A reflection on the future of the cognitive style field: a proposed research agenda

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ABSTRACT

The aim of this article is to build further on previous suggestions for the advancement of the style field by focusing on six critical issues in the area of the theory, measurement, and practical relevance of cognitive styles. Summarising these critical issues, it is suggested that it is necessary to (1) provide conceptual clarification by situating cognitive styles in the individual differences field, (2) develop an overarching, contextualised individual differences model, (3) conduct longitudinal, contextual research designs to find the origins of cognitive style, (4) search for fundamental cognitive style dimensions in the myriad of cognitive style models, (5) evolve from self-report questionnaires to multi-source, multi-method approaches, and (6) bridge the relevance gap by different approaches of knowledge creation and knowledge dissemination. On the basis of an overview of past and present work, an agenda for future research in the field of cognitive styles is proposed. Ideally, cognitive style research should evolve towards 'pragmatic science', which combines high theoretical rigour with high practical relevance.

INTRODUCTION

Education, management and organisational behaviour researchers are concerned with examining individual differences in respect of their impact on people in various educational and work settings (D'Amato & Zijlstra, 2008). One of the factors studied in this context are cognitive styles, which have been defined as the way people perceive stimuli and how they use this information to guide their behaviour (i.e., thinking, feeling, actions) (Hayes & Allinson, 1998). Cognitive styles have been studied from various points of view and different authors developed their own assessment instruments (Coffield et al., 2004; Hodgkinson & Sadler-Smith, 2003). Researchers have found that cognitive style differences influence perception, learning, problem solving, decision making, communication, interpersonal functioning, and creativity in important ways (Hayes and Allinson, 1994; Kirton, 2003; Sadler-Smith, 1998).

From his strategic review of the field, Riding (2000) concluded that research on cognitive styles had reached the stage to focus on four interrelated critical issues for the further successful development of the concept:

(1) identifying the fundamental cognitive style dimensions within the wide range of style labels;
(2) developing simple, valid, and direct cognitive style measures that are suitable for worldwide use;

(3) clearly situating cognitive style in the context of other individual differences and developing a model on how the various constructs interact in affecting behaviour; and

(4) establishing clear relationships between cognitive style measures and objectively observable behaviour in diverse settings.

According to Curry (2006), the advancement of the field can be established by three related approaches:

(1) conceptual clarification in the bewildering array of definitions and conceptualisations of the style concept;

(2) clear demonstration and accumulation of the validity and reliability of measures to indicate that they meet minimum standards for use and interpretation; and

(3) continuous attention for the relevance of the field for practice by providing answers to the 'so what?' question.

By focusing on six critical issues, the aim of this paper is to build further on the previously mentioned key aspects for the advancement of the field. On the basis of an overview of past and present work, useful avenues for future research in the field of cognitive styles are suggested.

ISSUE ONE: TOWARDS CONCEPTUAL CLARIFICATION TO SITUATE COGNITIVE STYLES

Many concepts have been introduced in theory and research on style differences, such as cognitive style, learning style, thinking style, or intellectual style (Coffield et al., 2004; Kozhevnikov, 2007; Zhang & Sternberg, 2006). Irrespective of specific approach or theory, the term style usually refers to a habitual pattern or preferred way of doing something (Grigorenko & Sternberg 1995). The focus lies on the cognitive style concept in this article.

Both Riding (2000) and Curry (2006) identified conceptual clarification of cognitive style in the context of other individual differences as a key issue for the advancement of the field. Hodgkinson and Sadler-Smith (2003) asserted that the main contribution of the cognitive style construct lies in its ability to bring notions of information processing and personality together. According to Sternberg and Grigorenko (1997, p. 701), cognitive styles represent "a bridge between what might seem to be fairly distinct areas of psychological investigation: cognition and personality". Researchers have investigated cognitive styles in relationship to various concepts, such as ability, personality, and affect.

Link between cognitive style and ability

The relationship between cognitive styles and abilities has been the subject of continuous debate among cognitive style researchers (Armstrong, 2000; Furnham, 1995). Riding and Rayner (1998) referred to style and ability as the two major characteristics that are studied in the context of individual variations in cognitive processing. Cognitive styles are considered to be unrelated to ability in general (Mudd, 1996; Riding & Rayner, 1998).

