formance. These findings indicate the potential importance of strategies to the understanding of ability.

In her chapter, "Basic Numerical Abilities," Rochel Gelman argues that "the abilities to count and to do simple arithmetic tasks are natural universal abilities" (p. 202). Her analysis of data suggesting that infants under one year of age can count is most intriguing.

The chapter, "Individual Differences in Attention," by Earl Hunt and Marcy Lansman, provides a new look at ability through the window of attention. In this chapter, the authors make important conceptual and methodological contributions to the study of the allocation of attention. The chapter makes a case for the interpretation of individual differences in ability in terms of attention and attention allocation.

Arthur Jensen's chapter, "The Chronometry of Intelligence," discusses strong relations between IQ and reaction time data as measured in four experimental paradigms. Jensen hopes that such research can lead to a biologically based theory of individual differences.

The volume also contains a chapter by John Frederiksen, "A Componential Theory of Reading Skills and Their Interactions"; a chapter by James Pellegrino and Robert Kail, "Process Analysis of Spatial Aptitude"; a chapter by Peter Polson and Robin Jeffries, "Problem Solving as Search and Understanding"; and a final chapter by Sternberg, "A Componential Approach to Intellectual Development."

Sternberg has done an excellent job in assembling and editing this volume. As the first in a series, it sets a very high standard. I, for one, am looking forward to the second volume in the expectation that Sternberg will do it again.

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Visual Information Processing

By Kathryn T. Spoehr and Stephen W. Lehmkuhle. San Francisco: W.H. Freeman, 1982. 298 pp. $22.50.

This very readable text nicely summarizes the sense and substance of the information processing approach to vision. Although the book occasionally includes previously undefined jargon, it will generally be quite accessible to students with a minimal background in psychology, and at the same time it will be of interest to more advanced students looking for a fairly broad summary of an eclectic field. The text stays agreeably close to the literature with over 300 references, and there is an apt mix in the description of models and data. Furthermore, the authors have paid off one of the promissory notes described in their preface—to provide a look at the process as well as the product of the research enterprise (although they occasionally missed a salient opportunity to expand on some of the more clever experiments in the literature).

Another of the promissory notes remains unpaid in full. The authors indicated that they intended to bridge "the conceptual gap between the study of the visual system at the sensory level and more cognitive approaches" (p. ix). However, they include only one chapter and small parts of others concerned explicitly with sensory mechanisms (chap. 2). This seems to us too little coverage to justify the authors' interdisciplinary claim.

After the chapter on sensory mechanisms, the authors present a traditionally organized discussion of pattern recognition models and their difficulties in chapter 3, along with a clear and up-to-date section on pattern recognition by machine. Then the reader is properly introduced to a further set of variables that affect recognition processes, those pertaining to organizational effects. This discussion, in chapter 4, includes not only the obligatory description of gestalt principles, but also more current developments concerning the separability of stimulus dimensions and empirical assessments of organizational effects.

We turn, then, to two chapters that contain much of the empirical substance in the information processing literature. Chapter 5 reviews evidence that supports the construct of iconic memory, and it provides some discussion, although a bit scant and noncommital, of the locus for this memory. This chapter also details the data and models of detection and visual search performance. Chapter 6 takes up the empirical tale for word recognition. There is extensive coverage of many well-known phenomena, such as the word-superiority effect, and there is a careful survey of various hypotheses to account for these phenomena. The chapter concludes with a brief review of word recognition as influenced by sentence context.

The authors then delve into a quite different set of topics concerned with the representation and processing of complex visual information. Chapter 7 reviews the facts and theories about perception and memory for pictures and faces. The coverage of relevant topics here is quite complete. There is discussion of variables that affect information extraction from pictures viewed both naturally (or as naturally as psychologists will permit) and tachistoscopically. A discussion of memory for pictures ensues, some of which builds nicely on the perceptual data. Finally, there is a review of some major phenomena relevant to processing faces, a review that is marred only by its brevity and by the somewhat tacked-on discussion of hemispheric specialization. Chapter 8 is a suitable companion to this whole chapter, being concerned with the mental representation of visual information. It consists largely of a review of various imagery phenomena such as the effect of imagery (as an independent variable) on memory, mental transformations of images, and individual differences in susceptibility to imagery. The chapter concludes with a discussion of cognitive maps as representations, and with a brief (thank goodness) recital of alternatives to an imagery theory.

The final chapter is an anomaly. It is a description of five phenomena that have had considerable play in the experimental literature (the Stroop effect, letter-matching, sentence verification, word and picture recall, and

the vulnerability of eyewitness testimony). Although the authors try to motivate the chapter with some talk about these phenomena all being representative of interactions between the visual and verbal systems, their discourse did not persuade. Instead, we had the impression that the authors simply could not find a better place to describe these interesting phenomena. This is a shame, actually, since there were some reasonably natural fits earlier in the text.

