PART I

GENERAL INTRODUCTION

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Motivation for This Book

In their course, Brain, Mind, and Behavior (a required course for students who major in pre-med at a private four-year liberal arts college in the United States), Alexander received an A, whereas Ashley barely achieved a passing grade. What could have accounted for these contrasting results? Did the course instructor's teaching style favor male students? Was the mode of assessment more suited to Alexander's personality? Was Alexander more motivated? Did Ashley not work hard enough? Was Ashley feeling out of sorts during her final examination?

What are often assumed to be differences in students' knowledge of course material may be nothing more than differences in intellectual styles – that is, individuals' preferred ways of taking in and processing information (Zhang & Sternberg, 2005). For example, in the aforementioned case, Alexander may have a style that is conducive to performing well in multiple-choice tests, whereas Ashley may have a style that enables her to excel in individual research projects. In this case, if Alexander and Ashley were both evaluated solely on their performance on multiple-choice tests, Alexander would have a considerable advantage over Ashley.

The chapter-opening example is hypothetical. However, when examining the relationships between learning performance and intellectual styles of final-year medical school students in South Africa, Gledhill and van Der Merwe (1989) discovered precisely the phenomenon portrayed here for male and female test takers. Similarly, in their research on the performance of students in a business school, Hedlund, Wilt, Nebel, Ashford, and Sternberg (2006) identified the same gender bias. When the multiple-choice Graduate Management Admission Test was used to evaluate students' academic achievement, males had a substantial advantage; when a supplementary, essay-based test was used, females had a sizable advantage; and when both kinds of tests were adopted, males and females performed

roughly equally well. This suggests that different modalities of testing may well lead to different results for males and females and, indeed, for different individuals, largely because different modalities of testing call for different intellectual styles.

Although the field of intellectual styles has a history of eight decades, until recently it was constantly struggling with its identity due to several major challenges. One of the long-standing challenges was that there was no clear definition of the style construct, given that styles can easily be mistaken for either abilities or personalities. Another challenge was that, although there were an enormous number of style labels accompanied by a vast number of style measures, there was no common language or conceptual framework within which work on styles could be understood. Still another challenge was the fact that there was little contact between work in the field and the larger context of psychology, education, and business. As a result, there was little understanding of how intellectual styles were related to the literature on education, psychology, and business (see Zhang, 2013 for details). Last but not least, the field was challenged by at least three long-standing controversial issues concerning the nature of intellectual styles, which are introduced in more detail in the next part of this chapter.

The last two decades, however, have witnessed a revival of interest in the study of styles in both academic and nonacademic settings. This renewed interest has led to the production of innovative theoretical frameworks and empirical studies. For example, Sternberg (1997) constructed his theory of mental self-government, which examines people's thinking styles. As another example, Grigorenko and Sternberg (1995) classified the large number of style labels into three traditions in the study of styles: cognition centered, personality centered, and activity centered. Styles in the *cognition-centered tradition* bear a strong resemblance to abilities in that, as is the case with an ability, having more of a style can be better than having less. Moreover, like abilities, styles in this tradition (e.g., reflective vs. impulsive styles proposed by Kagan, 1965a; field-dependent vs. field-independent styles by Witkin, 1962) are assessed by tests of maximal performance with "right" and "wrong" answers. The *personality-centered tradition* views styles as similar to personality traits. Additionally, like personality traits, styles in this tradition (e.g., the career personality styles constructed by Holland, 1966; the personality styles by Jung, 1923) are evaluated by tests of typical, as opposed to maximal, performance. The *activity-centered tradition* considers styles as mediators of activities involving both cognition and personality (e.g., learning approaches theorized by Biggs, 1978; learning orientations by Entwistle, 1981).

As a final example, Zhang and Sternberg (2005) proposed the Threefold Model of Intellectual Styles – based on both theoretical conceptualization and empirical evidence – which facilitated dialogue among scholars in the field and set in motion an explicit discussion about the nature of intellectual styles, particularly with respect to three long-standing controversial issues over the nature of intellectual styles (again, see the next part for a detailed discussion). In this model, Zhang and Sternberg (2005) classified all style labels, with or without the root word "style," into three types: Type I, Type II, and Type III intellectual styles. Type I styles are more creativity generating, denote higher levels of cognitive complexity, and are considered to possess more adaptive value because they are strongly related to desirable human attributes such as favorable personality traits and higher levels of psychosocial development. Type II styles suggest a norm-favoring tendency, denote lower levels of cognitive complexity, and are perceived to carry less adaptive value because they are strongly associated with undesirable attributes such as unfavorable personality traits and lower levels of psychosocial development. Type III styles may manifest the characteristics of either Type I or Type II styles, and their adaptivity varies because the ways in which these styles are related to other human attributes are largely inconsistent. In the styles literature, if a style's adaptivity varies, the style is said to be value differentiated (see Zhang & Sternberg, 2006).

