not ready to go [G3]
      P: Anyway uh he gives her a hug [G4]
      P: And then she's happy [G4]
      P: And then they have the car waiting to pick both of them up [G4]

Total: 47
Total number of C-units scored:13
Average global coherence rating: 3.62

Note: **P** = Participant; **G1, G2, G3, and G4** = reference to Wright et al (2010; 2013) global

coherence categories

3.3 Research Question 2a

Research question 2a addressed which diagnostic group best predicts topic management

performance. That is, research question 2a explored what average global coherence rating would

be predicted if a participant had MCI versus if a participant had AD.

3.3.1 Data Analysis

A linear regression was performed to ascertain the effects of MCI and AD on the likelihood of an

average global coherence rating (agcr). To analyze this, the following model was used: agcr = b0

+ b1 * diagnosis MCI + epsilon. If AD, then diagnosisMCI = 0, agcr = b0 + epsilon. If MCI,

then diagnosisMCI = 1, agcr = b0 + b1 + epsilon. The linear regression model that was run was

not statistically significant, $R^2 = 1.36e^{-4}$, $F(1,118) = 1.60e^{-2}$ $p = 0.90$. The model explained the

mean of agcr for participants with MCI to be 3.55 and the mean of agcr for participants with AD

to be 3.56. The linear regression showed that diagnostic group status is not a useful predictor for

average global coherence rating and that the average global coherence rating for MCI is not

significantly different from the average global coherence rating for AD.

Sex, age, and education were then added to the linear regression model and the analysis was

rerun. The linear regression model with covariates was not statistically significant, $R^2 = 1.18e^{-1}$,

$F(16,103) = 8.59e^{-1}$, $p = 0.62$. The model explained that sex, age, and education are not useful

covariates in explaining the statistical insignificance of using diagnostic group status to predict average global coherence ratings.

3.4 Research Question 2b

Research question 2b addressed whether topic management performance measure(s) could predict diagnostic group membership (MCI vs. AD). That is, research question 2b explored what diagnostic group would be predicted if a participant had a particular average global coherence rating.

3.4.1 Data Analysis

A logistic regression was performed to assess the relationship between average global coherence rating (agcr) and MCI/AD diagnostic group membership. To analyze this, the following model was used: logit(prob of diagnosisMCI) = b0 + b1 * agcr. The logistical regression model that was run was not statistically significant indicating that PLwMCI had an average global coherence rating that was not statistically significantly different than PLwAD, $p = 0.90$. It can be concluded that the average global coherence rating is not a useful predictor for diagnostic membership. Sex, age, and education were then added to the logistic regression model and the analysis was rerun. The logistic regression model with covariates was not statistically significant, $p = 0.79$. The model explained that sex, age, and education are not useful covariates in explaining the statistical insignificance of using average global coherence ratings to predict diagnostic group membership.

Examples of transcripts from a PLwMCI and a PLwAD with similar average global coherence ratings are listed below. Both transcripts include several utterances with the inclusion of suppositional information (i.e., G3), as well as some remotely related utterances (i.e., G2), resulting in an average global coherence rating below the mean.

Example 3: MCI Participant

        P: Here we have gorgeous George [G3]
        P: Nice fellow [G2]
        P: Sitting in his nice comfortable chair [G3]
        P: And along comes his wife starts battering him about "oh you haven't done this" [G3]
        P: "And you haven't done that" [G4]
        P: And he just sits there [G4]
        P: And reads his newspaper ignoring the poor lady [G4]
        P: And she of course walks out in anger [G4]
        P: And the next thing you see is him perplexed because he can't understand why she walked out on him [G4]
        P: Then his wife had a change of heart [G3]
        P: She came back into the house [G4]
        P: He welcomed her in [G4]
        P: She seemed to be very cold [G2]
        P: But he took her all of with the baggage that she had [G3]
        P: And he put it away [G2]
        P: And to show he loved her he gave her a great big hug [G3]

Total: 52
Total number of C-units scored: 16
Average global coherence rating: 3.25

Note: **P** = Participant; **G1, G2, G3, and G4** = reference to Wright et al (2010; 2013) global

coherence categories

Example 4: AD Participant

        P: Paul and Mary are having a d a d a discussion that isn't working out well [G4]
        P: She decides that she's leaving cuz she's so mad [G4]
        P: And takes a suitcase [G4]
        P: And away she goes [G4]
        P: Now he he's scratching his head [G4]
        P: Doesn't understand what's going on [G3]
        P: Then all of a sudden the door opens [G4]
        P: And she's back [G4]
        P: Why is she back [G1]
        P: Because she did something with the car [G2]
        P: Maybe [G1]
      =P: Is that

=E: Hmm
=P: It says this is it right
=P: Okay
P: It's the car doesn't look good [G4]
P: So something must've happened [G3]

Total: 42
Total C-units scored: 13
Average global coherence rating: 3.23

Note: **P** = Participant; **E** = ONDRI Examiner; **"="** = off-task discussion and was not rated as per

coding instructions; **G1, G2, G3, and G4** = reference to Wright et al (2010; 2013) global

coherence categories

Chapter 4

4 Discussion

4.1 Research Question 1

The aim of the current study was to understand whether there are differences in topic

management in the spoken sequenced-picture story description discourse between PLwMCI vs.

PLwAD. The ability to maintain the overall topic in a unit of discourse is a measure of global

coherence (Wright et al., 2010, 2013). Inclusion of suppositional or tangential information,

failure to include substantive information, recounts, inclusion of inappropriate egocentric

information, or commenting on the discourse are examples of contributions to non-coherent,

topic-interrupted discourse (Wright et al., 2010, 2013).

There are few published studies that addressed topic management in sequenced-picture-based

narrative discourse in PLwMCI. Based on the available literature, it was expected that PLwMCI

might display difficulties with global understanding of the narrative task. In the existing studies,

authors analyzing discourse production commonly based their analyses on single-scene

description tasks versus narrative tasks with sequences of actions (Drummond et al., 2015;

Forbes-McKay and Venneri, 2005; Tsantali et al., 2013). Drummond et al. (2015) compared

spoken narrative measures in healthy older adults, PLwMCI, and PLwAD by asking participants

to narrate a sequence story picture similar to that used in the present study. Drummond et al.

(2015) used a seven-scene narrative task referred to as the "Car Accident" that depicts the story

of an accident (Ska & Duong, 2005). The present study used a six-scene narrative task referred to

as "Argument" and depicts the story of a couple fighting (Nicholas & Brookshire, 1993). Both

Drummond et al. (2015) and the present study instructed participants to narrate the story using

the images without time constraints. However, according to Drummond et al. (2015), using

seven as the number of scenes permits the task to be split into three event blocks (i.e., initial event, development, and final outcome or resolution) which permits coherence and cohesion analyses. The authors suggested that these analyses cannot be assessed in fewer sequences (Drummond et al., 2015). They found that healthy older adults and PLwAD differed significantly in nearly all narrative measures, with the PLwAD having greater difficulties. The PLwMCI performed at an intermediary level between the healthy older adults and PLwAD for most variables. Regarding discourse measures of global coherence, PLwAD composed fewer macropropositions (i.e., the central idea of each action sequence and the feature that determines whether the global topic was understood and represented by the participant) versus the healthy older adults and PLwMCI (Drummond et al. 2015). However, PLwMCI and PLwAD exhibited similar performances by using more overall micropropositions (i.e., details provided in addition to the main ideas of the scene) and irrelevant micropropositions versus healthy older adults (Drummond et al., 2015).

PLwAD are reported to exhibit difficulties with narrative discourse (Ash et al., 2007; Drummond et al., 2015). Substantial research exists indicating impairments in topic management among PLwAD in comparison to healthy older adults (Dijkstra et al., 2004; Garcia & Joanette, 1997; Hall et al., 2018; Mentis et al., 1995). Specifically, impairments in global coherence are reported among PLwAD compared to normally healthy adults (Arkin & Mahendra, 2001; Glosser and Deser, 1991; Teten et al., 2015). Narrative and recount studies showed that PLwAD display greater deficits in macrolinguistic areas (i.e., semantic, pragmatic) versus microlinguistic areas (i.e., phonological, lexical, syntactic; de Lira et al., 2011; Drummond et al., 2015). Specific difficulties might include difficulty reporting a sequence of events (Mansur et al., 2005), information gaps resulting in hindered meaning overall (Chapman et al., 2002; Mar et al., 2004),

cohesion and coherence (Ash et al., 2007; Brandão and Parente, 2011; Drummond et al., 2015), poor topic maintenance and fewer inclusions of core elements of the topic (Bayles et al., 1985; Fleming & Harris, 2008; Forbes-McKay et al., 2013), and circumlocutions, preservation, and revisions (Bayles et al., 1985; de Lira et al., 2011). PLwAD engage in topic-extension and topic-shifting less frequently during conversation and produce an increased number of non-coherent topic shifts when compared to unimpaired conversation partners (Garcia & Joanette, 1997; Hall et al., 2018; Mentis et al., 1995).

Based on this extant literature, the first research question addressed whether there are differences in topic management in the spoken sequenced-picture story description discourse between PLwMCI vs. PLwAD. It was anticipated that there would be group differences between PLwMCI and PLwAD based on the literature noted above. The results from the current analyses showed no significant differences in average global coherence ratings between the two diagnostic groups. It is possible no group differences were found for the following reasons: 1) the spoken discourse task used to assess topic management was not sufficiently difficult enough for the participants to generate problems in their topic management, 2) the scoring protocol used to measure topic management was not sufficiently discrete to detect differences in topic management in PLwMCI and PLwAD, and/or 3) the diagnostic status of the participants was not sufficiently variable enough to present significant differences in their topic management abilities and skills.

4.1.1 Spoken Discourse Task

The first possible explanation for why group differences were not found based on average global coherence ratings could be due to the type of spoken discourse task chosen to assess topic

management (i.e., the Nicholas & Brookshire "Argument" picture sequence elicitation stimulus). A sequenced-picture story description discourse task is a structured procedure designed to elicit a lengthy sample of on-topic discourse. The task used in the current study resulted in a majority of c-units being categorized as G3 and G4 ratings for both PLwMCI and PLwAD. The nature of the instructions and the sequenced-picture story task do not provide opportunities for free-flowing discourse samples with opportunities for off-topic discussion (i.e., conversational discourse). The instructions for the task inform participants to use the pictures in the stimulus to tell a story; in comparison to giving a conversational topic (i.e., family), picture description is much more structured. Furthermore, the picture stimulus remains in front of the participant for the remainder of the task. This means participants can continue viewing the stimulus and thus continuously be reminded of the topic. The instructions and the task constrain opportunities for serendipitous topic changes. Although topic management and/or global coherence impairments are reported in PLwMCI and in PLwAD, many authors found these impairments using non-narrative spoken discourse samples (i.e., conversational discourse).

Impairment in global coherence is less frequently reported in PLwMCI in comparison to PLwAD. Chapman et al. (2002) found PLwMCI were more impaired in the overall gist and level of detail when listening to and retelling a biographical narrative sample. Sexis-Lima et al. (2020) reported deficits in coherence in PLwMCI compared to healthy controls in an autobiographical interview discourse sample. Kim et al. (2019a) found global coherence was lower in amestic-MCI (a-MCI) and non-amnestic-MCI (na-MCI) groups in comparison to cognitively healthy controls across three discourse tasks: an episodic narrative discourse task, a planning task, and a picture description task. Several authors reported impairment in global coherence and topic maintenance in PLwAD using a sample of discourse obtained from a conversation task (e.g.,

Dijkstra et al., 2004; Garcia and Joanette, 1997; Hall et al., 2018). Dijkstra et al. (2004) reported that global coherence and topic maintenance among other discourse features, occurred to a greater extent in the discourse of healthy older adults, in comparison to persons diagnosed with non-stroke-related dementia or AD. They categorized global coherence and topic maintenance as discourse building features and hypothesized that discourse building features would occur more frequently in healthy older adults than in PLwD (Dijkstra et al., 2004). They examined the discourse features previously mentioned using a conversational sample (Dijkstra et al., 2004). Garcia and Joanette (1997) analyzed conversations of individuals with dementia of the Alzheimer type and found their participants showed difficulties maintaining a topic of conversation in comparison to normal elderly individuals. Hall et al. (2018) reported that PLwD had difficulties contributing to on-topic talk during conversations between individuals with dementia and a familiar communication partner. The findings of the present thesis contrast with this previous research in terms of discourse task used to assess topic management. Further research is necessary to explore if using a different discourse task with this participant group and topic management performance measure would result in group differences.

4.1.2 Topic Management Performance Measure

A second explanation for why group differences were not found based on average global coherence scores could be due to the four-point measure used to assess global coherence. A thorough review of the literature was completed on studies that assessed topic management among PLwMCI and PLwAD, as well as in diagnostic groups such as cognitively normal older adults and those living with stroke-based dementia (i.e., vascular dementia). Using the existing literature, with support from members of my MS Advisory Committee, the four-point global coherence scale developed by Wright et al. (2010, 2013) was chosen as the best tool by which to

measure topic management (i.e., global coherence). Wright et al. (2010) piloted their scale in individuals with and without aphasia. The investigators found evidence for the four-point scale's convergent validity and reliability. The authors expanded on their pilot study (Wright et al., 2013) using storytelling discourse samples similar to that used in the present study on a larger group of cognitively healthy adults. They found that their four-point scale was feasible based on acceptable reliability and validity scores. Their findings provided substantial support for using the scale of global coherence to the present study's sample of PLwMCI and PLwAD. Findings from the current study show that Wright et al.'s scale (2010, 2013) may not be sufficiently sensitive to detect large or subtle differences in global coherence between PLwMCI and PLwAD. To the primary investigator's knowledge, this was the first study to use the Wright et al. (2010, 2013) four-point global coherence rating scale in PLwMCI and PLwAD for a spoken, sequenced-picture story description task. Therefore, it is possible that this scale is not suitable for group comparisons in PLwMCI and PLwAD. It also is possible this scale is not suitable for detecting differences in PLwMCI and PLwAD when using a spoken, sequenced-picture story description tasks. Although the scale was examined using wordless picture books, the coding manual included examples of procedural discourse, storytelling discourse, recounts, and eventcasts (Wright et al., 2010, 2013).

