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Fields of the Mind: An Integral Learning Styles Component of the E&L Cognitive Styles Construct

**BETTY LOU LEAVER
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1. Background

The E&L Cognitive Styles Construct was developed in 1997¹ and copyrighted in 2002 by Ehrman, director of the Research, Evaluation, and Development Division at the Foreign Service Institute (FSI), and Leaver, then an associate at the National Foreign Language Center. It was developed in order to organize the proliferation of validated cognitive styles into a single instrument with ten easy-to-understand subscales specifically for the field of foreign or second language (L2) learning and teaching (Leaver 1997, 2000;² Ehrman and Leaver 2002). The first two subscales, which relate to *FIELDS OF THE MIND*, however, have often created confusion or misunderstanding among users. This article clarifies these dimensions through deconstruction of the category of *FIELD INDEPENDENCE/FIELD DEPENDENCE* (henceforth *FIELD [IN]DEPENDENCE*), together with an examination and elucidation of the intrinsically related and intersecting category of *FIELD SENSITIVITY/FIELD INSENSITIVITY* (henceforth *FIELD [IN]SENSITIVITY*).

Fields of the mind—the individual tendency toward field dependence, field independence, field sensitivity or field insensitivity—have been among the most researched cognitive styles.³ They have

¹ The term E&L, standing for Ehrman and Leaver, was meant as a placeholder, not a formal name for the construct. Before a name could be assigned, however, colleagues began using the construct, referring to it as the E&L, and a new name was never proposed. In fact, while it has always been clear that E&L stands for Ehrman and Leaver, the construct has never been referred to by the authors' names nor copyrighted other than as E&L.

² Leaver (1997) is the first mention of the ectenic and synoptic overarching categories in print.

³ The fields of the mind subscales of the E&L Cognitive Styles Construct are a fitting topic for this memorial volume because of Dr. Olga Kagan's abiding fascination with learning styles. They served as an essential part of her dissertation, which saw print in the form of the teaching methods book, *Учимся учить* (Akishina and Kagan 2002).

spawned an extensive literature in cognitive psychology—the discipline in which they originated—as well as in numerous other disciplines. Application of fields to L2 learning was referenced in the applied literature no later than 1978 (e.g., Birchbickler and Omaggio 1978) and continues to be the topic of both applied and theoretical articles.

Nevertheless, fields of the mind continue to be poorly understood and therefore poorly exploited in L2 learning. There is as yet no consensus on the definition and theoretical framework of the field concepts vis-à-vis L2 learning or on parameters and guidelines for their effective exploitation, and there is little to suggest that their exploitation is being broadly promoted and tracked.

There are a number of interdependent reasons for this state of affairs. First, the literature related to fields in L2 learning has proceeded at a modest pace (Dörnyei and Ryan 2015). Second, many L2 specialists are unfamiliar with the basic concepts on which the fields depend (including the definition of a field), as these emanate from the research experience of an external discipline—cognitive psychology—with which most L2-learning specialists share little common frame of reference.

A critical weakness in the particular field construct which has been predominant in the literature until the present has tended, furthermore, to undermine understanding of the basic concepts on the part of those who critically examine them. The problem derives from the conflation of two aspects of cognition: perception (specifically, locus of COGNITIVE CONTROL in perception) and process (specifically, COGNITIVE MANIPULATION). This approach has led to the incorrect view of field (in)dependence as a bipolar, equipollent category, each pole of which has its own positive definition.

This conflation of perception and process leads to incorrect predictions and untenable models that lend themselves to justifiable criticism. The problem, however, is not in the viability of the underlying insights concerning fields, but rather in their articulation.

Uncertainty in a number of other respects has also tended to undermine confidence in the field construct(s). One of these respects is uncertainty as to the status of fields as a matter of style versus ability, intelligence, and personality. This in turn creates further uncertainty as to the scope of effective implementation and its purpose. Finally, there has been a paucity of practically oriented literature that would demonstrate

the many ways in which awareness of fields can be effectively exploited to enhance the L2-learning process and experience.

The absence of definitive solutions to these issues has inevitably had an impact on the understanding and exploitation of fields in the service of L2 learning. Enthusiasm has been further damped by the rise of a movement that explicitly denies the relevance of fields or, more generally, any cognitive style construct to L2 learning or, indeed, any educational program. Some researchers appear inclined to oppose the concept of learner individuality on bases other than “abilities and prior knowledge” (Willingham, Hughes, and Dobolyi 2015, 269).