Abilities have been characterised as (1) value directional (i.e., having more of an ability is better than having less), (2) enabling (i.e., facilitating task performance in particular areas), and (3) domain specific factors. Cognitive styles have been described as (1) value differentiated (i.e., particular cognitive styles have adaptive value under specified circumstances), and (2) organising and controlling variables (i.e., contributing to the selection, combination, and sequencing of the content and process, and regulating the direction, duration, intensity, range, and speed of functioning), (3) which cut across domains (Messick, 1994). Although cognitive styles and ability are considered to be independent, some studies have found a relationship between certain cognitive style measures and ability (Allinson & Hayes, 1996). It might be useful for future research to investigate the possible moderating effect of type of task on the cognitive style–ability relationship (Armstrong, 2000). Moreover, other aspects, such as motivation, strategies to learning, social work context, dyadic matching, or prior experience, may also affect the relationship between cognitive styles and ability (Armstrong et al., 2004). Hence, building a more complex model to investigate the link between cognitive style and ability can contribute to enhanced knowledge about their interrelation.

Link between cognitive style and personality

Personality is another construct that is often studied in relation to cognitive styles. Personality can be defined as "the relatively stable set of psychological attributes that distinguish one person from another" (Moorhead & Griffin, 2004, p. 91). Cognitive styles and personality are considered to be independent, but related constructs that together affect behaviour. Researchers differ in how they see this relationship. Riding and Wigley (1997) argued that behaviour is a combination of the level of a particular personality source, plus or minus the component due to cognitive styles that may either add to or decrease the effect of personality elements. According to Kirton (1994), behaviour that stems from cognitive styles is an expression of stable personality dimensions. Early researchers within the cognitive style field referred to a 'personality space', a conceptual space in which key bridging components of personality and cognitive style are situated (Kirton and de Ciantis, 1986). This conceptualisation implies that not all personality aspects will be related to cognitive styles; only some key elements that constitute the personality space will be. Further research that clarifies the physiological basis of the underlying mechanisms of the 'personality space' is needed.

Link between cognitive style and affect

Another issue to consider when situating cognitive styles in relation to other individual differences is the link between cognitive style and affect. Affect can be described as an umbrella term encompassing the broad range of feelings people experience, covering both emotions and moods (Barsade & Gibson, 2007). According to Tullett and Davies (1997), the interrelationship between cognition and affect is central to our understanding of human behaviour. There is currently no comprehensive model that integrates both the cognitive and non-cognitive processes that are involved in emotion activation, problem solving, and decision making (Messick, 1996). The question is: is possible that there is a kind of 'affect space', a conceptual space in which key bridging components of cognitive style and affect are situated? Just like there seem to be some consistent links between particular cognitive

styles and particular personality characteristics in various studies (the 'personality space') (Allinson & Hayes, 1996; Kirton, 1994; Riding &Wigley, 1997), there might be similar links between cognitive style and affect. Furnham (1995), for instance, also supposed that cognitive styles have an influence on emotional life (i.e., the kind of feelings people are likely to experience and their intensity, how people cope with emotion, and what factors arouse emotions). Messick (1994) saw cognitive styles as bridging cognitive, affective, and social domains of functioning. Further research on this conceptual 'affect space' is particularly relevant.

Proposition 1: Many assertions are made concerning the relationship between cognitive style and ability, personality, and affect respectively, but further research is needed on each of these links to stimulate conceptual clarification.

ISSUE TWO: TOWARDS AN OVERARCHING INDIVIDUAL DIFFERENCES MODEL

Scholars agree that various individual characteristics affect how people behave and perform, but how these characteristics interact is less obvious. Grigorenko and Sternberg (1995) already called for more systematic research on the link between cognitive styles, abilities, and personality traits to clarify the overlap and distinction between these concepts. Several researchers attempted to develop some kind of overarching model that situates different concepts in relation to one another (Furnham, 1995; Riding & Rayner, 1998; Sadler-Smith, 1998). Although these studies found interesting linkages between cognitive styles and other psychological constructs, the wide range of results still did not come together to form a single, comprehensive picture (Armstrong & Rayner, 2002; Rayner, 2006). Similar to studies that attempted to empirically test the interrelations between the layers (i.e., instructional preference, information-processing style, cognitive personality style) of Curry's (1983) onion model (e.g., Sadler-Smith, 1999), a useful first step might be to bring several of these concepts (i.e., cognitive style, ability, personality, affect) together in one research design and see how each of the concepts in interaction with the other ones contributes to clarifying people's behaviour and performance. When choosing measures to assess each of these concepts, it is crucial to choose models and instruments that are validated in various cultures and contexts, as this is a prerequisite to validly apply concepts in diverse settings (Gelfand et al., 2002).