Although substantial literature supports the use of global coherence scales to measure topic management (e.g., Glosser and Deser, 1992; Wright et al., 2010, 2013), there also is literature supporting other performance measures of topic management. For example, Drummond et al. (2015) investigated overall coherence in a picture sequence elicitation stimulus by analyzing the number of semantic propositions including macropropositions and micropropositions. They based their analyses on nine macropropositions identified in a pilot study. The overall total

number then was determined for macroproposisitons and micropropositions for each participant (Drummond et al., 2015). Ideas that were incorrect or out of context were considered irrelevant (Drummond et al., 2015). They found significant differences in the category of macropropositions; the control group and PLwMCI generated a higher number of macropropositions in comparison to the PLwAD (Drummond et al., 2015). However, the PLwMCI and PLwAD performed similarly using more micropropositions than the control group. Additionally, Kim et al. (2019a) evaluated coherence in healthy controls, individuals with a-MCI, and individuals with na-MCI. However, in contrast to the present study Kim et al. (2019) evaluated global coherence, using a four-point scale, and local coherence, using a two-point scale. They found that global coherence was one of the discourse measures that could distinguish language performance of the healthy controls, individuals with a-MCI, and individuals with na-MCI (Kim et al., 2019a). These findings suggest further research is necessary to investigate if group differences can be found when using a different measure and/or more than one measure of topic management.

4.1.3 Disease Stage and Severity

A third reason for the lack of significant differences between the diagnostic groups for average global coherence ratings could be that disease stage and severity may have influenced performances among the MCI and AD participants. The NIA-AA criteria (Albert et al., 2011; McKhann et al., 2011) were used in ONDRI for the amnestic single or multiple MCI and for the AD diagnostic groups. The stage or disease severity of each participant was not specified within the ONDRI database. Although the Montreal Cognitive Assessment (MoCA) was administered to all ONDRI participants, ONDRI investigators did not specify MoCA score-based criteria for mild, moderate, or severe clinical stage dementia. For example, it is possible that the PLwMCI

were more severe while the PLwAD were less severe. This could mean the overall differences between the participant groups were not substantial and could explain why group differences were not seen.

Although disease stage and severity were not specified, the MoCA scores were a part of the clinical demographic dataset. The average MoCA score for the PLwMCI was 23.5 out of a possible maximum score of 30, with a range of 18 to 30. The average MoCA score for the PLwAD was 22.0 out of a possible maximum score of 30, with a range of 15 to 26. Nasreddine et al. (2005) originally suggested a MoCA cut-off score of 26, and individuals scoring ≤25 would be suspected of having MCI. However, some studies have suggested adjusting the cut-off value based on age, education levels, and race corrections. Carson et al. (2017) conducted a meta-analysis that recommended a cut-off value of 23 offered more diagnostic accuracy than 26. Gagnon et al. (2013) suggested an interpretation of scores with and without an educational correction (i.e., adding one point for lower education levels) for diagnostic accuracy. Freitas et al. (2013) aimed to determine a cut-off score for MCI and for AD, as opposed to a single cut-off score for cognitive decline. They found below 22 to be an optimal cut-off value for PLwMCI and below 17 to be an optimal cut-off value for PLwAD (Freitas et al., 2013). Given this literature and the average MoCA scores for the present study, it is reasonable to assume both groups are well within the cut-off for cognitive decline. However, the close proximity of the average MoCA scores for the participant groups of the present study might suggest that disease severity could have been a factor in the present study's findings. Additional research is necessary to explore if the average MoCA scores for PLwMCI and PLwAD are too close in proximity, and if this might have impacted finding group differences in topic management performances.

4.2 Research Question 2

Linguistic deficits and linguistic behaviours have increasingly become an area of increased

research interest as an indicator of cognitive impairment and the onset of dementia (e.g., Calzà et

al., 2021; Mansur & Radanovic, 2011; Sexis-Lima et al., 2020; for a review see Taler & Phillips,

2008; Yeung et al., 2021). According to McKhann et al. (2011), one of the features that can be

observed often and early in dementia is linguistic impairment. Therefore, it is of high importance

to investigate the linguistic profile of PLwMCI as a potential to predict progression to dementia.

The literature has found performance in fluency tasks to be a useful predictor of the conversion

of MCI to AD (Clark et al., 2016; Molinuevo et al., 2011 Östberg et al. 2005; Sexis-Lima et al.,

2020; Tierney et al., 2005; Venneri et al., 2011). Furthermore, predictors of AD risk also include

markers of spoken discourse. Mueller et al. (2018b) investigated the relationship between

cognitive status, cognitively healthy, or early MCI, and connected language factors. They found

evidence of associations between features of connected language and individuals with early,

subclinical memory declines (Mueller et al., 2018b). Ahmed et al. (2013) found significant

correlations between language markers and disease progression by analyzing samples from a

picture description task. Kim et al. (2019a) examined coherence among other discourse measures

across three spoken discourse tasks in healthy controls, individuals with a-MCI and na-MCI.

They used a logistic regression analysis to evaluate predictors associated with being diagnosed

with a-MCI or na-MCI (Kim et al., 2019a). They found global coherence as one of the discourse

performance measures able of differentiating language performance among the three participant

groups (Kim et al., 2019a). Using exploratory factor analysis, Yeung et al. (2021) investigated

common factors between variables for speech characteristics in a single-picture spoken discourse

task for controls, PLwMCI, and PLwAD. They found that 20 speech variables were correlated

with incoherence, and two factors were identified by incoherence (Yeung et al., 2021). Forbes-McKay and Venneri (2005) looked at predicting diagnostic group membership in cognitively normal individuals and PLwAD using aspects of spontaneous language. They found evidence that measures of spontaneous speech are reliable in discriminating between the performances of the two groups (Forbes-McKay and Venneri, 2005). These studies' findings collectively provided a rationale that a predictive relationship could exist between a connected language factor (i.e., average global coherence ratings) and diagnostic group membership (i.e., MCI and AD). Thus, research questions 2a and 2b were asked which examined the predictive value of one's connected language factor to diagnostic group membership assignment.

4.2.1. Research Questions 2a and 2b

Research questions 2a and 2b are conceptually related. The first part of the second research question addressed whether diagnostic group (e.g., MCI or AD) could predict average global coherence ratings. The second part of the second research question addressed the reverse, if average global coherence ratings could predict diagnostic group membership (MCI vs. AD). For research question 2a, the results showed that the linear regression model was not statistically significant, and diagnosis is not a useful predictor for average global coherence rating. Similarly, for 2b, the results showed that the logistical regression model was not statistically significant and indicated that PLwMCI had an average global coherence rating that was not statistically significantly different than those PLwAD. It is possible that no statistical significance was found for the following reasons, identical to those outlined for RQ1: 1) the spoken discourse task used to assess topic management was not sufficiently difficult enough for the participants to generate problems in their topic management 2) the scoring protocol used to measure topic management was not sufficiently discrete to detect differences in topic management in PLwMCI and PLwAD

and/or 3) the diagnostic status of the participants was not sufficiently variable enough to present

significant differences in their topic management abilities and skills.

4.2.2 Spoken Discourse Task

The first explanation for why the predictions in research questions 2a and 2b were found

not to be statistically significant could be due to the type of spoken discourse task chosen to

assess topic management; the Nicholas and Brookshire "Argument" sequenced-picture story

elicitation stimulus. Other researchers who examined predictions between cognitive status and

factors of spoken discourse used a description of the "Cookie Theft" picture from the Boston

Diagnostic Aphasia Examination (BDAE; i.e., Ahmed et al., 2013; Mueller et al., 2018b; Yeung

et al., 2021). Ahmed et al. (2013) analyzed transcriptions of the "Cookie Theft" picture in

healthy controls, PLwMCI, persons living with mild AD, and persons living with moderate AD.

They analyzed transcriptions for speech production, syntactic complexity, lexical content,

fluency errors, and semantic content (Ahmed et al., 2013). They found the semantic, syntactic

complexity, and lexical content composites to be statistically significant changes with disease

progression (Ahmed et al., 2013). The semantic content findings are particularly relevant to the

present study as a measure of utterances communicating little to no information. Mueller et al.

(2018b) used linear mixed models to analyze the following discourse performance measures: (1)

semantic content, (2) syntax factor, and (3) lexical factor in cognitively healthy individuals and

persons living with early MCI. Using the BDAE "Cookie Theft" picture, they found the

interaction between time and cognitive status to be significant (Mueller et al., 2018b). Their

findings indicated that the PLwMCI declined faster on the semantic connected language factor

than their cognitively healthy counterparts over time (Mueller et al., 2018b). Fraser et al. (2016)

performed a factor analysis on Cookie Theft picture descriptions and found the semantic factor

differentiated spoken discourse samples of healthy controls and PLwAD. More recently, Yeung

et al. (2021) investigated incoherence, among other speech and language characteristics, using

the "Cookie Theft" picture in healthy controls, PLwMCI, and persons living with possible or

probable AD. They then performed exploratory factor analysis and found that 20 variables were

correlated for incoherence. (Yeung et al., 2021). The aforementioned studies all used the BDAE

"Cookie Theft" picture to evaluate predictive factors in spoken discourse. The present study

chose to use a sequenced-picture story elicitation stimulus as opposed to a single-picture due to

evidence that a sequenced-picture story offers greater value in understanding language and

cognitive impairments (Roberts et al., 2017). However, it's possible that "Cookie Theft" or a

different discourse task could have aided in investigating the predictive relationship between

global coherence and diagnostic status. Further research is necessary to explore if using a

different discourse task (i.e., "Cookie Theft") with PLwMCI and PLwAD and topic management

performance measure would result in significant findings.

4.2.3 Topic Management Performance Measure

Another explanation for why the predictions in research questions 2a and 2b were found not to

be statistically significant could be due to the performance measure of global coherence for topic

management. As described above, Yeung et al. (2021) used alternative measures to assess

coherence. Two factors explained Incoherence. The one of direct relevance to the present study

is "words with higher estimated ages of acquisition and more negative valence in the content of

speech" (Yeung et al., 2021, p. 7). When describing the "Cookie Theft" picture, off-topic

utterances were classified as those that result in deviations from typical and expected words and

sentences. Such coding would explain the relationship between higher incoherence ratings and

more negative valence and words with higher age of acquisition (Yeung et al., 2021). It is

possible that using measures of coherence or incoherence based on spoken language variables in explanatory analyses would provide greater insight into predicting diagnostic group membership. Kim et al. (2019a) found that reduced discourse performances in coherence increased the likelihood of being classified in the a-MCI group, as opposed to being labelled within the healthy control or na-MCI groups. However, they did not find any correlations between cognitive function and global coherence among participants with na-MCI (Kim et al., 2019a). Kim et al. (2019a) used both global and local coherence as measures of topic management. Once again, these findings suggest the possibility of finding a predictive relationship by using different and/or combining other measures to assess topic management. However, given the conflicting results for the a-MCI and na-MCI groups, further research is required to determine if this would be reproducible and applicable.

4.2.4 Disease Stage and Severity

Finally, disease severity also may have contributed to the non-significant findings in both regression analyses. Ahmed et al. (2013) examined three clinical stages of autopsy-confirmed participants with AD (i.e., MCI, mild AD, and moderate AD). They found a progressive disruption in language integrity that was detectable from prodromal disease stages and was best captured by measures of semantic and lexical content and syntactic complexity. It is possible that the regression analyses may have reached significance had the disease stage been known and included as a factor in the statistical analyses. Furthermore, adding a control group could strengthen predictions among them and the PLwMCI and PLwAD diagnostic groups. Calzà et al. (2021) examined healthy controls, PLwMCI, and individuals with early dementia. Part of their inclusion requirements for the healthy control group was a MoCA of > 18. However, the MoCA scores of the PLwMCI and the individuals with early dementia were not reported (Calzà et al.,

2021). Although the MoCA scores of the participants with cognitive impairment were not reported, MoCA scores $\geq$ 18 are noteworthy for healthy controls (i.e., within the range of MCI as per other published research criteria; Carson et al., 2017; Freitas et al., 2013; Gagnon et al., 2013; Nasreddine et al., 2005). Another inclusion criterion which differentiated the participants with MCI and those with early dementia was the presence of support needed for ADLs (Calzà et al., 2021). It is possible that including MoCA scores as an inclusion criterion versus as a demographic characteristic could have established disease severity and advanced solid comparisons among diagnostic groups. Further research is required to explore if more profound disease severity between PLwMCI and PLwAD could result in findings of a predictive relationship between average global coherence ratings and diagnostic group membership.

4.3 Implications

The findings from the current study offer several implications, including establishing markers in spoken discourse that can indicate differences between individuals with MCI and AD, predicting conversion from MCI to AD, and the state of research on spoken discourse in persons living with MCI and AD. The current study aimed to determine whether differences exist in topic management in the spoken discourse between individuals with MCI and AD. Findings did not demonstrate differences between persons living with MCI and AD on the basis of a measure of global coherence for topic management. Knowing markers in spoken discourse that can distinguish individuals with MCI and AD can strengthen diagnostic measures. The present study's findings indicate that the four-point global coherence scale may not be useful to distinguish individuals with MCI and AD during spoken, sequenced story picture description narrative discourse. Published findings suggest differences in topic management between persons with MCI and AD. Hence, the implication for this thesis is that perhaps it is wise to

consider using a different measure of topic management and/or spoken discourse task. Since the current findings contrast with what is reported in the literature, this also suggests that further research should be undertaken to examine topic management in PLwMCI and PLwAD.