More than a decade has passed since Zhang and Sternberg's (2005) classification of the three types of intellectual styles. Would this classification be supported by the outcome of a systematic review of the literature? In this book, I address the issue of style value further by examining a wide range of research findings.

The aim of this chapter is to set the scene for the rest of this book. The remainder of the chapter is composed of three parts. The first introduces three controversial issues concerning the nature of intellectual styles and concludes with justifications for writing this book. The second explains the motivation behind this book. The final part of this chapter describes the general methodology used to search the literature, introduces essential style constructs that generated the literature to be reviewed, and sets out the structure of the book.

THREE LONG-STANDING CONTROVERSIAL ISSUES

As noted earlier, in the *Threefold Model of Intellectual Styles*, Zhang and Sternberg (2005) comprehensively discussed three long-standing controversial issues concerning the nature of intellectual styles: (1) whether

styles are different constructs or similar constructs with different labels (commonly referred to as the issue of "style overlap"); (2) whether styles are traits or states (normally referred to as the issue of "style malleability"); and (3) whether styles are value free or value laden (widely recognized as the issue of "style value"). In what follows, each of these three issues is recapitulated. The purpose of this part is to demonstrate that, while the issues of both style overlap and style malleability have been well addressed in the existing literature, the issue of style value has not.

Are Styles Different Constructs or Similar Constructs with Different Labels?

Many style labels have been used in the literature, and each time a literature review has been conducted with the aim of presenting a clearer picture of the available style terms, the number of style labels has grown larger. For example, a review conducted by Hayes and Allinson (1994) suggested that there were 22 cognitive style dimensions. Five years later, Armstrong (1999) concluded that there existed 54 style dimensions, which he classified under the umbrella term "cognitive style." In 2009, Evans and Waring noted that there was a "bewildering library of style measures (over 71 theories of styles)" (p. 172).

Are these style labels related? For instance, if one prefers to use a Type I intellectual style such as the deep learning approach (Biggs, 1978) in a learning context, does one also tend to adopt a Type I intellectual style such as the innovative decision-making style (Kirton, 1976) in the workplace? Such questions have presented challenges not only to laypeople who are curious about the notion of styles but also to scholars in the field of intellectual styles and those in allied academic fields of inquiry (Messick, 1984; Riding & Cheema, 1991).

In *The Nature of Intellectual Styles,* Zhang and Sternberg (2006) clarified this issue by synthesizing the then-existing literature. On the basis of empirical data, they affirmed that the various styles overlapped irrespective of the fact that each of the style labels (and their corresponding measures) had been proposed independently. At the same time, however, they found that the shared variance between any of the two style dimensions examined generally ranged from 20% to 60%, which suggested that a substantial portion of the variance in the data could only be explained by the unique characteristics of each of the individual style dimensions concerned. Zhang and Sternberg (2006) therefore concluded that, although different style constructs overlapped across theories to varying degrees, each style construct

possessed its unique characteristics. At the conceptual level, Zhang and Sternberg recounted major scholarly efforts aimed at providing clearer definitions of styles, integrating style labels, and proposing more inclusive style terms (see Zhang & Sternberg, 2006 for details).

Subsequently, other scholars (e.g., Evans & Waring, 2009; Renzulli & Sullivan, 2009; Sadler-Smith, 2009) endorsed Zhang and Sternberg's (2006) stance that different style constructs overlap, but that each has its own space in relation to others. One could say that, because researchers have generally reached a consensus on the issue of style overlap, a continuing dialogue on this issue does not seem to be urgent.

Are Styles Traits or States?

Are styles inborn, hence representing traits? Or can styles be modified, therefore representing states? Answers to these questions have led to the second long-standing controversial issue regarding the nature of intellectual styles – style malleability. Some scholars, especially earlier ones in the field (e.g., Kagan & Moss, 1963; Miller, 1987; Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954), believed that styles represented traits and were therefore stable. Other scholars, especially those during and since the 1980s (e.g., Curry, 1987; Grigorenko & Sternberg, 1995; Zhang & Sternberg, 2006), considered styles to be similar to states and therefore changeable. At the same time, the literature has reported changes in the views of some scholars. For example, in their final major publication, Witkin and Goodenough (1981) revised their earlier view that field-dependent/independent styles could not be changed. By 2009, the view that styles are modifiable had become prevalent. Such a view was best reflected in the dialogues that occurred among the contributors in Zhang and Sternberg's (2009a) edited book *Perspectives on the Nature of Intellectual Styles*. However, much of the discussion in that book was conducted merely at the conceptual level, and much more research evidence demonstrating that styles could indeed be changed was still needed. Moreover, some scholars (e.g., Coffield, Moseley, Hall, & Ecclestone, 2004a, 2004b; Jablokow & Kirton, 2009) firmly held the position that styles are not modifiable. Given these conflicting views and the demand for empirical evidence, it became imperative that a comprehensive and systematic review of studies on style malleability be undertaken.