Importantly, it is also highly valuable that researchers in the development and empirical testing of an overarching model consider the influence of the wider context. Johns (2006) called for taking context into account when studying human behaviour as context elements can have subtle and powerful effects on research results. How people behave in learning environments, their job and organisation does not only depend on their cognitive style, but also on environmental factors and the interaction between their style and environmental conditions. Many empirical studies in cognitive style research were concerned with investigating fit or congruence in particular situations (e.g., Armstrong et al., 2004; Priola et al., 2004; Sadler-Smith, 1999). These studies, for instance, examined the impact of style (dis)similarity within interpersonal relationships, the effects of homogeneous versus heterogeneous cognitive-based teams, the consequences of cognitive fit or misfit in terms

of functional differences and work demands, or the influence of matching or mismatching people in training and education situations. It is not possible to draw general, straightforward conclusions about whether fit or misfit is the best option in each of these congruence studies as the particular context played an important role to clarify the findings. Hence, it is important to integrate the context in the research design, measurement, and analyses of future cognitive style studies. Importantly, in the light of 'bridging the relevance gap' (see issue six), this also implies specifying in the resulting research reports or articles in what context the findings apply and how the results can be used in educational and organisational practice. It is, for instance, not enough to conclude that style differences impact on learning behaviour, but the research also needs to stipulate in which specific circumstances this was (not) the case and how educators can effectively use the results in their teaching practice.

Proposition 2: To advance the cognitive style field, future research should continue the development and empirical testing of an integrated individual differences model that takes the wider context into account.

ISSUE THREE: TOWARDS CONTEXTUAL, LONGITUDINAL RESEARCH MODELS TO FIND THE ORIGINS OF COGNITIVE STYLE

An unresolved issue within the cognitive style field is that of the origin of cognitive styles. Are cognitive styles biologically based, the result of early learning, neither, or both? In other words, to what extent can cognitive styles be influenced by external factors (e.g., culture, education, social environment)? Furnham (1995) stated that determining the aetiology of cognitive style is important because it implicates how and how much a cognitive style may be changed. Most theorists claim that cognitive styles are stable, pervasive, and consistent across different areas of cognitive functioning (Sadler-Smith, 1998). People tend to retain their dominant preferences throughout various educational, work and social situations. Test-retest studies on the stability of cognitive style scores and comparisons between cognitive style scores before and after training sessions confirmed the stability of cognitive styles (Clapp, 1993; Murdock et al., 1993), however more recent studies have questioned the stability of certain types of cognitive style (Kozhevnikov, 2007). The question is then: do cognitive styles stabilise (assuming that they do), which ones stabilise and when? To find an answer to this question, a longitudinal approach seems warranted in which the cognitive development of people is followed from birth to adulthood (Riding & Rayner, 1998; Tullett, 1997; Tullett & Kirton, 1995).

Moreover, although cognitive styles are generally considered to be fairly fixed, relatively in-built features of people, researchers found that it is possible for individuals to process information and behave in ways that are not consistent with their habitual approach (Hayes & Allinson, 1994). The concept of cognitive strategy has been used to refer to these specific behaviours people use to cope with particular situations and tasks outside their natural preferences. This distinction between cognitive style and cognitive strategy derived from the apparent contradicting views concerning the stability versus malleability of cognitive styles (Coffield et al., 2004; Riding & Cheema, 1991). The question remains unanswered as to where cognitive strategies come from and how and when they arise.

Longitudinal, contextual, cross-cultural research designs can significantly increase our understanding in this respect.

Proposition 3: The further development of the cognitive style field can benefit from longitudinal, contextual, and cross-cultural research designs which may contribute to increased knowledge about the origins of cognitive styles, the potential external forces that have an impact on cognitive style development, and the interplay between cognitive styles and cognitive strategies.