A further contributing factor has been the absence of follow-up to earlier crucial contributions aimed at resolving the above issues. Dörnyei and Ryan (2015), in particular, note that the E&L (Leaver 1997; Ehrman and Leaver 2002),⁴ which had shown considerable promise when first described, had not been widely used subsequently, in part because of the limited availability of the instrument.⁵

The present article seeks to ameliorate the current state of affairs in the following manner. Section 2 provides diachronic context by surveying the origin and development of the field concepts. Within this section, we define the concept of “fields” as it relates to field (in)dependence and (in)sensitivity. Section 3 provides synchronic context for understanding fields through an introduction to the E&L, of which fields are an integral component. Section 4 contains a focused discussion of fields within the context of the E&L. Section 5 includes a brief response to several critiques of the E&L’s approach to fields. Finally, Section 6 introduces readers to the range and manners of effective exploitation of fields for L2 learning. In the context of a journal article, this section will necessarily be limited to the identification of basic categories and a limited number of examples. Full exemplification of the practical potential for exploitation of the field concepts must await a book-length exposition (Corin and Leaver 2019).

⁴ The E&L Cognitive Styles Construct Questionnaire V. 3 and Self-Scoring Grid are available at <https://sites.google.com/view/fom-supplement/home>, see scannable QR code in the Appendix.

⁵ This was due to the severe limitations on publishing by both of the authors of the E&L, due to their positions at US government institutions during subsequent years. Nevertheless, the E&L was validated at the FSI and widely deployed with thousands of students enrolled in US government language programs from 2002 to the present day.

2. Diachronic context

2.1. *Origin of the field concepts*

The field (in)dependence construct originated during the 1940s as an attempt by cognitive psychologist Herman Witkin and his collaborators to test competing hypotheses concerning the perceptual basis by which people determine upright (i.e., vertical to the ground) orientation of objects.⁶ One hypothesis held that perception of the upright is determined primarily on the basis of internal (vestibular or gravitational) cues. According to the other hypothesis, upright orientation is determined primarily on the basis of visual cues from the surrounding VISUAL FIELD (i.e., the environment visible to the subject).

Through experimentation, Witkin and his collaborators established a more nuanced result. For one thing, they found variation among individuals along a continuum between polar opposite manners (or levels) of performance. These differences, moreover, were consistent for a given individual over a variety of tests and relatively stable for that individual over time (Asch and Witkin 1948a, 1948b; Witkin 1949). They determined this by placing subjects in an experimental setting in which they viewed a tilted visual frame or “field” (a three-dimensional room or a two-dimensional rectangular frame that was objectively tilted out of vertical orientation in relation to the ground). They then asked subjects to orient an object (e.g., a straight rod) into a position objectively vertical to the ground while viewing the tilted visual field. In such a situation, almost all subjects oriented the rod at a tilt to the ground under the influence of the visual field. These persons came to be known as “field dependent” (i.e., dependent on the visual field for determining upright orientation). A smaller number of subjects based their determinations on internal (vestibular or gravitational) cues. These subjects oriented the rod or other object at much less of a tilt, in some cases close to true upright orientation. These persons came to be known as field independent—that is, independent (relatively independent would be more accurate) of the visual field in determining upright orientation.

Even during their early work, Witkin and his collaborators had asked themselves whether the ability to act independently of the visual field in determining upright orientation might arise out of a broader

⁶ A brief and highly readable summary of the development through Witkin’s death in 1979 is presented by Goodenough (1986).

ability to deal with any given field analytically (that is, to perceive a part of a field independently of its surroundings; Witkin 1949). Field thus came to be interpreted more broadly, as the environment or context in which some other action or situation occurred.

2.2. Conceptual expansion and conflation

What all aspects of field independence had in common was the ability to separate out relevant components of some environment (field) and manipulate them independently of one another. Field-dependent persons, in contrast, perceived and acted upon the environment (field) as an undivided entity. It was in this way that a conflation of perception (cognitive control) and process (cognitive manipulation) came to characterize the definition and interpretation of field independence.

Parallel to the positive definitions of field independence vis-à-vis field dependence cited above, it was noted that this opposition also related somehow to personality or social behavior. In this latter area, field dependence was correlated with its own set of positively defined and, in many respects, beneficial characteristics that balanced against the apparent abilities associated with field independence.⁷ Generally speaking, “field-dependent people tended to have an interpersonal orientation and field-independent people an impersonal orientation,” deriving from a tendency to rely primarily on external referents or on the self in psychological functioning (Witkin, Goodenough, and Oltman 1979, 1131).

