Chapter One INTRODUCTION

No disorder of childhood has generated more interest or prompted more controversy than severe and pervasive reading disorder in otherwise normal children, commonly referred to as developmental dyslexia or specific reading disability.[1] Indeed, in addition to concerned parents and other members of the lay public, reading disability has attracted the attention of researchers and practitioners alike, and much of the interest is due to the pioneering clinical studies of Samuel Torry Orton (1925, 1937). Orton, whose ideas are still influential, has imbued dyslexia with a certain exotic quality, manifested most prominently in the popular belief that children so afflicted literally perceive letters backward and frequently reverse them in their printing and writing, for instance, calling *b, d* or *was, saw.* Such inaccuracies, typically viewed as curious manifestations of brain malfunction, were said to be the result of spatial confusion caused by a maturational delay in hemispheric dominance for language. Letter reversals, in fact, occupied a central role in Orton's conceptualization of reading disability and have long been offered as the primary support for this and other perceptual deficit explanations.

Orton's theory of dyslexia is prototypical in that it exemplifies the basic process models that have been postulated in the literature concerned with the etiology of reading disability. The majority of those theories hold that the difficulty arises because of dysfunction in visual perception, presumably associated with neurological disorder. Maturation and lateral dominance problems are commonly inferred in such instances, although some accounts make reference to structural or functional deficits associated with

brain lesions, genetic predispositions, and various other types of neuropathology.

Not all basic process theories indict the visual system, however. Three that have achieved prominence in recent years earmark inferred dysfunction in integrating information from the sensory systems, in remembering things in their correct order, and in processing verbal information. The intersensory deficit theory has gained in popularity since Birch's (1962) initial treatment of the subject; it is now second only to visual deficit explanations. And although practitioners have for some time assumed that poor readers may support a select deficiency in serial order recall, only in recent years have attempts been made to formalize this point of view (Bakker 1972) or to explore its parameters in laboratory study.

Theories that implicate dysfunction in verbal processing as a basic cause of reading disability have had less currency over the years. This is somewhat paradoxical, considering that reading, by definition, entails the coding of one's natural language and would therefore seem to require intact linguistic ability. Of late, however, a number of investigators have become adamant in their insistence that reading is primarily a linguistic skill (cf. Kavanagh and Mattingly 1972), a claim that in my opinion has considerable validity. This view has led to more active exploration of the possibility that specific reading disability is caused by deficiencies in one or more aspects of linguistic functioning, but studies investigating this possibility have appeared only within the past decade. Thus, research in this area is of a seminal nature.

Recognizing the likelihood that dysfunction in a process as complex as reading is caused by a variety of factors, several investigators have proposed that more than one type of basic process disorder may lie at the root of a reading disability (Birch 1962; Myklebust and Johnson 1962). Typical suggestions have included deficits in all the major subsystems involved in reading, but dysfunction in either the visual or the auditory modality has been implicated most often. This point of view issues largely from clinical observation and has not yet been well documented in laboratory study.

Although competent researchers have recently become more actively invested in the study of dyslexia in young children, most descriptions of the disorder are based either upon clinical studies

and informal observations or upon loosely designed experimental contrasts that have typically yielded equivocal and conflicting results. Furthermore, most existing accounts have not meticulously defined the behavioral correlates of the basic process deficits advanced in explanation of dyslexia, nor has there been any comprehensive or systematic attempt to critically analyze research findings and the theories from which they emanate. Such analysis is necessary, not only to evaluate and integrate results in the literature but, more important, to facilitate the framing of coherent, better defined, and more plausible theories of reading disability than most currently available and to develop more effective educational programs for correction and prevention of the problem.

Accordingly, this volume constitutes a detailed review and critical evaluation of the major conceptualizations of the etiology of dyslexia that have appeared in the literature. It focuses primarily on the ones already mentioned, because they have either been the most influential of those available or are currently becoming more prominent. The primary purpose is to examine the theoretical foundations of these conceptualizations, closely scrutinizing their logical consistency, their empirical validity, their ability to account for and integrate conflicting results, and their overall productivity. A special effort is made to discuss the methodology and conclusions drawn from the studies reviewed, as well as to analyze and detail their conceptual bases.

Because descriptions and definitions of the behavioral components of given process disorders described in the literature have not always been clear-cut, primary emphasis is placed upon the immediate, or psychological, correlates of specific reading disability rather than on ultimate, or neurological, correlates. In all instances, the analyses and critiques of particular findings and theoretical positions rely exclusively upon contrasts of overt and measurable behaviors; inferences about underlying etiologies, such as brain dysfunction, genetic predispositions, and so on are minimized.

The reader should be forewarned, however, that the discussion of respective theories of dyslexia and of empirical findings extending from those theories is not without bias. That is, I have for some time been skeptical of traditional conceptualizations of reading disability, in particular, of the predominant view that the disorder is caused by deficiencies in visual perception. Indeed,

much of my own research has directly evaluated this hypothesis, and I have come to the conclusion that most visual deficit theories of reading disability qualify as little more than pseudoproblems and might better be discarded. I have also found reason to doubt the intersensory and serial deficit theories. In these instances my concern has issued from theoretical, methodological, and interpretive contraindications and, in the case of the serial deficit theories, from lack of definition as well.

On the other hand, my own laboratory studies and practical experience, the research of independent investigators studying normal and abnormal reading and language abilities, and some degree of intuition strongly suggest that a most promising but relatively unexplored avenue for additional study inheres in the possibility that specific reading disability is caused either by dysfunction in verbal processing or by a specific deficit in visual-verbal integration. I am inclined to agree with those who contend that reading is primarily a language-based skill, as illustrated in the fact that three of the five types of featural information contained in a printed word (graphic, orthographic, semantic, syntactic, and phonological) correspond with the major components of language. Thus the ability to learn to read would appear to be especially vulnerable to deficiencies in one or more of these linguistinc functions, though perhaps not in equal measure.

The ideas presented here are thoroughly discussed in the pages that follow. Particular emphasis is placed on the alternative conceptualizations of dyslexia, with systematic review and evaluation of the evidence for each. Inasmuch as my colleagues and I have been actively involved in research on various aspects of the theories to be discussed, I will generously refer to results of several of our own studies, integrating our findings with the results of others when indicated.