ISSUE FOUR: FROM A MYRIAD OF MODELS TO THE FUNDAMENTAL COGNITIVE STYLE DIMENSIONS

The literature on cognitive styles is extensive, but also fragmented and this may undermine the viability of the concept for academics and practitioners (Hodgkinson & Sadler-Smith, 2003; Kozhevnikov, 2007). According to Cassidy (2004), this is due to the large amount of research, the diversity of disciplines and domains in which these studies are conducted, and the varied aims of different studies. Coffield et al. (2004) identified 71 cognitive/learning style theories and models in a field review, and earlier Curry (2000) identified over 100 cognitive or learning style instruments. This diversity resulted in conceptual fragmentation and incomparable results. Riding (2000) suggested that cognitive style research should recognise and confirm the fundamental cognitive style dimensions within the extensive body of style labels. Several authors have already attempted to create order by integrating and categorising different cognitive style theories (Cassidy, 2004; Coffield et al., 2004; Desmedt &Valcke, 2004).

Beside these theoretical works, some scholars have also attempted to get a grip on the diversity of the field by including several cognitive style instruments simultaneously in empirical studies (e.g., Edwards et al., 2002; Leonard et al., 1999). This way, they hoped to identify fundamental cognitive style dimensions on the basis of the common factors within the different models. Different scholars stated that an important advancement of the field would lie in relating cognitive style measures developed by one investigator with those used by other investigators. Hence, several theoretical and empirical works have addressed the key issue to identify fundamental dimensions in the field through their 'meta-focus' beyond one particular model. However, these works have not yet lead to universally accepted cognitive style dimensions.

Proposition 4: Future theoretical and empirical work in the cognitive style field should continue the search for the fundamental cognitive style dimensions through the development of knowledge networks and the comparison of several cognitive style models. One way to achieve this could be the further establishment of particular Research Interest Groups (RIGs), as suggested by Rayner (2008).

ISSUE FIVE: FROM SELF-REPORT QUESTIONNAIRES TO MULTI-SOURCE, MULTI-METHOD APPROACHES

Different ways of measuring cognitive styles have evolved, ranging from laboratory-based tests, to the use of perceptual tasks, physiological assessments, computer-based instruments, and paper-and-pencil tests (Armstrong & Sadler-Smith, 2006). As cognitive style research stems from the psychometric tradition, cognitive styles have mostly been studied with quantitative research methods, with the majority taking the form of self-report measures. Self-report inventories have the advantage of being an easy and practical way of collecting information on people's cognitive styles. A potential weakness of using self-report measures is that people can unduly influence the results. Therefore, two potential avenues for future research are (1) making use of other-ratings beside self-reports including the use of brain imaging technology on the one hand and (2) using different methods to study cognitive styles on the other hand.

Multi-source approach

It can be an interesting additional source of evidence to assess people's cognitive styles from the perspective of others. Co-learners/workers are in a unique position to provide valuable cognitive style assessments for two reasons (Berr et al., 2000). On the one hand, they are often affected by the consequences of the focal person's actions. On the other hand, they can observe his or her behaviour over time and in a variety of situations. Multi-source evidence on cognitive styles can be highly valuable given the increased use of peer evaluations in educational settings and of 360 degree feedback sessions in organisations (Buttner et al., 1999). A key question also arises as to how one's own style impacts on one's assessment of another's style.

Multi-method approach

The last decade has seen an increase in the use of mixed-method studies. In adopting a mixed-method approach, the strengths of quantitative and qualitative research strategies are combined, which gives researchers the unique opportunity to strengthen their conclusions (Bachiochi &Weiner, 2002). The cognitive style field can significantly increase its credibility and relevance towards practice by more extensive use of qualitative research methods in addition to the large body of available quantitative research. Priola et al. (2004) also call for methodological triangulation in the field to enhance the understanding of the complex phenomenon of people (with different cognitive styles) behaving in particular environments.

Proposition 5: To further advance the cognitive style field, scholars should strive towards multiple sources of data and a mixture of qualitative and quantitative research methods as this can significantly enhance the insights about cognitive style differences and strengthen the validity of findings.