Additionally, the aim of the present study was to use average global coherence ratings as a predictor for MCI and AD. The present study did not find that average global coherence ratings could predict diagnostic group membership, or MCI and AD to predict average global coherence ratings. The lack of statistically significant findings from the regression analyses highlights the importance of conducting further research to determine if these predictions can, in fact be made using a control group, a different type of discourse task, and/or additional topic management performance measures. Providing insight into robust markers of spoken discourse, especially for topic management, offers the potential for clinicians to assess MCI or AD with greater clarity. Identifying robust markers of topic management in spoken discourse has immense clinical implications, such as improved diagnostic prediction for individuals with MCI and AD. The analysis used in this study provided a better understanding of what needs to be considered for future discourse analyses of topic management in PLwMCI and PLwAD. Furthermore, it sheds light on what lines of enquiry future researchers may choose to explore and which may hold great potential to positively influence communication among persons living with dementia, their care providers, and healthcare providers.

Finally, as the worldwide prevalence of PLwMCI and PLwAD increases, attention to accurate diagnostic prediction and discourse analyses should be researched accordingly. Discourse analysis has immense potential as a clinical tool to identify a variety of clinical populations

deferentially and help make valid commentary about the impact of language disorders on communication in real-life (Bloom, 1994).

4.4 Limitations and Strengths

4.4.1 Limitations

Limitations of this thesis include the lack of biomarker-confirmed AD cases, the uneven proportions of PLwMCI and PLwAD, and the lack of sample diversity. Recent developments in dementia diagnoses include the identification of biomarkers associated with AD in a living person (National Institute on Aging, n.d.). Using biomarkers most commonly involves gathering cerebrospinal fluid and more recently, blood samples from the individual and then testing for the corresponding biomarkers for Alzheimer's dementia (National Institute on Aging, n.d.). Advances in biomarkers over the past decade have led to enhancing AD diagnosis and innovative research for neurodegenerative disease (National Institute on Aging, n.d.). At the time of participant enrolment in the ONDRI dataset used in the current study, current and valid inclusion criteria for MCI and AD were used (Albert et al., 2011; McKhann et al., 2011). However, given the recent advancements in biomarker-confirmed AD diagnosis, the primary investigator acknowledges that the lack of their use in the current study is a limitation.

Next, the uneven distribution of PLwMCI (n=83) and PLwAD (n=37) could have impacted the findings of this study. Although the present study had a large number of participants (n=120), the PLwAD accounted for a smaller proportion of the overall sample. At the time of recruitment and enrollment, the participants had to meet the inclusion criteria for MCI or AD to participate in the Ontario Neurodegenerative Disease Research Initiative (ONDRI). A larger number of participants with AD would have increased the representation of PLwAD in the present study

and increased the reliability of the results. A larger sample, within each group and overall, would have increased the chances of finding real group differences in the present study. Therefore, the small sample of PLwAD could have contributed to no findings of group differences, especially in combination with the similarity of the average MoCA scores of the participant groups. Future studies should consider enrolling equal numbers of individuals in each participant group to increase the representation and reliability of results.

Finally, the lack of sample diversity could have impacted the findings of this study and is acknowledged as a limitation. The present study's sample distribution is similar to that of other studies of neurodegenerative diseases (i.e., MCI/AD) in terms of age, sex, education, and ethnicity (Sunderland et al., 2022). Although both diagnostic groups were similar to each other in terms of demographic diversity, the samples of PLwMCI and PLwAD lacked diversity. A demographically diverse sample, within each group and overall, would have made the results of the present study more applicable to all PLwMCI and PLwAD. Therefore, the lack of sample diversity in the present study limits the generalizability of the results. Future studies should consider demographic diversity when recruiting participants to reflect the diversity of PLwMCI and PLwAD. Further to this limitation is that the ONDRI MCI and AD participant demographic data only included sex data and not gender data. Therefore, sex and gender differences were unable to be analyzed in the participant group, and gender could not be included as a covariate in the regression analyses. Although the results of the present study were not statistically significant when sex was included as a covariate, the results of including gender as a covariate are not known. Further research is required to explore if including gender as a covariate could be useful in explaining the present study's findings.

4.4.2 Strengths

Strengths include a solid coding framework, coder blinding, high inter- and intra-rater reliability correlation scores, a fairly large sample size for discourse analyses studies, and consideration of statistical analyses with and without outliers. The coding framework makes the present study consistent with the current state of research in the field of topic management with persons living with MCI and AD. A literature review was conducted to ensure a comprehensive coding system was chosen to measure topic management abilities of the participants accurately. The literature review identified several coding systems that were discussed with supervisory and advisory committee members over numerous meetings. This permitted a thorough analysis of global coherence-based coding strategies known to be effective with PLwMCI and PLwAD to date.

The present study ensured that the primary investigator (SAD), her supervisor (JBO), and the inter-rater reliability coder (RGM) were all blinded to diagnostic status during all coding procedures and reliability measures. This ensured that the coding was not subject to biases based on knowing the diagnostic status of the participants. For example, knowing a participant was categorized as a PLwMCI could skew a coder to give higher global coherence ratings, as it was anticipated that the PLwMCI would have higher global coherence ratings than the PLwAD. Furthermore, inter- and intra-rater reliability correlation scores were very high (i.e., ≥ 0.97). These scores indicate that the coding training and analysis were extremely robust throughout the entirety of the study. Although no significant differences were found, these scores increased the primary investigator's confidence in the methods in which the coding system was applied.

The large number of participants being analyzed increases representation of PLwMCI and PLwAD and the reliability of the results of the present study. Previous similar studies included

samples of 77 (Drummond et al., 2015), 16 (Fleming & Harris, 2008), and 30 (Yeung et al., 2021). Analyzing spoken discourse samples of numerous participants of diverse backgrounds increased coders' (i.e., SAD, RGM) understanding of the variations in coherence of PLwMCI and PLwAD. This allowed us to analyze and code many c-units of all ratings (i.e., G1, G2, G3, G4, NR) and become increasingly familiar with various discourse patterns of PLwMCI and PLwAD. Finally, a strength of the study findings is that statistical analyses were run with and without outliers. The consideration of results with and without outliers ensures that the outliers did not skew the findings. Although no significant differences were found, we can be certain this was not due to the presence or absence of outliers.

4.5 Future Directions

Future studies could address the following. It would be valuable to perform future analyses that consider different types of discourse tasks, additional topic management performance measures, and/or compare MCI and AD groups to cognitively healthy older adults. Future research could examine topic management in a topic-directed conversational sample using the four-point global coherence scale to determine if MCI and AD group differences are more apparent and support the literature. Additionally, the analyses from the present study could be re-conducted, including coding for local coherence and a control group of healthy older adults. This would allow for the potential that local coherence may be more revealing for topic management differences between persons living with MCI and AD. Moreover, a control group would allow for comparisons to potentially indicate if the MCI group is more similar in terms of topic management to the AD group or the healthy older adults.

Future research should include the use of biomarker confirmed AD (i.e., Bayer, 2018; Simonsen et al., 2017). Biomarker confirmed AD diagnoses might be a more robust inclusion criterion to ensure the MCI and AD participant groups differ in terms of disease severity. Furthermore, the matter of disease severity could also be explored by expanding the present study to a longitudinal analysis. The ONDRI dataset offers longitudinal data on the MCI/AD cohort, and it may be of use for future research to explore if group differences develop as time elapses. Since linguistic deficits become more profound as disease severity increases, it could provide evidence that the group differences in the literature emerge at later time points of the ONDRI study.

Moreover, ensuring sample diversity in all demographic categories and including gender in addition to sex is a step future researchers could consider. Recruitment measures should be considered to limit the overrepresentation of any demographic. Future research could include diversity and inclusion monitoring as a part of the recruitment process to ensure the MCI and AD participant groups are demographically diverse. This would assist with overall sample representation and enhance the generalizability of study findings to PLwMCI and PLwAD. Particularly as the worldwide prevalence of PLwMCI and PLwAD increases, it is of high importance for future investigators to ensure sample diversity and thus accurate applicability of results. Furthermore, the addition of gender demographic data would allow for consideration of both sex and gender effects on prediction analyses and could provide valuable insights into future covariate regression analyses.

Future studies may want to consider using a different discourse task to assess topic management, different topic management performance measure(s), and considering diagnostic stage and severity of PLwMCI and PLwAD. Firstly, it is possible that differences in topic management are

more revealing when considering a discourse task with less structure, such as interviews or conversations. This may allow for greater topic shifts or off-topic discourse and, therefore may show group differences between persons living with MCI and AD. Garcia and Joanette (1997) used a topic-directed semi-conversational interview-based task and found topic management problems among PLwAD. Secondly, differences in topic management and the relationship between cognitive status and topic management may be more revealing depending on the measure(s) of topic management used. For example, future investigators could analyze global and local coherence. Finally, ensuring the diagnostic clinical stage of the PLwMCI and PLwAD are identified clearly should be a step future investigators want to consider.

4.6 Conclusion

As the prevalence of MCI and AD increase in Canada and worldwide, communication difficulties among PLwMCI and PLwAD are becoming increasingly recognizable and researched. PLwMCI and PLwAD commonly experience deficits in discourse which include coherence and topic management problems. Topic management is broadly defined as acts that maintain or terminate an established topic and is reliant on an individual's intact memory systems (Garcia & Joanette, 1997; Hall et al., 2018). Spoken discourse analysis is a method that can identify MCI and AD (Duong et al., 2003; Fleming & Harris, 2008). Topic management in the spoken discourse of PLwMCI is less commonly reported in comparison to in PLwAD. Nonetheless, reduced global coherence of discourse, low discourse efficiency, and topic management impairments are reported among PLwMCI and PLwAD (e.g., Dijkstra et al., 2004; Drummond et al., 2015; Garcia & Joanette, 1997; Kim et al., 2019a; Seixas-Lima et al., 2020). However, it was unknown whether the spoken discourse performance of PLwMCI vs. PLwAD could be distinguished based on topic management features, precisely global coherence.

To address this gap in the literature, the analysis of sequenced-picture story description discourse was conducted to examine differences in global coherence ratings between PLwMCI and PLwAD. The study's aim was to understand whether there was a difference in topic management in the spoken discourse comparison of participants with MCI vs. AD. Additionally, this study looked to examine if a predictive relationship could be found between topic management performance measures and diagnostic groups. The findings demonstrated no group differences between PLwMCI and PLwAD based on average global coherence ratings. The results also indicated that diagnosis was not a useful predictor for average global coherence ratings, and average global coherence ratings were not a useful predictor for diagnostic membership.

Three main potential reasons were identified and discussed as possible explanations for why no significant results were found: 1) the spoken discourse task used to assess topic management was not sufficiently difficult enough for the participants to generate problems in their topic management 2) the scoring protocol used to measure topic management was not sufficiently discrete to detect differences in topic management in PLwMCI and PLwAD and/or 3) the diagnostic status of the participants was not sufficiently variable enough to present significant differences in their topic management abilities and skills. The present study represents an attempt to establish markers in spoken discourse that can indicate differences between individuals with MCI and AD. Research in this domain has the potential to be applied clinically as a tool for predicting MCI and AD. The present study's findings highlight the need for continued research in this area.

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Watson, C. M., Chenery, H. J., & Carter, M. S. (1999). An analysis of trouble and repair in the natural conversations of people with dementia of the Alzheimer's type. Aphasiology, 13(3), 195–218. APA PsycInfo®. https://doi.org/10.1080/026870399402181

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    Research & Therapy, *13*(1), 109. https://doi.org/10.1186/s13195-021-00848-x