The conflation of perception with process, together with the identification of positively defined characteristics of field dependence that were complementary to those associated with field independence, thus reinforced the view of field (in)dependence as an equipollent, bipolar stylistic continuum.

2.3. Style versus ability

Researchers’ insistence on field (in)dependence as a style rather than ability was strengthened by demonstrating the malleability of the styles—the view that training can help people with one style to develop certain strategies associated with the other (e.g., Witkin, Goodenough, and

⁷ See Asch and Witkin (1948a, 1948b) and Witkin (1949). Witkin and Goodenough (1977) provided an extensive literature review on field dependence and interpersonal behavior.

Oltman 1979). This view was further buttressed by establishing that field (in)dependence was closely correlated with cultural and socio-economic factors reflecting divergent patterns of socialization in early childhood (Witkin, Goodenough, and Oltman 1979).

This development led to a paradox. On the one hand, field (in)dependence was determined through tests of ability (to determine upright orientation or to disembed simple shapes from within more intricate surrounding patterns in the Embedded Figures Test). On the other hand, a range of other factors led researchers to see field (in)dependence as the two poles of a continuum of cognitive processing style, rather than of ability. This dichotomy of view has never been fully resolved, and it now appears that elements of style and ability may both be involved (Ehrman 1996).

Despite the efforts of researchers to paint a value-neutral picture of field (in)dependence, there appears to have been a broad popular understanding of field independence as a desirable characteristic correlated with greater achievement. The available tests for field independence had, after all, been designed as tests of ability.

2.4. L2 learning applications

The view of field independence as an ability (or at least as a skill) correlated with higher learning achievement appears to have carried over into early applications to L2 learning (Birchbickler and Omaggio 1978; Hansen and Stansfield 1981, 1982), with some researchers concluding that field independent learners exhibited higher learning achievement (Chapelle & Roberts 1986) which reflected the kinds of strategies and success evinced by studies on “the good language learner.”⁸ Field dependence, in contrast, was viewed at least implicitly as a limiting factor for which remedial techniques might be applied.⁹

Hansen and Stansfield, however, suggested that research indicating greater L2 learning achievement by field-independent students might be skewed by the very design of curricula. In so doing, they were reflecting an insight enunciated earlier by Ramirez, Herold, and Castañeda

⁸ Some of the better-known work on “the good language learner” was published at about this time by Stevick (1990); Rubin and Thompson (1994); and Naiman, Fröhlich, and Stern (1996)

⁹ This is indicated, for example, by the references to field dependence in Birchbickler and Omaggio (1978, 337–38).

(1974) and Witkin, Moore, Goodenough and Cox (1977) in regard to general education. “Since the social and interpersonal communicative abilities linked to field dependence do not seem helpful, perhaps the latter are not being demanded in any important way in the classroom. That is, linguistic acuity and manipulative skill may still be given more significance in texts, class activities, and assessments than social and interpersonal communicative competence” (Hansen and Stansfield 1982, 272). Certainly, the grammar-translation methods present in nearly all classrooms of the 1970s and early 1980s¹⁰, in which these studies were done, with their presentation of decontextualized grammar and expectation for memorization of decontextualized vocabulary, would tend to privilege field-independent learners.

Conversely, the emerging concepts of COMMUNICATIVE LANGUAGE TEACHING (Savignon 1972), alternatively referred to as communicative approaches, would theoretically privilege learners able to make use of the field, not those who easily extracted information from it. The new paradigm thus provided impetus for the de-conflation of the perception (cognitive control) and process (cognitive manipulation) aspects of cognition, which led to recognition of the distinct category of field sensitivity.

It was within this context that Ehrman (1996) overtly challenged the bipolar model of field (in)dependence. Ehrman noted that the term “field dependent” in existing literature had two definitions. It could refer either to the absence of field independence or to the presence of the positively defined attributes of field dependence. Ehrman termed the latter FIELD SENSITIVITY (a term she borrowed from Ramirez and Castañeda [1974])¹¹ and treated it as an independent category in which field sensitivity was opposed to lack of field sensitivity (now infelicitously termed FIELD INSENSITIVITY). This opened up the possibility of four combinations of high or low field independence with high or low field sensitivity, which could be illustrated by means of a chart divided into four quadrants (see Figure 1).