ISSUE SIX: BRIDGING THE RELEVANCE GAP THROUGH DIFFERENT APPROACHES OF KNOWLEDGE CREATION AND DISSEMINATION

After touching on the five previous issues, it is clear that the field of cognitive styles is characterised by a lack of a coherent or consensual theory (Armstrong & Rayner, 2002; Rayner, 2006). According to some scholars, however, so much energy has been devoted to developing such a theory and criticising each other's theories that the real world seemed to be forgotten (Coffield et al., 2004; Curry, 2006). Hodgkinson et al. (2001) addressed the need for a shift towards pragmatic science, which combines high theoretical rigour and high practical relevance. Optimally, research is of high academic quality and of high relevance to users (Van de Ven & Johnson, 2006; Vermeulen, 2007). Hence, taking a functional perspective in style research is important. Armstrong and Rayner (2002) called for a paradigm shift in the field and emphasised the importance of filling the 'relevance gap'. This implies, for instance, not developing an overarching individual differences model or searching fundamental cognitive style dimensions just for the sake of doing it. Keeping in mind the practical relevance is equally important in this process. In this respect, some relevant criteria to assess the rigour and relevance of cognitive style research are provided in the Appendix.

Several authors developed theories to conceptualise the gap between theory and practice and made suggestions to bridge it. To create useful knowledge for practitioners, researchers need to bridge some of the assumptional differences that characterise knowledge creation and knowledge utilisation activities in research and in practice. With regard to different approaches of knowledge creation, Starkey and Madan (2001) suggested that the formation of knowledge networks can align the needs of researchers and practitioners. These knowledge networks involve the practitioners from the beginning of the research process (e.g., formulating the research agenda, choosing the topic and mode of research), making sure dissemination of research findings takes place as an integral part of the actual research process. Joint knowledge creation by academics and practitioners is not intensive enough yet to enhance the relevance and usefulness of cognitive style research. Another important element in knowledge exchange is the ability of practitioners to use the knowledge that is transferred. Starkey and Madan (2001: S12), for instance, formulated following writing advice: "Authors who strive to craft relevant articles for practitioners need to focus on the concerns of practice, provide real value to professionals, and apply a pragmatic rather than academic tone. Ideally, they should also describe how the ideas discussed or actions suggested would be implemented in practice, allowing for contextual differences that are important to different readership communities."

Proposition 6: In addition to theoretical rigour, the practical relevance of cognitive style research should be enhanced by taking a pragmatic reflex in style research and by focusing attention on reliability, validity, and practical relevance in the design of research and in the process of inquiry.

A POTENTIAL AGENDA FOR FUTURE STYLE RESEARCH

To conclude, the issues previously discussed and our proposed suggestions need to be brought together in a potential future research agenda for the field of cognitive styles in general (see Figure 1).

With regard to theoretical advancement, the cognitive style field can take advantage of building networks of cognitive style scholars. A multidisciplinary approach can also help to overcome the fragmented perspective of many studies in the field. Developing a joint research agenda needs to start with clearly defining what cognitive styles are and what differentiates them from other concepts, and with making an overview of what is already known about the impact of cognitive styles in education, psychology, management, and organisational behaviour and which areas are still unexplored. Several recent reviews in the cognitive style field also called for (1) investigating the contribution of different cognitive style models on the basis of extensive reviews and meta-analyses on the one hand, and (2) examining the validity, reliability, and practicality of cognitive style measures for use in educational and organisational contexts on the other hand (Armstrong & Sadler-Smith, 2006; Cassidy, 2004; Coffield et al., 2004; Rayner, 2006).

Curry *Riding*	THEORY		MEASUREMENT		PRACTICAL RELEVANCE	
IDENTIFY FUNDAMENTAL DIMENSIONS	*Knowledge networks of cognitive style scholars*		*Research with various cognitive style measures simultaneously*		*Attention for knowledge dissemination to practitioners*	
DEVELOP SIMPLE, VALID & DIRECT MEASURES	*Scrutinise existing cognitive style measures*		*Develop an overarching instrument*		*Research in environmental settings*	
SITUATE COGNITIVE STYLES	*Develop overarching theory*		*Longitudinal designs*		*Provide relevant, contextualised, and concrete practical implications*	
LINK WITH OBSERVABLE BEHAVIOUR	*Interdisciplinary research teams*		*Multi-method approach* *Multi-source approach*		*Joint networks of scholars and practitioners*	

Figure 1:   A research agenda for future cognitive style research

In the area of measurement, evolving towards longitudinal studies in natural settings that make use of multiple methods and multiple sources seems crucial. Additionally, using several cognitive style measures simultaneously can lead to interesting perspectives and potentially even to the identification of fundamental cognitive style dimensions and to the development of an overarching cognitive style measure.