Appendices

Appendix A: Topic Management Summary Tables

Citation (APA)	Population (dementia, Alzheimer's dementia, MCI, etc)	Participants (Dyad)	Context (discourse task)	Nature of topic analysis	Types of topic definitions	Discourse Analysis Schema for Topic	Examples
Blonder, L.X., E.D. Kort, and F.A. Schmitt. "Conversational Discourse in Patients with Alzheimer's Disease." Journal of Linguistic Anthropology 4, no. 1 (1994): 50–71. https://doi.org/10.1525/jlin.1994.4.1.50.	Mild to moderate probable dementia of the Alzheimer type (DAT)	5 subjects and their partners	Interviews - variety of topics	Interviews were audiotaped and transcribed then coded discourse constituents in each transcript	Non sequitur - an inference or a conclusion that does not follow logically from the preceding discussion, topic shift - a change in the topic of conversation initiated by a speaker	Coded the following speech acts: Request for information (RI), response to a question (RQ), self-initiated comment (SIC), non sequitur (NS), narrative (NA), topic shift (TS), figure of speech (FS), direct quote (DQ)	
Dijkstra, K., Bourgeois, M. S., Allen, R. S., & Burgio, L. D. (2004). Conversational coherence Discourse analysis of older adults with and without dementia. *Journal of Neurolinguistics*, *17*(4), 263–283. APA PsycInfo®. https://doi.org/10.1016/S0911-6044(03)00048-4	Dementia (non-stroke related or Alzheimer's)	30 subjects, 30 healthy older adults	Oral reading task Picture description task Conversational sample	Transcripts were coded according to discourse building and discourse impairing features	Elaborations on topic, topic, subtopic, coherence, global coherence, local coherence, topic maintenance, disruptive topic shifts	Global coherence - number of utterances that represent the topic of conversation; Local coherence - number of utterances connected to the preceding utterance; Topic maintenance: elaborations divided by disruptive topic shifts; Disruptive topic shifts, abrupt topic shift	Global coherence: Well I was born and raised in Ohio (topic is 'life'); Local coherence: Yeah, can you tell me about your day? Well, uh, I start getting ready to get up around seven or something; Topic maintenance: It is a very nice place. Have you met this lady?; Disruptive topic shifts, abrupt topic shift: And they are both with the Lord You are a good-looking woman.
Garcia, L. J., & Joanette, Y. (1997). Analysis of Conversational Topic Shifts: A Multiple Case Study. Brain and Language, 58(1), 92–114. https://doi.org/10.1006/brln.1997.1871	Probable dementia of the Alzheimer type (DAT)	5 subjects, 5 normal elderly, 1 normal healthy adult	Conversation sample - any topic desired between individual and normal healthy adult	Transcriptions made and reviewed with videotape, turns were numbered in sequence, and each turn evaluated in terms of its relation to the topic. General and Subject Profile extracted from these data.	Topic, topic unit Global Categories: Topic Maintenance (semantic and nonsemantic), topic shift or undetermined Topic Shift Categories: place of shift (within turn, across turn), type of shift (topic initiation, topic shading, renewal, insert, unexpected, undetermined), reason for shift (end of topic, decreased comprehension, failure to continue, outside event, repetition of an idea, anecdotal, undetermined), relation to context (text, environment, specific knowledge, general knowledge, unknown)	The General Profile: global graphic representation of conversation (1) percentage of all productions in the conversations including both conversers and (2) each converser's contribution to the conversation The Subject Profile: percentage of each subject's productions, excluding those made by the normal healthy adult (S.W.) Analysis 1: Global Dimension Analysis 2: Type of Shift Analysis 3: Reason for Shift Analysis 4: Context	The General Profile: number of shifts, maintenances (semantic and nonsemantic), and undetermined calculated as percentage of total number of turns in the conversation. Categories within Place, Type, Reason, and Context calculated as percentage of total number of topic shifts in conversation The Subject Profile: number of shifts, maintenances (semantic and nonsemantic), and undetermined calculated as percentage of total number of turns produced by that speaker in conversation. Categories within Place, Type, Reason, and Context calculated as percentage of total number of topic shifts produced by that speaker in conversation
Hall, K., Lind, C., Young, J. A., Okell, E., & Steenbrugge, W. (2018). Familiar communication partners' facilitation of topic management in conversations with individuals with dementia. International Journal of Language & Communication Disorders, 53(3), 564–575. APA PsycInfo®. https://doi.org/10.1111/1460-6984.12369	Moderate to severe dementia	3 subjects, 3 Familiar Communication Partners (FCP)	Two 10-minute tasks: 'have a chat' and 'plan a special dinner'	Sequences of videoed talk analyzed according to principles of communication applied conversation analysis (CA). 'Topic' according to definition by Crow (1983). Sequences analyzed according to: (1) type of conversational behaviour, (2) whether the conversational behaviour occurred immediately following a topic-shift, (3) the FCP's response to the conversational behaviours, and (4) impact of the FCP's response on topic-management	Topic, proximity to topic-shifting turns, verbal and visual patterns of behaviour that reflected topic-management difficulties, topic-maintenance, topic extension, and coherent topic-shifting (topic-shading), topic-shift type	Characteristics of topic-management difficulties by individuals with dementia Characteristics of FCPs' facilitation of topic-management difficulties Responding to topic-management difficulties that explicitly request assistance: responding to explicit repair-initiators (RIs) Responding to topic-management difficulties that do not explicitly request assistance, and that occur close to topic shifting turns Responding to topic-management difficulties that do not explicitly request assistance, and that occur distant from topic-shifting turns	Topic shading example - excerpt 2 line 6: now do you remember who your family is - topic is shifted from being near their family to who the family is. See excerpt 2.
Mentis, M., & Briggs-Whittaker, J. (1995). Discourse topic management in senile dementia of the Alzheimer's type. *Journal of Speech & Hearing Research*, *38*(5), 1054. https://doi.org/10.1044/jshr.3805.1054	Senile dementia of the Alzheimer's type (SDAT)	12 subjects, 12 normal elderly (NE)	20-minute casual conversational interaction with SLP	Topic Coherence Analysis - analysis yields information regarding topic introduction (number and manner of topics introduced and nature of topic sequences preceding partner topic introductions) and topic maintenance (type of contributions made by each partner to the development of the topic, number and type of contributions that disrupt topic maintenance, and specific features that underlie these problematic contributions).	Topic, appropriate topic changes, appropriate topic shifts, problematic noncoherent topic changes, problematic tangential shifts, intonation units, ideational units, nonlinguistic units, unintelligible units, ambiguous units	(1) Analysis of topic introduction: (a) number of topics introduced (percentage of topics introduced by subject and percentage of topics reintroduced by wither speaker) (b) manner of topic introductions - to provide description of mechanisms used to chain together topic sequences - appropriate (topic changes and topic shifts) or problematic (noncoherent changes and tangential shifts) - percentage of each category calculated (c) nature of topic sequences preceding partner topic introductions - to provide extent to which partners introduced topics in response to disruptions in previous topic sequence (percentage of partner topic introductions preceded by problematic and condition-related units) (2) Analysis of topic maintenance: intonation unit - ideational units (new information, no new information, textual, condition related, and problematic), nonlinguistic units, and unintelligible units	
Perkins, L., Whitworth, A., & Lesser, R. (1998). Conversing in dementia: A conversation analytic approach. *Journal of Neurolinguistics*, *11*(1–2), 33–53. https://doi.org/10.1016/S0911-6044(98)00004-9	N/A - review of existing literature	N/A - review of existing literature	Conversation analysis	Review of existing literature	Topic ("what is talked about through some series of turns at talk"), topical coherence ("something that is constructed across turns by the collaboration of participants")	N/A	
Palm, S., & Purves, B. (1996). Management of a word-finding deficit in discourse: A case example. *Journal of Speech-Language Pathology and Audiology*, *20*(2), 155–166. APA PsycInfo®.	Probable Alzheimer's Dementia (AD)	One subject	Semantic tasks Conversation Picture description	Test, intervention, retest	Topic maintenance cues	Information per utterance, length of sentence, syntactic complexity of sentences	
Ripich, D. N., Vertes, D., Whitehouse, P., Fulton, S., & Ekelman, B. (1991). Turn-taking and speech act patterns in the discourse of senile dementia of the Alzheimer's type patients. *Brain and Language*, *40*(3), 330–343. APA PsycInfo®. https://doi.org/10.1016/0093-934X(91)90133-L	Senile dementia of the Alzheimer's type (SDAT)	11 subjects, 11 normal elderly, 1 examiner	9-minute unstructured conversation with examiner	What are the conversational differences in word use, turn-taking, nonverbal responses, and speech act production of NE compared to those of SDAT patients? What are the differences in worse use, turn-taking, nonverbal responses, and speech act production of conversational partners in interactions with NE speakers and SDAT patients? Orthographic transcriptions were coded and tallied for words spoken, conversational turns, speech acts, unintelligible utterances, no answers, and nonverbal responses	N/A	N/A	
Shakespeare, P., & Clare, L. (2005). Focusing on task-oriented talk as a way of exploring the interaction between people with early-onset dementia and their carers. *Qualitative Research in Psychology*, *2*(4), 327–340. APA PsycInfo®. https://doi.org/10.1191/1478088705qp043oa	Early-stage Alzheimer's Dementia (AD)	10 subjects and their partners	Up to 5-minute conversation between subject and partner - discuss current situation	Conversation analysis	Topic management, interactional rights in relation to topic management, topic development	Indirectly through conversation analysis see notes - elucidated through analyses	See extract 2 page 7 for example of interactional rights
Spilkin, M.-L., & Bethlehem, D. (2003). A Conversation Analysis Approach to Facilitating Communication with Memory Books. *Advances in Speech Language Pathology*, *5*(2), 105–118. APA PsycInfo®. https://doi.org/10.1080/14417040510001669131	Alzheimer's Dementia (AD)	One subject and caregiver	Pre-intervention: Two 20-minute conversational interactions Intervention: Three 1-hour workshops for caregiver Post-intervention: Two 10-minute conversational interactions with memory book	Pre-intervention: recorded interactions, transcribed, and analyzed using CA principles. Pre- and postintervention rating scale language and communication rating scale. Intervention. Post-intervention: recordings transcribed and analyzed	Topic initiation (when and how often a new topic was introduced), topic maintenance (keeping to a topic), topic bias (if the same topic was introduced on consecutive occasions)	Turn taking analysis: minimal versus maximal turns (single versus multipart questions, open-ended versus close-ended questions), silences, interruptions **Topic management analysis**: topic initiation, topic maintenance, and topic bias Conversational repair: self-initiated self-repair, self-initiated other repair, other-initiated other-repair, other-initiated self-repair	
Watson, C. M., Chenery, H. J., & Carter, M. S. (1999). An analysis of trouble and repair in the natural conversations of people with dementia of the Alzheimer's type. Aphasiology, 13(3), 195–218. APA PsycInfo®. https://doi.org/10.1080/026870399402181	Senile dementia of the Alzheimer's type (SDAT)	10 subjects, 10 normal control subjects	Spontaneous conversation between SDAT subject and control subject	Analysis according to trouble indicating behaviour, repair trajectory, repair type used, and acceptance/non-acceptance of the particular use of repair	Trouble indicating behaviours - reflecting topic maintenance and elaboration difficulty. Topic maintenance, topic elaboration, and topic switch	N/A	Normal 14: so did your wife tell you what operation she had? SDAT 15: Yes - lack of uptake/continuation reflecting difficulty with topic maintenance, elaboration, and shift
Upcoming Discourse Chapters - including for topic definitions							
Chapter 10 - Assessing Conversation after Traumatic Brain Injury - Louise C. Keegan, Nicholas Behn, Emma Power, Susan Howell & Rachael Rietdijk					Topic analysis (method for examining patterns dn problems in topic management, broad focus on topic initiation and maintenance including any topic changes or disruptions)		
Chapter 11 - Assessing Discourse in People with Right Hemisphere Disorders - Melissa D. Stockbridge, Jamila Minga, Alexandra Zezinka Durfee, Melissa Johnson				Topic maintenance can be assessed a 4-point scale ranging from a completely unrelated, egocentric, and/or off-topic utterance (1) to a completely on-topic utterance directly related to the topic at hand (4) - Wright et al., 2013	Coherence (the semantic relationships between distant utterances within a given discourse and captures the inclusion of information that is tangential or conceptually incongruous)		
Chapter 7 - Clinical Application of Conversation Analysis in Aphasia - Jamie H. Azios and Nina Simmons-Mackie					Fronting (when a turn starts with a noun or temporal phrase to introduce a topic), smooth introduction of a new topic (occurs by using a cohesive device to tie the new topic semantically to prior talk)		
Chapter 6 - Weaving Research Evidence and Clinical Expertise together in Discourse Analysis of Spoek Personal Narratives in Aphasia - Dr Lucy Dipper & Dr Madeline Cruice					Correct Informational Units (CIUS) (words that are intelligible in context, accurate in relation to the picture(s) or topic, and relevant to and informative about the content of the picture(s) or the topic), measure of local coherence (provides an evaluation of how well one utterance links tot he next), measure of global coherence (how well one utterance relates to the overall topic), production of linguistic items (to create reference chains/lexical cohesion; relating to topic/gist; denoting relevant semantic-conceptual content; with the correct form [syntactic, morphological, phonological])		
Chapter 4 - Conversation and Typical Aging - Marion Leaman and Aviva Lerman				Evaluated verbosity and topic maintenance on a 5-point scale	Topic maintenance (extent and frequency of 'off-topic' language, defined as abundant output with redundant focus), off-topic language (verbosity, talkativeness, or rambling language), topic maintenance (extent to which a contribution is relevant to the ongoing topic), verbosity (an inefficiency of conveying information due to inclusion of unnecessary or peripheral detail and repetition)		
Chapter 2 - Cognitive and Linguistic Characteristics of Narrative Discourse Production in Healthy Aging					Mozeiko et al. (2011) efficient discourse processing also requires executive functions: the ability to inhibit the production of irrelevant pieces of information such as off-topic comments and derailments, update incoming information with what has been previously communicated through working memory, and shift between strategies so to select new episodes or new informative words.		
LITERATURE SEARCH							
SCOPUS - Keywords (duplicates removed)							
"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic* OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia							
Drummond, C., Coutinho, G., Fonseca, R. P., Assunção, N., Teldeschi, A., de Oliveira-Souza, R., Moll, J., Tovar-Moll, F., & Mattos, P. (2015). Deficits in narrative discourse elicited by visual stimuli are already present in patients with mild cognitive impairment. *Frontiers in Aging Neuroscience*, *7*, 96. https://doi.org/10.3389/fnagi.2015.00096	Amnestic mild cognitive impairment (a-MCI) and Alzheimer's disease (AD)-related dementia	41 Controls 22 a-MCI participants 14 AD participants	Narrative discourse elicited with visual stimuli - the "car accident" task Confrontation naming Verbal fluency	Discourse transcribed, characterized as (1) predominantly narrative and (2) predominantly descriptive, overall coherence (number of semantic propositions - macropropositions and micropropositions), referential cohesion (1) appropriate and (2) inappropriate, index of discourse effectiveness, narrative structure - complete or incomplete	Macropropositions, micropropositions, appropriate referential cohesion, inappropriate referential cohesion, index of discourse effectiveness, complete narrative structure, incomplete narrative structure	Analyzed transcripts across the following parameters: (a) narrative time, (b) total number of words, (c) discourse type (narrative or descriptive) (d) overall coherence (number of semantic propositions - macropropositions [central idea of each context action] and micropropositions [relevant or irrelevant to the context]), (e) referential cohesion (cohesion between elements), (f) index of discourse effectiveness (total number of words recalled divided by number of macropropositions, (f) narrative structure (complete = initial event, story development, outcome)	Macroproposition: "The boy set the car's parking brake" Relevant microproposition: "His sister, who was wearing a blue shirt, leaned her head on the seat and waved to her mother" Irrelevant microproposition: "When it rains, it is not possible to drive" Inappropriate referential cohesion: "The man is driving. At a certain point, she got out of the car. The passenger who was in the backseat threw himself
Ellis, C., Henderson, A., Wright, H. H., & Rogalski, Y. (2016). Global coherence during discourse production in adults: A review of the literature. *International Journal of Language & Communication Disorders*, *51*(4), 359–367. https://doi.org/10.1111/1460-6984.12213	Dementia, memory impairment and other populations	8 studies	Description of his/her family and work experience, interview, description of procedural tasks, interview-style conversation, story retelling, story generation, narrative and procedural, picture description	Five-point rating scale, consensus, number of utterances representing the topic of conversation, positive scoring on global connectedness, percentage of global coherence errors	Coherence, global coherence, local coherence	N/A	
Kurczek, J., & Duff, M. C. (2011). Cohesion, coherence, and declarative memory: Discourse patterns in individuals with hippocampal amnesia. Aphasiology, 25(6-7), 700–712. https://doi.org/10.1080/02687038.2010.537345	Hippocampal amnesia	6 hippocampal amnesia 6 controls	Story generation Story retelling Narrative Procedural	Discourse transcribed, coded for number of words and utterances distributed into T-units. Coherence analysis - local and global	Coherence, global coherence, local coherence	Each narrative rated on global and local coherence according to 5-point Likert scale, each T-unit assigned rating for global and local coherence	
Lock, S., & Armstrong, L. (1997). Cohesion analysis of the expository discourse of normal, fluent aphasic and demented adults: A role in differential diagnosis? *Clinical Linguistics & Phonetics*, *11*, 299-317.	Young and elderly normal subjects, subjects with anomic aphasia, and subjects with probably AD	80 people in the 4 subject groups	Cookie Theft expository discourse	Discourse transcribed, excluded unintelligible utterances, dysfluencies, and word repetitions from cohesion analysis. Segmented as a basis for cohesive ties - appropriate and disrupted cohesion - # of cohesive ties in each sentence identified and coded, total # of cohesive ties within each cohesion category, within each subtype	Appropriate cohesion, disrupted cohesion, cohesive item and the referent	Coding of cohesive ties, appropriate and disrupted cohesion was subject to analysis	
Mueller, K. D., Koscik, R. L., Hermann, B. P., Johnson, S. C., & Turkstra, L. S. (2018). Declines in Connected Language Are Associated with Very Early Mild Cognitive Impairment: Results from the Wisconsin Registry for Alzheimer's Prevention. *Frontiers in Aging Neuroscience*, *9*, 437. https://doi.org/10.3389/fnagi.2017.00437	Early mild cognitive impairment (eMCI)	200 cognitively healthy (CH) 64 eMCI	Cookie Theft	Language samples transcribed, utterances segmented into C-units, coded (filled and unfilled pauses, repetitions, revisions, semantic units, errors, and non verbal behaviours), semantic content factor, syntax factor, lexical factor, fluency factor	Semantic factor (percent nouns, percent verbs, pronoun index), syntax factor (verb index, proposition density, grammatical complexity), lexical factor (type-token ration, number of unique words, semantic unit idea density), fluency factor (maze index)	Factors and connected language measures	
Teten, A. F., Dagenais, P. A., & Friehe, M. J. (2015). Auditory and Visual Cues for Topic Maintenance with Persons Who Exhibit Dementia of Alzheimer's Type. *International Journal of Alzheimer's Disease*, *2015*. https://doi.org/10.1155/2015/126064	Adults with language disorder secondary to DAT	5 healthy elderly adults 5 adults with probable DAT	Three topic-directed 5 minute conversation (baseline, auditory condition, and visual condition)	Transcripts were typed, each utterance coded on 1-5 global coherence scale, overall coherence score	Overall coherence representing topic maintenance abilities	Transcriptions segmented and utterances scored	

