

Constraints on Language:
Aging, Grammar, and Memory

Constraints on Language: Aging, Grammar, and Memory

edited by

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PREFACE

Susan Kemper

A debate about the role of working memory in language processing has become center-most in psycholinguistics (Caplan & Waters, in press; Just & Carpenter, 1992; Just, Carpenter, & Keller, 1996; Waters & Caplan, 1996). This debate concerns which aspects of language processing are vulnerable to working memory limitations, how working memory is best measured, and whether compensatory processes can offset working memory limitations.

Age-comparative studies are particularly relevant to this debate for several reasons: difficulties with language and communication are frequently mentioned by older adults and signal the onset of Alzheimer's dementia and other pathologies associated with age; older adults commonly experience working memory limitations that affect their ability to perform everyday activities; the rapid aging of the United States population has forced psychologists and gerontologists to examine the effects of aging on cognition, drawing many investigators to the study of cognitive aging. Older adults constitute ideal population for studying how working memory limitations affect cognitive performance, particularly language and communication. Age-comparative studies of cognitive processes have advanced our understanding of the temporal dynamics of cognition as well as the working memory demands of many types of tasks (Kliegl, Mayr, & Krampe, 1994; Mayr & Kliegl, 1993).

The research findings reviewed in this volume have clear implications - for addressing the practical problems of older adults as consumers of leisure time-reading, radio and television broadcasts, as targets of medical, legal, and financial documents, and as participants in a web of service agencies and volunteer activities. Older adults are often the recipients of "elderspeak," an insulting and patronizing form of address which is intended to enhance older adults' comprehension (Kemper, 1992; Kemper, Finter-Urczyk, Ferrell, Harden, & Billington, in press); yet elderspeak, by conveying a sense of disrespect, may offend older adults, reducing intergenerational contact and thereby indirectly contributing to older adults' cognitive and social decline (Ryan, Giles, Bartolucci, & Henwood, 1986). Effective strategies for enhancing older adults' comprehension must be developed

which will minimize processing demands without relying on "baby talk." Broadcasts and texts targeted at older adults must be adapted to slower information processing rates and reduced working memory capacity if older adults are to continue to be informed and engaged. The chapters in this volume examine what is known about memory, aging, and grammar in order to better understand how such constraints affect language and communication.

PLAN OF THE BOOK

The contributors to this volume fall into three clusters: (1) Leading cognitive aging researchers with special expertise in language production and comprehension (Kemper, Burke, Kliegl, Stine-Morrow, Waters, Wingfield); (2) Syntacticians concerned with developing performance-based models of language (Frazier and Fanselow); (3) Neuroscientists studying language processing (Gunter, Caplan, Kempler). These researchers adopt a variety of methodological approaches to the study of language processing including psycholinguistic investigations of comprehension and production, psychometric studies of the component processes of reading and of individual differences, neuroimaging studies of linguistic function, and neurolinguistic investigations of pathologies of language. Research populations including young and older adults, older adults with dementia and other age-related diseases, and speakers of English and German.

The first set of chapters draws upon recent research in cognitive aging to consider how language production and comprehension are constrained by aging. Studies of normal aging adults offer a unique opportunity to study the role of working memory in language processes. Each chapter focuses on a different aspect of language processing and explores how the architecture of cognition affects language processing. In Chapter 1, Burke draws upon Node Structure Theory in order to consider how asymmetries in language production and perception can arise from limitations of phonological access. She presents new evidence from experimental and naturalistic studies of verbal fluency, word finding, name retrieval, and spelling that highlight how constraints on phonological access can affect older adults. In Chapter 2, Wingfield and Tun focus on studies of spoken language perception to consider the role of working memory and the role of compensatory mechanisms in language processing. In Chapter 3, Stine-Morrow and Soederberg Miller consider how time as a limited resource can affect older adults' reading comprehension. They use regression techniques to decompose the reading process, discovering how some components may be disadvantaged by slower processing whereas other components of reading may be advantaged by slower processing.

The chapters in Section 2 focus on syntactic processing. Kemper and Kemtes in Chapter 4 review recent research on the effects of working memory limitations on language processing with an emphasis on syntactic processing. In Chapter 5, Waters and Caplan consider whether there are significant individual differences in working memory, how they best might be measured, and the extent to which such individual differences affect on-line language processing. In Chapter 6, Kliegl and his colleagues investigate how syntactic factors interact to affect older adults' processing of complex constructions. Like the other contributors to this section, they argue that

some aspects of language processing are age-invariant whereas others are age-varying. Kliegl et al. also provide a detailed tutorial on alternative experimental paradigms for investigating age invariance in language processing. The contributors in Section 2 identify a mosaic of age-spared versus age-impaired language processes at lexical - sentence - and discourse levels of analysis; age-spared processes appear to be buffered from working memory whereas age-varying processes are dependent on working memory.

The third set of chapters offer insights from contemporary models of syntax. Both contributors seek to define which aspects of language are subject to working memory constraints and which are buffered from working memory limitations. In Chapter 7, Fanselow and his colleagues, working from a Minimalist perspective, consider parallels between formal grammatical theory and the operation of the human syntactic parser. They argue that grammars avoid postulating movement operations in the same way that human parsers do. Drawing upon linguistic arguments as well as experimental studies, they consider the costs of movement operations in both German and English. In Chapter 8, Frazier also draws upon linguistic arguments as well as experimental studies of reading to examine how sentence complexity as well as discourse factors can affect comprehension.

The final set of chapters draws on neuroscience studies of language processing to examine how working memory may be affected by aging and, in turn, affect language processing. In Chapter 9, Kempler and his colleagues draw on comparative studies of healthy older adults and adults with probable Alzheimer's dementia. They show how Alzheimer's dementia selectively impairs semantic processes, including word retrieval and word comprehension, while sparing basic syntactic processes. In Chapter 10, Gunter and his colleagues from the MPI in Cognitive Neurosciences present evidence for age-related working memory limitations on syntactic processing from a study of event-related potentials (ERPs) measured during a sentence reading task. The effects of syntactic complexity on the pattern of ERPs varied with age and working memory capacity, providing further insight into the role of working memory in syntactic parsing. In Chapter 11, Caplan and Waters look at how the use of positron emission tomography (PET) can help to resolve questions concerning the neurological localization of language processing. They suggest that aging may affect language processing at the level of neurological organization and localization. Kliegl and Kemper provide a summary discussion of issues raised by these chapters in their Conclusion.

ORIGINS OF THE BOOK

This book is based on a workshop sponsored by the Merrill Advanced Studies Institute and the Research Training Program in Communication and Aging at the University of Kansas. The workshop was held March 25 - 29, 1998 in Sedona, AZ. Participation was limited to the senior contributing authors (Burke, Wingfield, Waters, Stine-Morrow, Kliegl, Fanselow, Frazier, Gunter, Kempler, and Caplan) plus a small group of students and faculty from the University of Kansas. We thank Mabel Rice, the Director of the Merrill Advanced Studies Institute and University Distinguished Professor, for her support and encouragement, Meredith Porter for her

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