I took on this daunting task in my book, *The Malleability of Intellectual Styles* (2013). By critically analyzing research findings derived from both cross-sectional and longitudinal investigations performed during a period

of more than seven decades, I demonstrated that intellectual styles could be modified through both socialization and purposeful training. I proposed further research avenues that scholars could take to understand further the nature of intellectual styles. In the closing section of my book, I alluded to the heuristic value of the findings reviewed in the book for developing adaptive intellectual styles in both academic and nonacademic settings. Obviously, this call for the development of adaptive intellectual styles was based on the assumption that some styles are more adaptive (thus, more valued) than others; however, such an assumption must be substantiated with a coherent body of empirical evidence.

Are Styles Value Free or Value Laden?

As just noted, whether some styles are better than others (i.e., styles are value laden) or simply different (i.e., styles are value free) has yet to be determined on the basis of a solid body of research evidence. For a long time, many scholars have held the belief that different styles are neither better nor worse than each other but simply different (e.g., Witkin et al., 1954; see also Kozhevnikov, 2007). At the same time, other scholars have asserted that for many styles, such as the field-independent/dependent styles and the reflective-impulsive styles, this belief does not hold true. In this regard, Kogan (1989) used convincing examples to support his argument that styles had never been considered value free. He pointed out, in terms of Witkin's notion of field dependence/independence (FDI), that style training programs had tried to make individuals more field independent rather than more field dependent. He further noted that similar considerations held even more strongly in the case of reflective versus impulsive styles in that all training efforts had been directed at boosting the reflective style. Positive characteristics associated with the impulsive style, however, had yet to be shown.

In 2006, Zhang and Sternberg presented research evidence derived from studies based on style constructs other than FDI and reflectivity-impulsivity. Like Kogan (1989), Zhang and Sternberg argued that most styles (i.e., Type I and Type II styles) are largely value laden and, every so often, some styles (i.e., Type III styles) could be value differentiated, but that styles could not be value free. Since then, other researchers, in discussing styles, have argued in favor of Kogan's (1989) and Zhang and Sternberg's (2006) assertion that styles are value laden (e.g., Evans & Waring, 2009; Kaufman & Baer, 2009; Renzulli & Sullivan, 2009; Sadler-Smith, 2009; Zhang & Sternberg, 2009a, 2009b).

At present, it would be accurate to state that researchers generally agree that styles are not value free but are value laden or, at the very least, value differentiated. However, within this common understanding, scholars' views differ as to whether Type I intellectual styles are superior to Type II intellectual styles or vice versa, thus resulting in divided views on which types of styles should be encouraged. For example, Kaufman and Baer (2009) articulated the advantages of Type I styles over Type II styles. Likewise, Zhang and Sternberg (2009b) advocated the cultivation of Type I intellectual styles based on the findings of their review of studies rooted in Sternberg's construct of thinking styles. Similarly, Sadler-Smith (2009) noted that much education and training was directed more toward the development of the analytic mode (a Type II style) than toward the intuitive mode (a Type I style) of information processing and argued that the intuitive mode should not be ignored. In contrast to the aforementioned scholars, however, Jablokow and Kirton (2009) maintained that too much importance had been placed on Type I styles. Can Type I styles be overemphasized? Is there a critical body of literature that systematically demonstrates the superiority of Type I styles over Type II styles?

FURTHER MOTIVATION FOR THIS BOOK

Certainly, the renewal of interest in styles work over the last couple of decades has led to significant achievements in the field. Nonetheless, two types of problems

remain. One concerns criticisms of the notion of intellectual styles on the part of the academic community and the general public, and the other pertains to the need for a coherent and convincing account of the issue of style value. The remainder of this part is divided into two sections: The first highlights major criticisms of work on styles and provides an analysis of these criticisms, and the second presents the rationale for an in-depth analysis of work on style value.

Criticisms and Responses to Criticisms

Despite the abundant literature showing the critical roles of intellectual styles in various domains of human learning and performance, the style construct has every so often been challenged by trenchant critiques. The intention of these critiques seems to have been to "undo or discount . . . style as a meaningful construct or to discredit its purported indicators as measures of something else entirely, such as intellective ability" (Messick,

1994, p. 131). Indeed, each of the critiques is severely biased and profoundly illogical.