"topic management*" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speak* OR convers* OR speech* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"						
Fleming, V. B., & Harris, J. L. (2008). Complex discourse production in mild cognitive impairment: Detecting subtle changes. Aphasiology, 22(7–8), 729–740. https://doi.org/10.1080/02687030701805762	Mild Cognitive Impairment (MCI)	8 participants with MCI 8 older adults with typical cognitive ageing	Spoken discourse sample; "Trip to New York"	Audio samples were transcribed and coded, analysed for length, complexity, and quality. 13 thematic core concepts (scored), scored on a scale for irrelevance and verbosity	N/A	N/A
SCHMITTER-EDGECOMBE, M., & CREAMER, S. (2010). Assessment of strategic processing during narrative comprehension in individuals with mild cognitive impairment. Journal of the International Neuropsychological Society, 16(4), 661–671. https://doi.org/10.1017/S1355617710000433	Mild Cognitive Impairment (MCI)	23 participants with MCI 23 cognitively healthy older adults	2 narratives - both short stories, 20 sentences; text comprehension (20 T/F - 10/story, 5 factual, 5 inferential); think-aloud task	Verbal protocols segmented into clauses, clauses assigned to one of four non-inferential categories (repetitions, paraphrases, incomplete, or meta-comments) or one of three inferential categories (explanations, predictions, or associations) and inferential were judged for accuracy. Correct inferences coded (forward or unreasonable clause) + predictive inference that was unadministered to (reading test was coded as incorrect. Inferential statements coded for memory operation used in to generation as activation, retrieval, or maintenance	Maintenance or retrieval: generated inferences that included information provided earlier in the narrative	N/A
"topic management" OR "topic maintenance*" OR "topic cohe*" OR "topic shift" OR topic" OR "convers* topic" AND "spoke discourse"						
Purver, M., Griffiths, T. L., Körding, K. P., & Tenenbaum, J. B. (2006). Unsupervised topic modeling for multi-party spoken discourse. Proceedings of the 21st International Conference on Computational Linguistics and the 44th Annual Meeting of the ACL - ACL '06, 17–24. https://doi.org/10.3115/1220175.1220178	N/A	N/A	Spoken discourse	Model each utterance as being generated from a particular distribution over topics, where each topic is a probability distribution over words. Generative model used: a hierarchical Bayesian model	Topic segmentations (division of a text or discourse into topically coherent segments); topic identification (classification of those segments by subject matter)	Analysis of properties of the algorithm across 3 experiments

PSYCHINFO- keywords (duplicates removed)

"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia						
Mackenzie, C., Brady, M., Norrie, J., & Poedjianto, N. (2007). Picture description in neurologically normal adults: Concepts and topic coherence. Aphasiology, 21(3–4), 340–354. https://doi.org/10.1080/02687030600911419	Neurologically normal adults	225 adults	"Cookie theft" picture description	Orthographically transcribed, concept analysis (presence, accuracy, completeness), topic coherence analysis	Main topic (description of the picture), subtopic, sub-subtopic, sub-sub-subtopic	Topic coherence analysis - counts made of occurrences of new topic, related of re-introduced topic, subtopic sub-subtopic, and sub-sub-subtopic
"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"						
Seixas-Lima, B., Murphy, K., Troyer, A. K., Levine, B., Graham, N. L., Leonard, C., & Rochon, E. (2020). Episodic memory decline is associated with deficits in coherence of discourse. Cognitive neuropsychology, 37(7-8), 511–522. https://doi.org/10.1080/02643294.2020.1770207	Amnestic mild cognitive impairment (a-MCI)	17 individuals with a-MCI 17 controls	Autobiographical interview - 5 minutes	Recorded responses, transcribed, segmented into propositions ("details"), analysed and classified as episodic, semantic, or supplementary. Then coded using a coherence rating scale	Relatedness to the topic (through the relationship between life period and the facts and happenings being described)	Each detail received a score from 0 to 3 based on its relatedness to the topic; final score was weighted average	Relatedness to the topic: if participants were asked to describe event from childhood, details from happenings or facts of childhood narrative were considered cohered with the topic
Tomoeda, C. K., Bayles, K. A., Trosset, M. W., Azuma, T., & McGeagh, A. (1996). Cross-sectional analysis of Alzheimer disease effects on oral discourse in a picture description task. Alzheimer disease and associated disorders, 10(4), 204–215. https://doi.org/10.1097/00002093-199601040-00006	AD and MCI	60 AD subjects 5 very mild cognitive impairment 52 normal controls (NC)	One of two pictures "Easter Morning" or "The Runaway" - 3 minutes	Eight measures of discourse (total words, information units, conciseness, circumlocutions, frustrations, aborted phrases, revisions, and ideational repetitions)	N/A	N/A

Medline - keywords (duplicates removed)

"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia						
Shimmei, K., & Yamada, Y. (2019). Automatic Quantification of Atypical Topic Repetition in Single Daily-Conversation Resulting from Alzheimer's Disease. AMIA Summits on Translational Science Proceedings, 2019, 379–387.	AD	2 individuals with AD 6 older adults	Conversational data	Audio to text data manually transcribed, omitted incomplete words and fillers, extracting topic repetition (topic similarity and frequency of the same topic); used BTM to estimate topic in each sentence	N/A	N/A
Shinkawa, K. & Yamada, Y. (n.d.). Topic Repetition in Conversations on Different Days as a Sign of Dementia. 5.	Dementia	2 elderly individuals with dementia 2 elderly individuals	Conversation	Transcribed, obtained the feature of topic repetition (extraction), calculated topic repetition	N/A	Topic extraction using latent Dirichlet allocation
"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"						
Chen, L., Dodge, H. H., & Asgari, M. (2020). Topic-Based Measures of Conversation for Detecting Mild Cognitive Impairment. Proceedings of the First Workshop on Natural Language Processing for Medical Conversations, 2020, 63–67.	Mild Cognitive Impairment (MCI)	20 MCI 22 healthy controls (older adults)	Semi-structured conversations - freely talk about a predefined topic	Adopted LCseg algorithm to divide utterances into semantically related clusters, removed interviewer's speech, set minimum number of words/utterance to three words	Lexical chain (a set of semantically related words inside a window of utterances that capture the lexical cohesion followed within the window)	N/A

Cinahl - keywords (duplicates removed)

"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia						
N/A no articles pulled from search						
"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"						
N/A no articles pulled from search						

Academic Search Ultimate - keywords (duplicates removed)

"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia						
N/A no results						
"topic management" OR "topic maintenance*" OR "narrative quality*" OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR topic" OR "convers* topic" AND "spoke discourse" OR speech* OR communica* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"						
Fleming, V. B. (2014). Early Detection of Cognitive-Linguistic Change Associated With Mild Cognitive Impairment. Communication Disorders Quarterly, 35(3), 146–157. https://doi.org/10.1177/1525740113520322	Mild Cognitive Impairment (MCI)	9 adults with MCI 9 cognitively normal adults	Spoken discourse production - task required planning a trip to NYC and describe in detail activities associated with preparing for trip. Planning task. Cognitive flexibility components of EF	Each sample was transcribed - only first 5 minutes, coded, analysed using SALT for quantitative and qualitative information (length, complexity, quality)	N/A	Length was determined by totally number of words, complexity was determined by mean number of morphemes per t-unit, quality was reflecting using three measures - the number of indefinite terms used in proportion to total number of words that can contribute to empty speech, examining maze production that indicates utterance formulation difficulties which can reduce the clarity of the discourse, and thematic coding, 13 thematic core concepts were rated

Web of Science- keywords (duplicates removed)

"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia								
Brady, M., Mackenzie, C., & Armstrong, L. (2003). Topic use following right hemisphere brain damage during three semi-structured conversational discourse samples. *Aphasiology, 17*(9), 881–904. https://doi.org/10.1080/02687030344000292	Right-hemisphere brain damage (RHBD) and non-brain damaged (NBD)	17 RHBD participants 51 NBD participants	Topic-structured clinical discourse sample - 10 minute minimum - family, daily activities, and health	Samples orthographically transcribed; topic coherence analysis and topic management analysis	Topic coherence, topic management, topic, subtopic, sub-subtopic (subordinate to a subtopic and expands, or elaborates on, an element within the subtopic), sub-sub-subtopic (another organizational layer - focus on an aspect within sub-subtopic structures), topic shading, fillers (utterances that assisted in the maintenance of the ongoing topic but were themselves devoid of semantic content or consisting of non-meaningful words - on-topic fillers, meta-fillers, topic-shading fillers, and off-topic fillers), meta-statements (utterances that made comment on the ongoing topic and included statements in relation to task and/or performance, requests for clarification, topic-shading statements, fillers linked to these statements), topic-shading utterances (shade the ongoing topic to add relevant comment on an aspect of that topic, a relevant anecdote, or a personal opinion), off-topic utterances (do not contribute to the ongoing topic and include replication, utterances focused on another topic utterances generated by external events, and utterances that could not be evaluated)	Topic coherence analysis - analysing monologue discourse from Mentis & Prutting (1991) + extended to include sub-subtopic and sub-sub-subtopic classifications, topics and subdivisions categorized as new, related, or reintroduced Topic management analysis - Orange et al. (1998) - evaluated degree of 'on-topicness' of the discourse, how far off-topic the discourse had moved, and how long disruption lasted. Each utterance evaluated in relation to the primary topic - on-topic (clear-on-topic utterances, meta-statements, topic shading, and fillers), frequency of use of topic management categories	See appendix for worked examples with topics, subtopics, sub-subtopics, sub-sub-subtopics, see figure 1
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"								
N/A no articles pulled from search								
ProQuest Sociology Collection - keywords (duplicates removed)								
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia								
N/A no articles pulled from search								
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"								
N/A no articles pulled from search								
Nursing and Allied Health - keywords (duplicates removed)								
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia								
N/A no articles pulled from search								
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"								
N/A no articles pulled from search								
Embase (duplicates removed)								
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND Alzheimer* OR dementia								
N/A no articles pulled from search								
"topic management" OR "topic maintenance"* OR "narrative quality"* OR "topic cohe*" OR "discourse cohe*" OR "topic shift" OR "discourse analysis" OR "topic" OR "convers* topic" AND "spoke discourse" OR speech* OR speak* OR convers* OR communicat* OR verbal* OR "convers* analysis" AND "mci" OR "mild cognitive impairment"								
N/A no articles pulled from search								