There are two appendixes after chapter 9, one on signal detection theory, and one on reaction time analysis. Although each appendix is constructed competently, the one concerned with reaction time is a bit thin given the widespread use of latency as a dependent variable. It includes only a cursory summary of the subtractive method and of additive factor logic.

The authors have gathered together a widely cited body of literature that should certainly form a substantial portion of the study of cognitive processes. But we wonder what part of the core is represented here. What is the referent of the title? One possibility that suggests itself from examining the first portion of the book is that it refers to any internal transformation and analysis of visual input, regardless of how this input is eventually represented or used. Another possibility, reflected in the later chapters, is that the term refers to any process that acts on information represented in a form similar to its physical structure. This latter interpretation helps to explain why the authors largely ignored such topics as reading comprehension (e.g., eye movement studies of reading). Perhaps if the authors included an explicit discussion of the sense of the term "visual information processing," readers would be better able to evaluate the material and, better still, to know what was left out.

Our other major dissatisfaction with the text concerns transitions. To be sure, chapters are not tied together well, but we suspect that this has to do with the schizophrenic nature of the topic. In any case, most instructors will violate the bound order of the chapters to suit their own preferences. Our major complaint is that transitions between sections *within* a chapter are often weak. Consider, for example, the first sentences of a new section on picture perception:

> Subjects in the memory studies cited in the preceding section were allowed to study the stimulus pictures for several seconds apiece. In this section, we consider whether subjects can extract enough information for good recognition performance when significantly less time is allowed for viewing and whether performance is a function of viewing time or a function of the number of eye fixations the subject makes during the allotted viewing time. (p 174)

We know that the work of Potter, Loftus, and Tversky (the contents of this section) had better motivation than this. Perhaps the poor quality of transitions such as this results from the attitude that experiments motivate themselves and related experiments. We prefer to think that texts should be organized so that *issues* are the motivation, with appropriate experimental results the vehicle.

Be that as it may, Spoehr and Lehmkuhle have organized a fine set of core material in cognition. This text will serve students well.

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History of Academic Psychology in Canada

Edited by Mary J. Wright and C. Roger Myers. Toronto: C. J. Hogrefe, 1982. 260 pp. $19.80 paper.

As stated in the preface, "it was decided that the focus should be on those universities in which doctoral programs in psychology had been developed before 1960." A questionnaire sent to all departments of psychology in Canada revealed that the 12 departments listed below met this criterion. A member of the faculty of each department wrote its history for this book.

An introductory chapter gives a brief history of the ethnic groups that settled Canada and a chronology of the founding of the 12 universities covered in the book. This is followed by Part I, "The English Universities of Eastern and Central Canada." After an introductory overview, there are chapters on Dalhousie (by F. Hilton Page and James W. Clark), McGill (George A. Ferguson), Toronto (C. Roger Myers), Queen's (James Inglis), Western Ontario (Leola E. Neal and Mary J. Wright), and McMaster (P. Lynn Newbigging). We learn that the first laboratory on British soil was founded at Toronto by James Mark Baldwin in 1889. Psychology departments separate from those of philosophy first occurred at Toronto and McGill in the 1920s. No other university took this step until the 1940s. The Canadian Psychological Association was founded in 1939.

Part II, "The French Universities of Central Canada," has an overview, then chapters on Ottawa (Anthony Paskas and Joseph DeKoninck) and Montreal (Luc Granger). Part III, "The English Universities of Western Canada," has an overview and chapters on universities at Manitoba (Morgan W. Wright), Saskatchewan (Gordon A. McMurray), Alberta (Thomas M. Nelson), and British Columbia (Donald C. G. MacKay).

Part IV, "The Great Expansion of the 1960s," first summarizes the great expansion of Canadian institutions of higher education in the post–World War II decades. The province of Ontario grew from 5 to 15 such institutions in a short time. Brief coverage is then given to newer institutions in each of the provinces: Newfoundland and Prince Edward Island each have 1 university; Nova Scotia, 4 besides Dalhousie; New Brunswick, 4; Quebec, 5 in addition to McGill and the University of Montreal; Ontario, 10 besides Ottawa, Queen's, Toronto, McMaster, and Western; Manitoba, 3; Saskatchewan, 2; Alberta, 3; and British Columbia, 3.

Religious and ethnic factionalism continue in Canada. There are English speaking and French speaking universities. There are more institutions in some provinces than their small populations warrant, again because of fac-