¹⁰ Though some leading educators (e.g., Paulston et al. 1975; Savignon 1972) were beginning at this time to experiment with communicative approaches, neither the wealth of literature nor the subsequent applications fully appeared until the 1980s (e.g., Canale and Swain 1980; Littlewood 1981; Savignon 1983), with the preponderance of communicative textbooks and programs surfacing in the mid-1980s through the current day.

¹¹ One group of researchers had renamed field dependence “field sensitivity” (see also Ramirez, Herold, and Castañeda 1974), an innovation that was not broadly accepted at the time.

Figure 1. A quadrangular typology of field independence and field sensitivity (adapted from Ehrman et al. 2003).

		Field Sensitivity	
		High	Low
Field Independence	High	Type 1 Most flexible	Type 2 Spotting what is important (as a matter of perception)
	Low	Type 3 Making use of the whole situation (as a matter of process)	Type 4 Least flexible

In this way, Ehrman freed the categories of field independence and field sensitivity from one another, redefining each as a distinct category. A person might thus simultaneously and independently possess both field independence and field sensitivity (i.e., what had previously been viewed as the positively defined attributes of field dependence). By the same token, a person might simultaneously lack both field independence and field sensitivity. This eliminated the formal paradox of the earlier bipolar equipollent model, within which presence to some extent of the positive attributes of field independence implied in principle (not merely as a tendency) absence to the same extent of the positive attributes of field dependence (i.e., field sensitivity). The new approach left open the possibility for people to exhibit primarily field independent or field sensitive styles but removed the formal straightjacket that had made it impossible even to conceive of the simultaneous presence or absence of both sets of positive characteristics.

Ehrman further acknowledged that field independence and field sensitivity might reflect both ability and preference, with the two probably in a “reciprocal relationship” (1996, 87). “Field independence as an ability probably leads to preference for learning in field independent ways (focused attention and analysis of material). Field sensitivity is similar . . .” (88).

Applying the dimensions of cognitive control and cognitive manipulation to L2 acquisition has required a more complex interpretation

of what one considers a field than domains (mathematics, science, biology, general studies¹²) used in earlier cognitive fields research because the cognitive fields in L2 learning occur within a verbal environment, not a physical one. For that reason, both perception (cognitive control) and process (cognitive manipulation) contribute to successful communication; considering only one or the other in defining the learning tendencies of L2 learners leads to an overly simplistic understanding of the role of the cognitive fields in L2 learning.

In regard to perception, the orientation in space associated with non-language domains is reflected in L2 learning as orientation within a text. Field independence (i.e., the preferred use of inner cognitive code) within a verbal text presents itself as the learner bringing inner control to the perception of the meaning of a text. This may be reflected as a tendency to focus on morphemes, syntax, phonetic cues, key lexical items, and other details separate from the gist or whole text. Field dependence presents itself as external control, with the text itself seen as a whole, such that grammar is not necessarily pulled out of lexical phraseology.

Limiting the definition of cognitive field to field (in)dependence (a matter of perception) would not account for how readers or speakers handle the complexity of verbal texts in communication. Texts, either for receptive or for productive purposes, must be manipulated. Field (in)sensitivity, which relates to cognitive manipulation of the verbal environment, describes a process critical to L2 learning and use. A field-sensitive learner would make use of the field (i.e., the environment as a whole) in learning, for example by figuring out lexical meaning from context and determining the gist from text structure or even background knowledge. Field-insensitive learners would not be comfortable or skilled in doing this, limiting themselves to manipulating particular details extracted from the field (and, in L2 learning, often missing the point of the text).

The interaction of field (in)dependence and field (in)sensitivity provides the more complex interpretation of “field” required to describe the working of the cognitive fields for L2 acquisition. Cognitive control and cognitive manipulation interact within each learner, who evinces

¹² Other domains typically used in non-language research have included social and cultural applications. While, theoretically, these domains could be of interest to L2 instructors, the authors have chosen not to include them in this article due to limitations of space.

a specific preference for cognitive control and a specific preference for cognitive manipulation. Thus, one learner can be field independent and field sensitive, whereas a second can be field independent and field insensitive, a third field dependent and field sensitive, and a fourth field dependent and field insensitive. All four types occur naturally in the L2-learning population though some are more common than others. Each type has significance for the kinds of instruction that produce the most effective and efficient results and enjoyable learning experience.