Appendix B: Western University Ethics Approval for ONDRI

Western Research

Research Ethics

Western University Health Science Research Ethics Board
HSREB Amendment Approval Notice

Principal Investigator: Dr. Michael Strong
Department & Institution: Schulich School of Medicine and Dentistry\Pathology, Western University

Review Type: Full Board
HSREB File Number: 104915
Study Title: The Ontario Neurodegenerative Disease Research Initiative
Sponsor: Ontario Brain Institute

HSREB Amendment Approval Date: November 09, 2016
HSREB Expiry Date: March 04, 2017

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Revised Western University Protocol	Amendment 17	2016/10/13
Revised Letter of Information & Consent	Main	2016/10/13
Letter of Information	Brain Autopsy - Version 3	2016/10/13
Wallet Card	Version 3	2016/10/13
Other	After Death Instructions - Version 4	2016/10/13
Other	Informed Verbal Re-Consent - Version 1	2016/09/21
Instruments	ONDRI Newsletter for participants - Fall 2016	2016/08/19
Other	ONDRI Research Protocol - Version 17	2016/10/13
Sponsor Protocol	Protocol Amendment Summary of Changes - Version 17	2016/10/13

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the amendment to the above named study, as of the HSREB Initial Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use Guideline for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

behalf of Dr. Joseph Gilbert, HSREB Chair

Ethics Officer Erika Basile ___ Katelyn Harris ___ Nicole Kaniki ___ Grace Kelly ___ Vikki Tran ___ Karen Gopaul

Western University, Research, Support Services Bldg., Rm. 5150
London, ON, Canada N6G 1G9 t. 519.661.3036 f. 519.850.2466 www.uwo.ca/research/ethics

Appendix C: ONDRI Datasets Filenames for Data Reported in this Thesis

OND01_ADMCI_01_CLIN_DEMOG_2020JAN30_DATA,

OND01_ADMCI_01_CLIN_DEMOG_2020JAN30_DICT,

OND01_ADMCI_01_CLIN_DEMOG_2020OCT22_README,

OND01_ADMCI_01_CLIN_DHX_2019JAN23_DATA,

OND01_ADMCI_01_CLIN_DHX_2019JAN23_DICT,

OND01_ADMCI_01_CLIN_DHX_2020OCT20_README,

OND01_ADMCI_01_NPSY_2020DEC16_README,

OND01_ADMCI_01_NPSY_MINIMUM_2020DEC16_DATA,

OND01_ADMCI_01_NPSY_MINIMUM_2020DEC16_DICT,

OND01_ADMCI_CLIN_LIVING_CIRCUM_UPDATE_2020OCT22,

OND01_ADMCI_CLIN_SUBTYPE_PROGRESSION_2020OCT20.

OND01_ADMCI_01_NPSY_SEQSTORT2A_2021AUG05_MISSING

Appendix D: Coding System for Topic Management and Coding Procedures

COHERENCE PROCEDURES

1. Coherence is the appropriate maintenanc e of some aspect of the topic within the discourse; based on raters' impressions of the meaning of the whole verbalization with respec t to meaning in the adjoining discourse, irrespective of lexical or syntactic errors.
   a. Global and local cohesion are scored separately
      i. Higher global coherence ratings assi gned to verbalizations which provided substantive information directly related to the *designated topic*
      ii. Local coherence includes relations hips of continuation, repetition, elaborat ion, subordination, or coordination with *the topic in the immediately preceding verbalization/C-unit*
2. Samples need to be segmented into C-units prior to completing coherence analyses.
3. Audio recordings need to be accessibl e while performing cohesion analyses.
4. Use scales to rate each c-unit for global and local cohe rence (complete training and practice items prior to beginning analyses).
5. Calculate Global and Local Coherence Scores for each discour se type: divide the total rating by the total number of c-units *rated* (do not count "not rated" utterances in the total number of utterances rated).

*Note:

☐ Disregard/do not rate ending commentary (e.g. "That's it." "The end." "That's the story.") when rating **both** global and local coherence.
   o E.g., "And that was all I did on my recent holiday" – **do not score** because it is commentary ending the "holiday" recount
   o E.g., "And that was how I spent my Thanksgiving" – **do score** because it provides specific information about the topic (i.e., Thanksgiving is the ho liday that the participant is referencing)

☐ Disregard/do not rate direct responses to examiner unless additional information is provided. Do not count first utterances that are questions to examiner r equesting clarification of task instructions.

Global Coherence Rating Scale

4 The utterance is overtly related to the stimulus as def ined by mention of actors/act ions/objects present in the stimulus which are of significant import ance to the <u>main details of the stimulus</u>. In the case of procedural descriptions and recounts when a designated topic acts as t he stimulus, overt relation is defined by provision of substantive information related to the topic so that no inferenc ing is required by the listener

3 The utterance is related to the stimulus or designated t opic but with some inclusion of suppositional (extra) or tangential information that i s relevant to the <u>main details of the stimulus</u>; *or* substantive information is not provided so that the topic must be inferred from the statement. *In recounts, appropriate elaborations that are not essential but related to the main topic should be sc ored a 3.

2 The utterance is only remotely related to the stimulus /topic, with possible inclusion of inappropriate egocentric information; may include tangential inform ation or reference some element of the stimulus that is regarded as non-critical.

1 The utterance is entirely unrelated to the stimulus/topic; the utterance may be a comment on the discourse or tangential information is solely used

**Notes:
☐ Global coherence requires use of the sti mulus/awareness of the narrative topic when rating

- ☐ Hedges that function more like fillers (e.g. I mean, I would say, I don't know…, you know) should not be considered tangential or egocentric if they lead into additional content. Treat them as though they are fillers by ignoring them and scoring the primary content of the utterance.
- ☐ If an utterance includes a revision, score the complete portion of the utterance disregarding the ambiguous revision.

Local Coherence Rating Scale

4   The topic of the preceding utterance/C-unit is continued by repetition or elaboration of the general theme, as defined by the use of two or more previously presented lexical items (maintaining the same actor, action, and/or object). **These lexical items must be of significant importance to the main details provided in the previous utterance.**

- ☐ "Previously presented item" may be a lexical tie that is a variation or different form of the lexical item (i.e. pronoun representing previously presented noun, semantically related word or words/phrase representing previously presented actor/action/object, synonym, antonym); e.g.: "There's a couple in a car. And they are driving." Both 'they' and 'driving' would count as a lexical tie. 'They' represents 'the couple,' and 'driving' acts as a semantically related tie to 'car.'
- ☐ Transitional verbiage (i.e. conjunction, temporal sequencing) may or may not be included

3   The topic of the preceding utterance is continued by repetition or elaboration of the general theme through the use of only one previously presented lexical item. **This lexical item must be of significant importance to the main details provided in the previous utterance.**

- ☐ Again, "previously presented item" may be a lexical tie that is a variation or different form of the lexical item (i.e. pronoun representing previously presented noun, semantically related word or words representing previously presented actor/action/object, synonym)
- ☐ Transitional verbiage may or may not be included

2   The utterance contains appropriate transitional verbiage (e.g. and, so, then, but, next, because, meanwhile, etc.) to link completely unrelated information to the preceding utterance (i.e. **no previously presented lexical items are used**).

1   The utterance has no relationship to the content of the preceding utterance; **no transitional verbiage or previously presented lexical items are used.**

***Note:
- ☐ Do not rate first utterance since there is no previous utterance to score it against.
- ☐ When rating procedures, do not count "I" or "you" as previously presented items/lexical ties

GLOBAL COHERENCE TRAINING ITEM
(Participant 70_01_H)

PROCEDURES

Key: <u>Underline</u> = tangential information; *Italicized* = egocentric or requires inferencing

Rating	Line #	Procedure: PB&J Transcript	Explanation
4	1	well first you gotta have bread	
4	2	you gotta have a knife	
4	3	you gotta have peanut butter	
4	4	and you gotta have jelly.	
2	5	and you take the you may want put butter on the bread.	Subject is peanut butter and jelly sandwich but participant is referencing unrelated element "butter.' Because an aspect of the topic is present (i.e spreading something on bread to make a sandwich) it is not scored a 1. It is not a 3 because "butter" is not relevant to the main details of the procedure.
2	6	<u>you know it all depends.</u>	Tangential information that is non-critical to describing how to make a PB&J. Not scored a 1 because the comment is referencing an aspect of the general topic.
2	7	and then you either put butter	Same as line 5 above (because the task is to tell how to make a PB&J, the reference to "butter" is considered tangential, non-critical, and is not relevant to the main details of the stimulus but is remotely related because something is being spread on the bread to make a sandwich.)
4	8	and then put peanut butter	
4	9	and put jelly and xxx	
4	10	and then eat it	
3	11	now <u>if you're polite</u> you'll cut them in half.	"if you're polite" is tangential but whole utterance is still relevant to main details of the topic
2	12	but I don't cut them in half *when I do it* or quarters.	Because it has already been explained to cut the sandwich in half, this utterance has become tangential. Utterance is also egocentric, although related to the overall topic.
Rating	Line #	Procedure: "Flower" Transcript	Explanation
2	1	well I I really not you know if I liked yard work I hate yard work.	This utterance is tangential but remotely related to the topic.
3	2	but I assumed you take a pot like that.	"like that" is tangential and requires inferencing
4	3	dig a hole	
3	4	and stick it and pull it outta the pot.	Again you must infer what "it" is. In none of the previous utterances was the flower introduced.
3	5	stick it in the ground	Same as line 4 above
3	6	put your ground around it	Same as above

3	7	and pour water on it.	Same as above
3	8	and and hopefully it grows.	Same as above
Total	**Total c-units scored**		**Average Global Coherence Rating = Total Global Coherence Rating/ Total c-units scored**
63	20		63/20 = <mark>3.15</mark>

STORIES
Key: <u>Underline</u> = tangential information; *Italicized* = egocentric or requires inferencing

Rating	Line #	Stories: Good Dog Carl	Explanation
4	1	there's a bad dog named Carl.	
4	2	and he but he is good	
4	3	and he watches over the little girl that's laying down sleeping	
4	4	he's a a babysitter dog.	
4	5	and his mother has to go out for awhile.	
4	6	she says Carl I'm gonna be out for awhile	
4	7	so if anybody comes you just give em a hard time.	
4	8	well he gets up and goes to the window	
4	9	and boy she's gone the dog said.	
4	10	and he goes over to the little girl or boy and says hey get on my back.	
4	11	let's go for a ride.	
3	12	and sure enough the dog the dog gets on the back <u>which I didn't know</u>	Utterance is related to the topic but tangential information is included
1	13	<u>I I really didn't look</u>	Tangential, not related to general topic.
3	14	the girl gets, the child gets on the dog and they *wrap around*	"wrap around" requires inferencing to know how it relates to the overall topic
4	15	They go to the mother's bed and plays around.	
4	16	and then they go to the er uh uh dresser and plays on the dresser.	
3	17	and she starts picking things off the dressser and *putting dressing*	Inferencing required to know what putting, dressing is referencing
4	18	and then uh he puts her in the laundry chute.	
4	19	and that's gonna be a lot of fun cause the laundry chute drops down to the basement.	
4	20	but he runs right down.	
4	21	and lo and behold she's in the basement	
3	22	and he's *down there to… didn't catch her*.	Inferencing required
4	23	but he's down there.	
4	24	and she gets on his back	
4	25	and he rides up	
4	26	and they play some more and some more	
4	27	and they oh he put her in the he tries and see if she can swim.	
4	28	he puts her in the fish tank.	
4	29	but that didn't work too good.	
4	30	so he gets her out of the fish tank	
4	31	course she's a little wet by now.	

4	32	and he sorta dances around plays with her a little bit.	
4	33	and uh pretty soon the mother's gonna be coming home.	
4	34	but um they go to the door look she's not home yet	
4	35	so he looks like he um he really plays with her and has a lotta fun.	
4	36	both are getting exhausted about this time.	
4	37	the little girl found some grapes.	
4	38	and oh the child finds some grapes and feeds the dog.	
4	39	next then he opens up a can.	
4	40	and he pours out chocolate syrup for her.	
4	41	and they have really a ball.	
4	42	poor mother's gonna have a fit when she gets back.	
4	43	place is getting messy	
4	44	and he finally figured must be mus the mother's must be coming back.	
4	45	so he takes her up.	
4	46	oh he puts her in a bathtub and cleans her up	
3	47	how about that.	"That" refers to cleaning up the baby thus the somewhat tangential comment is related to the general topic.
4	48	and then he looks out the um dumps her back into the crib.	
4	49	and he tries to clean up the mess.	
4	50	oh he's a good dog	
2	51	I'd like to hire that dog.	Tangential but related to overall topic because he wants to hire a dog that cleans, etc.
4	52	and he looks out the window	
4	53	and he and he see the mother coming	
4	54	and so he um lays down again and just like she was when the mother left.	
4	55	and the mother's so happy.	
4	56	The poor the "good dog Carl"	
4	57	you're a good watch dog.	
4	58	and she little does she know what happened while she was gone.	
Total	**Total c-units scored**		**Average Global Coherence Rating = Total Global Coherence Rating/ Total c-units scored**
219	58		219/58 = 3.78