Finally, to further bridge the relevance gap and to evolve in the direction of pragmatic science (i.e., high scientific rigour combined with high practical relevance), different approaches of knowledge creation and knowledge dissemination need to be considered. Building joint networks of researchers and practitioners can be worthwhile in this regard. Joint international multidisciplinary research teams, such as the previously mentioned idea of creating RIGs (Rayner, 2008), can both stimulate the theoretical advancement of the field and increase its relevance to practice. According to Rayner (2008), the RIG approach is aimed at "realising further integration and application of theories of knowledge management, educational and organisational psychology and a pragmatic research methodology for use in style research" (p. 95).

CONCLUSION

Understanding why people act the way they do considering the interplay of a vast array of factors in educational and business settings is essential if we are to enhance capacity for life-long learning and associated independence in learning. However, understanding and predicting learning and human behaviour remains a challenge as many factors influence the interaction between people and situations. Many scholars have tried, with various methods and approaches, to find the ultimate way to do so. Furnham and Springfield (1993, pp. 827-828) even compared it with the search for the Holy Grail: "The search for personality [individual differences] correlates and determinants of organisational behaviour (success and failure) has a lot in common with the search for the Holy Grail. However, the search has been very long standing, full of myths and legends, and largely unsuccessful". Tett and colleagues (2000) also concluded that the complexity of managerial and organisational behaviour poses various challenges on those who attempt to predict, regulate, and understand it and the same could be applied to educational settings.

But the difficulties to find the Holy Grail may not prevent us from seeking it. Or, like Furnham (1995, p. 411) wrote: "A pessimist might argue that despite 50 years of research into cognitive/learning styles, we still know precious little if the above questions have not been answered or even attempted. An optimist, though, might be impressed by the research effort that has gone into this topic, by the proliferation of ideas, and by the evidence already accumulated." Let's conclude with an optimistic note. Taking into account the proposed research agenda in further work can help us – cognitive style scholars and practitioners – to come one step closer in our search for understanding the impact of cognitive style differences on human behaviour, attitudes, and educational performance. Hence, the search goes on…

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Criteria to evaluate the rigour of models and instruments [a]	
Theoretical specification	Does the model have a reasonably complete, well-specified, and internally consistent style theory that is connected with the existing body of research?
Reliability	To what extent is the instrument accurate in measuring whatever it measures?
Internal validity	Is the underlying structure of the data as predicted by the theory (using factor analysis or some other method of internal analysis to check this)?
Convergent validity	Does the style instrument correlate with other measures with which, in theory, it should correlate (e.g., other cognitive style instruments)?
Discriminant validity	Does the style instrument not correlate with other measures with which, in theory, it should not correlate (e.g., ability)?
Criterion-related validity	Does the style instrument show links with objectively observable behaviour in such a way as predicted by the theory (e.g., link with occupational choices)?

Criteria to evaluate the practical relevance of cognitive style research [b]	
Descriptive relevance (meaningfulness)	Are the research findings accurate in capturing phenomena encountered by practitioners in real life?
Goal relevance	Do the outcome variables in the research correspond with things practitioners wish to influence?
Non-obviousness (innovativeness)	Does the research meet or exceed the complexity of common sense theories that are already used by practitioners?
Operational validity (actionability)	Is it possible for practitioners to implement the practical implications of the research?
Timeliness Cost of implementation	Are the research findings available to practitioners in time to use it to deal with problems? Are the suggested solutions feasible in terms of their costs?

Note. [a] These criteria were developed on the basis of following works: Riding (2000), Sadler-Smith (2001), and Sternberg and Grigorenko (1997). [b] These criteria for practical relevance are based on the work of Thomas and Tymon (1982) and Shrivastava (1987).

Appendix 1: Criteria to assess the rigour of cognitive style models and instruments, and to evaluate the practical relevance of cognitive style research