Cognitive Limitations in Aging and Psychopathology

This book examines the major progress made in recent psychological science in understanding the cognitive control of thought, emotion, and behavior and what happens when that control is diminished as a result of aging, depression, developmental disabilities, or psychopathology. Each chapter of this volume reports the most recent research by a leading researcher on the international stage. Topics include the effects on thought, emotion, and behavior by limitations in working memory, cognitive control, attention, inhibition, and reasoning processes. Other chapters review standard and emerging research paradigms and new findings on limitations in cognitive functioning associated with aging and psychopathology. The explicit goal behind this volume was to facilitate cross-area research and training by familiarizing researchers with paradigms and findings in areas different from, but related to, their own.

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Cognitive Limitations in Aging and Psychopathology

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As technological advances lead to more understanding of the brain, or the “hardware” of human thought, the importance of understanding the “software” that is, cognitive functions, has become even more important. There has been progress in the cognitive sciences in understanding the basic processes of cognition and how these processes relate to the operations and behaviors of the organism in the environment. Among the most intensely studied processes are those relating to attention and working memory (e.g., inhibition, updating, and coordination) and higher level cognitive abilities such as planning, reasoning, comprehension, and problem solving, which are attributed to circuits associated with the brain’s frontal lobe. One reason for this accelerating interest is the rapid progress in those areas of cognitive psychology and cognitive neuroscience that focus on working memory and neuroimaging research (Andrade, 2001; Cabeza & Nyberg, 2000; Davidson, Pizzagalli, Nitschke, & Putnam, 2002; Gazzaniga, Ivry, & Mangum, 1998; Logie & Gilhooly, 1999; Miyake & Shah, 1999; Richardson et al., 1996). Another reason for this surge of interest is that many populations, such as older adults (Craik & Salthouse, 2000; Perfect & Maylor, 2000; Rabbitt, 1997), persons with emotional disorders (Hertel, 1997; von Hecker & Sedek, 1999; Williams, Watts, MacLeod, & Mathews, 1997), and individuals with brain injuries (Waltz et al., 1999), have demonstrated cognitive limitations with respect to attention, working memory, and other so-called executive functions.

The significance of these functions is underscored by the wide range of populations in which such impairments have been found and by the areas of specialization within the cognitive sciences in which they have become increasingly important. In this broad interdisciplinary research domain, one might distinguish, on the one hand, basic research fostering the understanding of cognitive processes, and, on the other hand, research fields that combine those recent advances in cognitive psychology with the investigation into individual or group differences. Such individual
differences might be associated with developmental changes such as aging, developmental problems such as reading disability, and psychopathology such as depression and schizophrenia. For example, cognitive aging links the research lines on aging to those on cognitive processes. Similarly, studies in cognitive psychopathology examine emotional, mental, and brain disorders in terms of the underlying basic cognitive mechanisms that are affected in these states. Unfortunately, the literatures in these affiliated fields tend to evolve and progress largely separate from each other, although they share common concepts and objectives and are tightly linked by their central objective to obtain insights into cognitive functions. Explanations of the effects of aging and psychopathology on cognitive performance often make use of concepts from the basic cognitive literature; however, contributors to the two literatures do not often communicate directly with one another. This lack of communication means that insights and information gained from scientists working with one population, or with a particular paradigm, often do little to advance understanding in other closely related areas.

Our experience is that discussions across disciplines provide inspiration that help focus and develop our own understanding and research. The goal of the present volume is to provide such stimulation to others working in the large area of the cognitive sciences. This volume is unique in that it is an original attempt to combine a range of recent research achievements of North American and European teams fostering innovative experimental investigations in the previously mentioned fields. The publication of the volume was motivated by an international, interdisciplinary conference in Kazimierz Dolny, Poland, in autumn 2002, during which most of the chapter authors presented and discussed their work. Unlike larger conferences during which scientists communicate primarily with those working in their own areas of specialization, this conference focused on the presentation and discussion of cutting-edge paradigms and findings from each others’ areas, and listening to the thoughts of “outsiders” regarding one’s own work. The presenters came from different backgrounds with substantial overlap, such as the emotion–cognition link (Elaine Fox, Jutta Joormann, Edward Necka, Grzegorz Sedek), working memory (Randall Engle, Akira Miyake, Klaus Oberauer, James Waltz), social cognition (Miroslaw Koita, Daniel McIntosh, Ulrich von Hecker), and cognitive aging (Elizabeth Maylor, Ralf Krampe, Paul Verhaeghen, Patrick Rabbitt).

The aim of the conference was to bring together scholars from different but intersecting fields in an environment that engendered dialogue and understanding of problems common to the intersecting areas. The beautiful Polish countryside and wonderful Polish food and vodka served to lubricate and stimulate the easy flow of ideas across the participants. In terms of this dialogue, for example, cognitive functioning and adaptation were addressed in the context of basic research on working memory and
in various attempts to understand specific psychological states. Anxiety, depression, older age, or the experience of social stigmatization, to name just a few examples, can change the way we memorize, reason, or make judgments. Conversely, knowledge about these functional changes might again inform theories about working memory and social cognition in general. The speakers at the conference, and mostly the authors of the present volume, focused their contributions on the relation between the allocated amount of attentional resources and particular modes of processing and on how certain patterns of executive functioning may directly characterize certain states, such as anxiety, depression (dysphoria), or activated stereotypes. They also talked about different candidate functions within current models of working memory, such as attention, maintenance, or inhibition, to better understand the mechanisms of how psychological states might affect thinking and judgment.

In an attempt to further strengthen the theoretical and empirical scope of the volume along the lines discussed at the conference, we invited a number of further authors who are leading experts on related fields, but had not been part of our meetings, to share their views and contribute chapters. We are especially delighted to have received enthusiastic feedback to this invitation and thus be able to include Barch and Braver’s chapter on impairments of cognitive control in schizophrenia; Sliwinski, Smyth, Stawski, and Wasylyshyn’s chapter on the relation between stress experience and working memory performance; and West and Bowry’s chapter on cognitive neuroscience methodologies applied to cognitive aging.

Our aim was to produce a work with chapters that meet the highest demands of accuracy and currency within specializations, but that is accessible to scientists and students outside the authors’ specialties. To accomplish this aim, all chapters were reviewed not only by the external reviewers (professionals from the same research field) but also by graduate students who were specialists in areas other than the chapter they reviewed. We believe that those currently working in one area will find the chapters from researchers both inside and outside their area relevant and stimulating. We also believe that students of any of the cognitive sciences will benefit from exposure to both “hot cognition” and “cold cognition” perspectives represented here. We hope readers will find this volume as informative, stimulating, and generative as we found both the conference and the reading of these chapters.

Autumn 2004
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