Rating	Line #	Stories: "Picnic" Transcript	Explanation
3	1	I hadn't really figured out what I wanna call these animals.	Related to the topic but tangential
3	2	habits hobbits or uh I don't know.	Same as above
3	3	they kinda uh really don't look like much of an animal.	Tangential/Extraneous
2	4	mouse *I don't like mouses.*	Inserting opinion (inappropriately egocentric) that really has nothing to do with the topic. Not scored a one because of the relationship with "mouse" to the general topic
3	5	and so anyway we'll call them hobbits.	Same as lines 1 and 2 above
4	6	they're all getting ready to go.	
4	7	the whole family's getting together	
4	8	they just decide they really going to go have a great day.	
4	9	one of them can drive a truck.	
4	10	and they all jump in.	
4	11	and it looks like there's a couple a families involved xxx and they're gonna go on a group picnic and go up the hill and through the hills and dales and valleys	
4	12	and they finally um come to a beautiful place.	
4	13	well let's have a picnic.	Quoting characters is okay. If the "let's" had referred to the subject it would have been scored as egocentric.
4	14	and it's really rough road.	
4	15	and one of them actually falls outta the truck.	
3	16	but I hope he catches up with them later on.	Egocentric and tangential but related to main topic.
4	17	here they get into a little uh rolling hills.	
4	18	and and they all jump out.	
4	19	and they get under trees cause it's too hot to um uh to be out in the sun.	
4	20	so they that was uh one of the uh the swimming pools there.	
3	21	it didn't show it in the first but there's a swimming pool there.	Extraneous comment related to overall topic.
4	22	and they spread out their um um blanket so they can put the food out uh picnic blanket what do you wanna call it.	
4	23	one of them looks at the water on the diving board.	
4	24	and they're dancing around having all sorts of fun as everybody does when they go on a.	
4	25	and before they eat they decide to have a	

		xxx and a baseball game.	
4	26	they got them all lined up.	
4	27	but a couple of em are still playing in the water.	
4	28	but it looks like this one poor guy he's really lost.	
4	29	and he's really worried how is he gonna get home.	
4	30	where is everybody?	
4	31	and he walks down this road	
4	32	and the grass is taller than he is.	
4	33	and he's getting more uh he's getting scared and scared and scared	
4	34	the other people hadn't missed him at all.	
4	35	they're having a big time.	
4	36	they're starting to eat the food now.	
4	37	some of them are in the swimming pool.	
4	38	they got little sailboats.	
4	39	and um oh they're even taking pictures of each of old granddad over there	
4	40	and but the other little the other little kid just keeps wandering along.	
4	41	and he finds strawberries.	
4	42	and he starts eating strawberries.	
4	43	and hobits usually don't like strawberries	
4	44	but he decided he's gonna try them anyway.	
4	45	so now they come to the table	
4	46	everybody's called to the table.	
4	47	and they started counting up the kids.	
4	48	and then lo and behold hobbit junior is missing.	
4	49	where oh where is he.	
4	50	and they start praying.	
4	51	and they start whoooo oh where is he.	
4	52	where is he	
4	53	where is he	
3	54	and then they and then they get out	Inferencing required
4	55	then they go back in their truck and look for him.	
4	56	but he's eaten so many strawberries he's got an upset stomach right now.	
4	57	and he's laying down.	
4	58	they keep yelling for him riding down the road.	
4	59	and uh he must of heard em cause all a sudden he gets up and jumps in road.	
4	60	and there they are.	
3	61	and they had a *happy beginning*.	Inferencing required

2	62	and they *guess who had the best time* the one that ate the strawberries or the ones that went to the swimming pool.	Asking a question to the listener is extraneous and the content of the utterance also requires inferencing.
4	63	so they were all hugging and kissing.	
4	64	and everything's back everything's normal again.	
4	65	and he found his little baby doll he had with him.	
4	66	and that's the story of the hobbits going on a picnic.	
Total	**Total c-units scored**		**Average Global Coherence Rating = Total Global Coherence Rating/ Total c-units scored**
250	66		249/66 = 3.79

RECOUNTS

Key: <u>Underline</u> = tangential information; *Italicized* = egocentric or requires inferencing

Rating	Line #	Recounts: Christmas Transcript	Explanation
Not Scored	1	We sat right here.	Response to examiner without additional content is not scored.
4	2	Our daughter came over.	
4	3	Her husband came over.	
4	4	and that's about it.	
4	5	well Christmas xxx well they have brunch down here for Christmas dinner.	
4	6	and there's usually a bunch a people.	
4	7	but basically they came for brunch	
4	8	and we just sat around	
4	9	and they went home after awhile.	
Rating	**Line #**	**Recounts: "Last Weekend"**	**Explanation**
3	1	well see you're talk to a bunch of retired people.	Inferencing required for topic relatedness
1	2	you don't get very much.	Not related to topic
4	3	we were right here all weekend.	
4	4	we didn't really do anything is what I'm saying you know.	"you know" is a filler and is not considered tangential.
4	5	uh last weekend I think I probably showed the movie here you know for the for the people on a Sunday.	"you know" is a filler and is not considered tangential.
Not Scored	6	no not really.	Response to examiner without additional information provided is not scored.
2	7	we don't you know this is like I say xxx xxx xx nintety percent of the people will be that way you talk to that'll be in this this type of environment is what I'm trying to say.	Utterance is tangential with only a remote relationship with overall topic: how you spent last weekend.
Rating	**Line #**	**Recounts "Last Vacation" Transcript**	**Explanation**
4	1	well we really don't take vacations anymore as compared to what you usually don't what your normal xxx vacation.	
4	2	but the last time we left Phoenix basically we went to uh to Santa Bell California to visit our son.	
4	3	we stayed there.	
2	4	and uh let's see I believe they're they have twins and a daughter.	Extraneous information not directly related to the topic (vacation). This is not an appropriate elaboration but rather considered tangential an extraneous.
2	5	the oldest son is they have the they have the oldest son.	Extraneous information not directly related to the topic (vacation). This is not an appropriate elaboration but rather considered tangential an extraneous.
2	6	and they have twins a boy and a girl.	Extraneous information not directly related to

			the topic (vacation). This is not an appropriate elaboration but rather considered tangential an extraneous.
2	7	and the twins just finished up the community college for medical technician.	Same as lines 4 - 6 above.
4	8	so we went to her graduation.	
4	9	and then we flew back in.	
Total	**Total c-units scored**		**Average Global Coherence Rating = Total Global Coherence Rating/ Total c-units scored**
82	*23		82/23 = 3.57

*note all c-units not counted in total but only those *scored*

EVENTCASTS
Key: Underline = tangential information; *Italicized* = egocentric or requires inferencing

Rating	Line #	Eventcasts: "Directions" Transcript	Explanation
3	1	Well the poor driver you know and somehow or another let's see is the wife driving.	Inferencing required to understand relation to overall topic.
3	2	the wife must be driving.	Tangential self talk that is related to the topic.
3	3	she found a her being wanna stop and ask directions the wife said no we get lost.	Inferencing required
4	4	we need to stop and ask directions	Quoting characters is okay when related to the topic.
4	5	so he saw this farmer um right by the roadside.	If picture had not been there this might have been rated a 3 because inferencing would be required. Because it is an eventcast we must assume the speaker is pointing to the picture identifying "he."
4	6	so they stopped.	
4	7	and he pulled out the map trying to find out where he is.	Same as line 5 above.
4	8	and he starts pointing.	Same as lines 5 and 7 above.
4	9	you go north so many miles and turn west so many miles.	
3	10	and and uh by that time they the car leaves.	Inferencing required but the rest of utterance is related to main details in the picture.
4	11	and he's out digging the a uh place to plant the um tree.	
4	12	and first they know the um the couple returned.	
4	13	and apparently they got confused.	
4	14	and he gave them a round a round trip direction.	
Rating	Line #	Eventcast: "Cat in Tree" Transcript	Explanation
4	1	well you know the the little daughter got really upset	
4	2	and her went running in the house and say Daddy Daddy Daddy my cat's up in a tree	
4	3	and he can't climb down.	
4	4	the father instead of saying the kitty the cat wants to get down he'll come down.	
4	5	but he said no that's not the right thing to say to his little girl.	
4	6	so he gets the ladder and climbs up on the tree.	
4	7	and a dog knocks the ladder down.	
4	8	and the poor dad can't get down.	
4	9	but it looks like he could jump down from that distance.	
4	10	but he's scared to do that.	

Rating	Line #	Transcript	Explanation
4	11	and they call the fire department to come get the dad down and	
4	12	also get the cat down.	
4	13	and they all ended up happily there after.	
3	14	except he probably had to pay the fire department some money to come get him.	Tangential information related to the main topic.
No Rating	15	but that's the story.	Ending commentary not rated.
2	16	I had a we lived in Thailand one time and had a and uh the dog the cat got on the roof our cat.	Egocentric extraneous information that is remotely related to the topic.
2	17	and uh so uh I put a ladder up there.	Same as above.
2	18	and I figured wanna eventually he'll wanna come down.	Same as above.
2	19	and and the cat got so that he would climb up and down the	Same as above.
Rating	**Line #**	**Eventcast: "Argument" Transcript**	**Explanation**
4	1	well it looks like um she wants to go somewhere.	
4	2	and he refuses to go.	
4	3	and they have a big argument.	
4	4	and she sorta calls his bluff.	
4	5	and she gets her um suit well it looks like a suitcase.	
4	6	so maybe it's longer than a day's trip.	
4	7	and he's you know she's out the door	
3	8	and he's real sad what if I did this.	Inferencing required due to omission of the word "thinking" or "saying".
3	9	well oh my goodness what's gonna happen.	Quotation related to topic but inferencing required.
3	10	and um the wife gets kinda well I don't really wanna go off by myself.	Inferencing required
4	11	so she comes back in and opens the door.	
3	12	<u>haaa</u> they get together	"haaa" is tangential
4	13	and they hug each other say oh we can't do that again.	
Rating	**Line #**	**Eventcast: "Birthday" Transcript**	**Transcript**
2	1	oh boy xxx this is my favorite one.	Reference is about the stimulus but is egocentric and tangential.
4	2	the dog the dog was hungry and he came in the hou in the room.	
3	3	nobody was there you know.	Inferencing required for discerning relationship between utterance and main topic.
4	4	and he saw this nice cake.	
2	5	course it better not be chocolate cause chocolate's bad for dogs.	Tangential comment remotely related to the stimulus
2	6	but he doesn't worry about it.	Tangential comment remotely related to stimulus.
4	7	he just jumps up on the table and takes a	

		couple of big bites out of it.	
4	8	and and he hears the people coming.	
4	9	and he go gets under the sofa.	
4	10	and the mother's just really mad.	
4	11	and she doesn't know what to do.	
4	12	and the little kid his birthday is all crying cause his birthday cake got spoiled.	
3	13	but why not.	Inferencing required to know what "why not" is referencing, however, the reference is to the main topic "dog eating cake."
3	14	the dog's part of the family.	Extraneous comments but related to the stimulus.
3	15	he should have a piece of cake.	Extraneous comments but related to the stimulus.
4	16	and the people are coming in bringing the gifts.	
4	17	and the mother's trying to clean up the mess the dog made.	
Total	**Total c-units scored**		**Average Global Coherence Rating = Total Global Coherence Rating/ Total c-units scored**
221	*63		221/63 = <mark>3.51</mark>

*note all c-units not counted in total but only those *scored*

GLOBAL COHERENCE PRACTICE ITEM
(Participant 70_05_H)

PROCEDURE

Rating	Line #	Procedure: "Flower" Transcript
	1	not my specialty.
	2	I would say you need to prepare the soil first.
	3	and if you're um planting from a ah like uh I don't know what they call it a setting or a cutting or something you dig a small hole
	4	set the root ball of the flower in to the soil.
	5	cover bring the soil up to the edges of the stem of the plant.
	6	and your done.
	7	and then water it.
Total	Total C-units Scored	**Average Global Coherence Rating =** **Total Global Coherence Rating / Total C-units scored**

EVENTCAST

Rating	Line #	Eventcast: Birthday Transcript
	1	in this scene we have a uh indoor scene a living room
	2	and uh children are arriving with their parents carrying presents.
	3	evidently it's a birthday cake.
	4	on the table we see a birth- did I say it was a birthday cake?
	5	it was a birthday party.
	6	on the table we see a birthday cake with a huge hole uh bitten out of it.
	7	and we see paws.
	8	we see paw prints leading from the cake across the floor and to a dog who is hiding under the sofa.
	9	the lady of the house looks very mad and is threatening the dog with a broom.
	10	and behind her is the birthday boy crying big tears because the dog has ruined his birthday cake.
Total	Total C-units Scored	**Average Global Coherence Rating =** **Total Global Coherence Rating / Total C-units scored**

RECOUNT

Rating	Line #	Recount: "Last Holiday" Transcript
	1	last Thanksgiving our son who's a single young man lives in San Diego came over to be with us for the week.
	2	and we had tickets on Thanksgiving day for the skybox at the ASU football game.
	3	so we live quite close to the stadium.
	4	we walked over to the stadium and went up to the elevator all the way to the skybox and went into the skybox where they had prepared Thanksgiving dinner.
	5	they had the turkey and the stuffing and the potatoes and the vegetables and the appetizers and the gravy and all the fixings.
	6	it was wonderful.
	7	so we got to watch the football game.
	8	unfortunately ASU lost the game.
	9	but we were with friends and had a wonderful meal and watched the ball game from the skybox.
	10	and I didn't have to cook.
	11	so that was how we spent last Thanksgiving.
Total	**Total C-units Scored**	**Average Global Coherence Rating =** **Total Global Coherence Rating / Total C-units scored**

EXPLANATION OF CORRECT RATINGS

PROCEDURE

Rating	Line #	Procedure: "Flower" Transcript	Explanation
3	1	not my specialty.	Related to main topic (planting flower) but considered an extraneous elaboration as it is not essential to the procedure.
4	2	I would say you need to prepare the soil first.	
4	3	and if your um planting from a ah like uh I don't know what they call it a setting or a cutting or something you dig a small hole.	
4	4	set the root ball of the flower into the soil.	
4	5	cover bring the soil up to the edges of the stem of the plant.	
Not Rated	6	and your done.	Ending comment that does not supply additional content and only proclaims "that's it", "the end" etc. is not rated.
4	7	and then water it.	
Total	Total C-units Scored		**Average Global Coherence Rating = Total Global Coherence Rating / Total C-units scored**
23	6		(23/6) = 3.83