For example, several authors (Jones, 1997; McKenna, 1983, 1984; Richardson & Turner, 2000; Zigler, 1963) have discounted the FDI construct as a style construct for the simple reason that performance on the Embedded Figures Test tends to be associated with tasks that call for visual disembedding. However, such a judgment is rather hasty. The overlap of one construct with another does not warrant the discrediting of either construct because each construct still possesses its own unique characteristics, and each explains a different phenomenon. In fact, scholars (e.g., Kogan, 1983) have long recognized that individuals' cognitive styles necessarily overlap with their problem solving and general intellectual functioning. In the case of McKenna's (1983) criticism, for instance, one should note that in the very same article in which he contended that measures of FDI should be regarded as ability measures, McKenna (1983) cited the work of Turner, Willerman, and Horn (1976), who had found a substantial overlap between the independence personality trait (Cattell, 1969) and the Wechsler Adult Intelligence Scale. Why should such an overlap cause Cattell's personality trait measure to be regarded as an ability measure? Obviously, it should not (see also Sternberg, 2015).

As another example, after reviewing merely eight style concepts and their measures, Tiedemann (1989) expressed his disillusionment with the notion of styles: "At the moment, nobody can claim that cognitive styles do not exist. But life is short, and so my personal opinion on the state of research into cognitive styles has to be: There is no point in chasing a chimera!" (p. 273). However, as Messick (1994) has pointed out, throughout his review, Tiedemann mistook style measures for style constructs. Furthermore, Tiedemann rejected some concepts (e.g., cognitive complexity vs. simplicity) as style constructs because they are value directional, yet, as will be discussed in the next section, and, indeed, as will be shown in the next seven chapters (Chapters 2 through 8), the majority of styles are value directional.

Another attack on styles work was launched by Coffield and his colleagues (Coffield et al., 2004a, 2004b) at the University of London. In their critique, Coffield and colleagues were dismissive of the relevance of styles for education. Although the critique was not without its merits in that it did raise some valid and important points, including some of the challenges mentioned earlier in this chapter (see also Zhang, 2013), it had serious shortcomings. Rayner (2007), for example, pointed out that the critique had adopted a fundamentally flawed review methodology.

It had traversed different paradigms in evaluating the styles literature at different stages of the review, and it had made use of secondary sources in arguing that the majority of style measures lacked rigor. Another shortcoming of the critique was that, in criticizing the field of styles as "fragmented, isolated, and ineffective" (p. 136), Coffield and colleagues largely ignored the progress that the field had made in the previous three decades. Most notably, at the time when the authors were preparing the report, at least four major attempts (Curry, 1983; Grigorenko & Sternberg, 1995; Miller, 1987; Riding & Cheema, 1991) had been made to bring together the fragmented body of literature. Nevertheless, these achievements were not considered in the critique.

Yet another flaw in the critique was that, in questioning the relevance of styles to education, Coffield and colleagues contended that individualized instruction was difficult and perhaps even unnecessary. However, Coffield and his co-workers quite simply missed the point about the relevance of styles to education. No one would seriously go so far as to ask teachers routinely to change their teaching style to accommodate the learning style of every single student in each class. Besides, students have a repertoire of learning styles that they may deploy depending on the stylistic demands of a specific situation or task. This aspect of the critique is the subject of a classic debate in the field of styles: the debate over the "matching hypothesis," which claims that individuals learn best when they are taught with teaching styles that are most suited to their own learning styles. Indeed, constant criticism has been leveled at the so-called matching hypothesis," as in the next critique.

In 2008, a critique by a group of American psychologists (Pashler, McDaniel, Rohrer, & Bjork, 2008) appeared in *Psychological Science in the Public Interest*. In this critique, the authors asserted that because there is no sufficient empirical evidence supporting the so-called matching hypothesis, style assessments should not be incorporated into general educational practice. However, as pointed out by Sternberg (2015), in formulating their critique, Pashler and colleagues used a very small sample of studies. In fact, their firm conclusion was ultimately not based on any research. The reason for this was that for a study to be included in Pashler and colleagues' review, it had to meet a set of criteria (see Pashler et al., 2008, p. 105) so stringent that practically all studies were ruled out. Moreover, the authors mistakenly equated a selected number of what Grigorenko and Sternberg (1995) called "activity-centered" styles (e.g., learning styles as conceptualized in the popular VAK – visual, auditory, kinesthetic learning style model) with the entire body of style theories and research.