EVENTCAST

Rating	Line #	Eventcast: Birthday	Explanation
3	1	in this scene we have a uh indoor scene a living room	Concrete, not directly related to global topic, "birthday." Tangential to the main topic. Score unnecessary but appropriate elaborations as a 3.
4	2	and uh children are arriving with their parents carrying presents.	
4	3	evidently it's a birthday cake.	
2	4	on the table we see a birth- *did I say it was a birthday cake?*	Tangential with comments on the discourse but some elements of utterance were related to topic (on the table…birthday cake)
4	5	it was a birthday party.	
4	6	on the table we see a birthday cake with a huge hole uh bitten out of it.	The use of "we" is not considered egocentric or tangential because it is generally being used as the subject of the sentence and is not specifically referencing the speaker and someone else.
2	7	and we see paws.	"Paws" is inaccurate thus considered tangential, but *remotely* related to the stimulus. "Paw prints" would have been scored as a 4.
4	8	we see paw prints leading from the cake across the floor and to a dog who is hiding under the sofa.	
4	9	the lady of the house looks very mad and is threatening the dog with a broom.	
4	10	and behind her is the birthday boy crying big tears because the dog has ruined his birthday cake.	
Total	**Total C-units Scored**		**Average Global Coherence Rating = Total Global Coherence Rating / Total C-units scored**
35	10		(35/10 = 3.50

RECOUNT

Rating	Line #	Recount: "Last Holiday" Transcript	Explanation
4	1	last Thanksgiving our son who's a single young man lives in San Diego came over to be with us for the week.	
4	2	and we had tickets on Thanksgiving day for the skybox at the ASU football game.	
3	3	so we live quite close to the stadium.	This is tangential detail about how they spent their last holiday. Score unnecessary but appropriate elaborations as a 3.
4	4	we walked over to the stadium and went up to the elevator all the way to the skybox and went into the skybox where they had prepared Thanksgiving dinner.	
4	5	they had the turkey and the stuffing and the potatoes and the vegetables and the appetizers and the gravy and all the fixings.	
3	6	it was wonderful.	This is tangential to the main topic. Score unnecessary but appropriate elaborations as a 3.
4	7	so we got to watch the football game.	
3	8	unfortunately ASU lost the game.	This is tangential to the main topic. Score unnecessary but appropriate elaborations as a 3.
4	9	but we were with friends and had a wonderful meal and watched the ball game from the skybox.	
3	10	and I didn't have to cook.	This is tangential to the main topic. Score unnecessary but appropriate elaborations as a 3.
4	11	so that was how we spent last Thanksgiving.	
Total	**Total C-units Scored**		**Average Global Coherence Rating = Total Global Coherence Rating / Total C-units scored**
40	11		(40/11) = 3.64

Appendix E: Average Global Coherence Ratings for All Participants

Participant Number	Average Global Coherence Rating	Diagnostic Status
1	3.57	MCI
2	3.95	MCI
3	3.48	MCI
4	3.73	MCI
5	3.75	MCI
6	3.77	MCI
7	3.60	MCI
8	3.78	MCI
9	3.00	MCI
10	3.25	MCI
11	3.16	MCI
12	3.67	MCI
13	3.81	MCI
14	3.90	MCI
15	3.80	MCI
16	3.48	MCI
17	3.91	MCI
18	3.83	MCI
19	3.82	MCI
20	3.81	MCI
21	3.50	MCI
22	3.90	MCI
23	3.53	MCI
24	3.71	MCI
25	2.72	MCI
26	4.00	MCI
27	3.39	MCI
28	3.79	MCI
29	3.55	MCI
30	2.97	MCI
31	2.92	MCI
32	2.73	MCI
33	3.56	MCI
34	3.76	MCI
35	3.50	MCI
36	3.39	MCI
37	3.38	MCI
38	3.79	MCI
39	3.62	MCI
40	2.90	MCI
41	3.81	MCI

42	3.82	MCI
43	3.25	MCI
44	3.75	MCI
45	3.58	MCI
46	2.34	MCI
47	3.89	MCI
48	3.12	MCI
49	3.17	MCI
50	3.93	MCI
51	3.38	MCI
52	3.78	MCI
53	3.48	MCI
54	3.76	MCI
55	3.50	MCI
56	3.78	MCI
57	3.80	MCI
58	3.96	MCI
59	3.94	MCI
60	3.81	MCI
61	3.87	MCI
62	3.75	MCI
63	3.71	MCI
64	3.53	MCI
65	3.60	MCI
66	3.58	MCI
67	3.52	MCI
68	3.70	MCI
69	3.81	MCI
70	3.67	MCI
71	3.32	MCI
72	4.00	MCI
73	3.66	MCI
74	3.21	MCI
75	3.47	MCI
76	6.63	MCI
77	3.32	MCI
78	3.94	MCI
79	3.83	MCI
80	2.80	MCI
81	2.82	MCI
82	2.76	MCI
83	3.25	MCI
84	3.91	AD
85	3.47	AD
86	3.57	AD

87	3.75	AD
88	3.88	AD
89	3.75	AD
90	3.43	AD
91	3.23	AD
92	3.62	AD
93	3.61	AD
94	3.67	AD
95	3.33	AD
96	3.73	AD
97	3.67	AD
98	3.76	AD
99	3.69	AD
100	3.40	AD
101	3.60	AD
102	3.71	AD
103	3.40	AD
104	3.27	AD
105	3.83	AD
106	2.78	AD
107	3.73	AD
108	3.56	AD
109	3.44	AD
110	3.72	AD
111	3.29	AD
112	3.88	AD
113	3.75	AD
114	2.50	AD
115	3.86	AD
116	3.45	AD
117	3.88	AD
118	3.45	AD
119	3.88	AD
120	3.33	AD

Curriculum Vitae

Sydney DiFruscia

EDUCATION

Master of Science in Health and Rehabilitation Sciences, Speech and Language Science	**2021 – Present**

Western University, London, ON
- Presented at the 2022 Health and Rehabilitation Sciences Graduate Research Conference
- Presented in the 2021-22 Speech and Language Science Field Seminar

Bachelor of Arts Honors Specialization in Kinesiology	**2014 – 2018**

Western University, London, ON
- Dean's list 2017-2018, Dean's list 2015-2016

SPEECH-LANGUAGE PATHOLOGY VOLUNTEER EXPERIENCE

Volunteer, Speech-Language Pathology	**December 2019 – August 2021**

Parkwood Institute, St. Joseph's Health Care, London, ON
- Supported Speech-Language Pathologists providing services in the Comprehensive Outpatient Rehabilitation Program, Community Stroke Rehabilitation Team, Acquired Brain Injury and Complex and Continuing Care Programs
- Created individualized patient work, activities for aphasia groups and dysphagia intervention groups, and materials for Acquired Brain Injury's Return to School Program
- Worked with patients in the Complex Care Program to encourage the use of assistive devices, such as voice amplifiers and Alternative Augmentative Communication (AAC) Devices

Volunteer, Elizabeth Skirving & Andrea Jennings, Speech-Language Pathologists	**September 2019 – March 2020**

Fern Speech and Language Services, London, ON
- Assisted with Program for Early Readers and Learning to Connect, a group intervention program for social communication skills
- Acted as the physical prompter for introducing the Picture Exchange Communication System (PECS)
- Worked with children and adults, some with Autism Spectrum Disorder, Down Syndrome, or Adult Disfluency

Volunteer and Shadowing, Cheryl Cameron, Speech-Language Pathologist	**October 2019 – February 2020**

London District Catholic School Board, Sir Arthur Carty Catholic School, London, ON
- Facilitated intervention groups of junior and senior kindergarten students not meeting early literacy expectations to practice and improve phonological and phonemic skills
- Worked with elementary school children, some with Selective Mutism, Autism Spectrum Disorder, or Rett Syndrome

Volunteer and Shadowing, Janaki Kothari, Speech-Language Pathologist (SLP)	**October 2019 – December 2019**

Oxford Speech Plus, Woodstock, ON
- Assisted with reading and spelling intervention for children using the Remediation Plus (R+) Program
- Influenced clients' spelling, sentence formation, and reading; provided documentation of client interactions for the SLP

Job Shadow, Kelly Schaap, Speech-Language Pathologist	**October 2019 – October 2019**

Thames Valley Children's Centre, London, ON
- Observed tykeTALK, a program for children from birth to school age with speech and/or language difficulties
- Interacted with a multidisciplinary team of Speech-Language Pathologists, Occupational Therapists, Physiotherapists, Social Workers, Therapy Assistants, and other healthcare professionals

ADDITIONAL VOLUNTEER EXPERIENCE

Student Volunteer, Student Teaching Assistants, Resource & Supports Program	**September 2017 – April 2018**

Western University, London, ON
- Proctored examinations, role-played patients with assigned conditions, observed, coached, and supported nursing students

Student Volunteer, Dental Outreach Community Service (DOCS) Program	**September 2017 – April 2018**

Western University, London, ON
- Supported a team of dentists, dental students, hygienists, and assistants in their delivery of a program to provide free dental care to low-income families who have no dental insurance

Volunteer and Shadowing	**June 2017 – March 2018**

Dr. Karin Van Ryswyk and Associates Family Dentistry, Dr. Mark Botsford Family Dentistry, London, ON
- Assisted with the day-to-day tasks of a dentist and their team of hygienists, receptionists, and assistants

Rehab Assistant, Fowler Kennedy Sport Medicine Clinic	**January 2016 – August 2016**

Western University, London ON
- Communicated with patients throughout treatment, administered therapeutic ultrasounds and the cold therapy compression system, assisted with patient exercises, and ensured the facility was organized and supplies were stocked

Volunteer Instructor, Autism Ontario	**June 2014 – March 2015**

London, ON
- Instructed children of all ages with Autism Spectrum Disorder in Pin Pals Bowling Program and A League of Our Own Soccer Team while encouraging physical, mental, and emotional development and social communication through sports

Team Member, London Chapter of Tony Robbins' Basket Brigade   **Winter 2013 & 2014**
London, ON
- ☐ Collected donations, packaged, and delivered food hampers for low-income families during the holidays

RESEARCH EXPERIENCE

Graduate Student Assistant   **September 2021 – Present**
Western University, School of Communication Sciences & Disorders, London, ON
- ☐ Transcribe, segment, and annotate spoken discourse audio files from research participants with dementia who participated in the Ontario Neurodegenerative Disease Research Initiative (ONDRI) study
- ☐ Assist the Scientific Director, Dr. J.B. Orange, and the Applied Research Coordinator, Shannon Belfry, in carrying out activities related to funded research projects for the Canadian Centre for Activity and Aging (CCAA)
  - o Participated in poster submission to Parkwood Institute Research Day 2022 and won Best Poster in the Cognitive Vitality and Brain Theme

Student Research Assistant   **October 2020 – September 2021**
Western University, School of Communication Sciences & Disorders, London, ON
- ☐ Completed orthographic transcriptions for the ONDRI study
- ☐ Reported to Dr. J.B. Orange and collaborated with a team of Speech-Language Pathology students to carry out duties assigned

Research Assistant (Volunteer), Dr. Ruth Martin   **September 2020 – August 2021**
School of Graduate and Postdoctoral Studies, Western University, London, ON
- ☐ Reviewed current literature on Speech-Language Pathology involvement with individuals with COVID-19
- ☐ Created mind maps to visually represent our research findings on COVID-19-related speech-language difficulties, such as symptoms, dysphagia, dysphonia, cognitive-communication, and neurological complications

Research Assistant (Volunteer), Dr. J.B. Orange   **June 2020 – August 2020**
School of Communication Sciences and Disorders, Western University, London, ON
- ☐ Completed literature searches related to Speech-Language Pathology in PubMed, CINAHL, PsycINFO, Embase, ORCID, Scopus

WORK EXPERIENCE

Graduate Teaching Assistantship   **September 2021 – Present**
Western University, London, ON
- ☐ *COMMSCI 4411 Introduction to Speech and Language Disorders (Fall 2021 and Fall 2022)*: format lecture content, meet with students to support their learning needs, and grade student assignments
- ☐ *AHCP 9630 Supervised Research Experience (2022-23)*: manage groups for research projects, assist with the implementation of program and projects, and research day organization

Social Media Coordinator   **May 2020 – Present**
Dolcetto Risto, London, ON
- ☐ Curate engaging text, image, and video content to enhance business awareness, promote marketing efforts, and increase sales

Professional Recruiter   **October 2018 – July 2019**
Aerotek, Toronto, ON
- ☐ Executed full-cycle recruitment process including requirement qualification, sourcing, screening, interviewing, reference checks, selecting, and placement of candidates in various positions within banking and financial services
- ☐ Managed contractors by maintaining relationships and administering performance counselling

Business Development Executive   **June 2018 – October 2018**
Generis Group, Toronto, ON
- ☐ Qualified and prospected new leads; built relationships with current clients to generate new business from referrals
- ☐ Collaborated with various lines of business to develop strategies and action plans to serve clients best

Bartender and Server   **May 2015 – September 2017**
The Pub at FireRock Golf Club, Budweiser Gardens, The Ceeps and Barney's Limited, London, ON
- ☐ Delivered comprehensive customer service and communicated with a diverse population in a professional manner
- ☐ Trained new staff and demonstrated leadership skills while delegating duties to a team of servers and server bussers

Lifeguard and Swim Instructor   **May 2013 – September 2014**
The City of London, London, ON
- ☐ Recognized and responded effectively during emergencies and provided first aid when necessary
- ☐ Developed and delivered innovative lessons to introduce new skills while fostering child engagement

CERTIFICATIONS AND SKILLS

- ☐ Standard First Aid CPR-C Certified
- ☐ Languages: English: Fluent, French: Basic