3. The E&L Cognitive Styles Construct

Between 1992 and 1996, Ehrman and Leaver, after more than a decade of exploring and using a variety of learning style instruments, including those testing for field (in)dependence, with literally thousands of students, decided to simplify this area of research and application. At the same time, they hoped to expand understanding of some of the styles they felt had been theoretically skewed. Among the latter was the concept of field independence and field dependence (Ehrman 1996; Leaver 1997).¹³

The E&L (Ehrman and Leaver 2002), which emerged from this effort, made several contributions to the field:

- (1) overarching categories that simplified and organized the ever-increasing number of cognitive styles identified by various researchers;
- (2) deconflation and splitting of the global-analytic juxtaposition, which did not seem to work for all learners (particularly those both global and analytic in orientation), by providing a quadrant approach to related styles: global versus local and synthetic versus analytic;¹⁴ and
- (3) an expanded and deconflated conception of field (in)dependence and field (in)sensitivity as a quadrant system, adding a language-oriented description of each of the

¹³ Development of the E&L also drew upon a general learning styles instrument, the American Global Studies Institute (AGSI) Learning Styles Instrument, which contained many of the same cognitive styles categories. The AGSI Learning Styles Instrument was developed by Leaver and Leaver in the early 1990s in Russian, was then consolidated and published in English in 1996, and later, nearly parallel with the formal and separate appearance of the E&L (Ehrman and Leaver 2002), was revised by Echo Leaver (2000) as the American Council of Teachers of Russian (ACTR) Learning Styles Assessment Tool. It was available for a several years thereafter at www.actr.org/russnet/ALSAT/html.

¹⁴ For further discussion, see Corin and Leaver 2019.

quadrants and a mechanism for determining L2 learners' preferences, as distinct from other areas of application (e.g., mathematics or orientation in physical space).

3.1. Overarching categories

The need for a framework to simplify the existing plethora of cognitive style constructs became clear to Ehrman and Leaver as they tried to apply the various constructs (71 as of 2004; Zhang, Sternberg, and Rayner 2012) to their student bodies and research efforts. The use of any one model (lumpers vs. splitters,¹⁵ for example, or the Kolb model¹⁶) limited the possibility for the model to explain the diversity in any given set of students well enough to allow successful adaptation of instruction to presented learning styles. Yet, the full range of possibilities remained too many to juggle, and selection from within that range could result in subjective, unreliable, and likely invalid generalizations.

To frame their response, Ehrman and Leaver surveyed the full body of theoretical and applied literature devoted to cognitive style constructs present at the time (and essentially to this day). Informed by this comprehensive aggregation of style information, they hypothesized that all validated learning style continua, each with its own opposing poles of style, might be seen as instantiations of an overarching category that they called *ECTENIC* versus *SYNOPTIC*. In the E&L, *SYNOPSIS* represents a holistic or condensing approach to perceiving and processing information. *ECTASIS*, the Greek antonym of synopsis, refers to a stretching out, devolving, or unraveling of information. In essence, "an ectenic activity represents conscious control of what a synoptic activity accomplishes preconsciously" (Ehrman 2001–2005, 51).

3.2. Subscales and cognitive style preference profiles

Based on an analysis of evidence presented in the voluminous

¹⁵ Lumpers and splitters, a category proposed by Messic (1976), is incorporated into the E&L, along with similar models, as levelers (synoptic learners) and sharpeners (ectenic learners); the latter terminology was first introduced in the 1950s.

¹⁶ The Kolb model (Kolb 1976), later the Kolb Learning Style Inventory Version 4.0 (2011, Kolb and Kolb 2013), combined two continua to create a model with four quadrants: active experimentation, reflective observation, abstract conceptualization, and concrete experience. The E&L reflects these two sets of styles as a subordinate quadrant as well as two continua: reflective (ectenic) and impulsive (synoptic) learning and concrete (ectenic) and abstract (synoptic) learning. The continua were not unique to Kolb.

psychological research literature, a detailed comparison of the wide variety of models available at the time, and, to some extent, speculation informed by personally conducted research and case studies at US government language institutions spanning two decades and more than 10,000 students, Ehrman and Leaver chose to conceptualize both the overarching category and its subscales (ten in number, including the two fields of mind scales) as continua rather than as simple toggles. That is to say, both aspects (polar values) of each subscale are generally present in all learners, simply to a greater or lesser extent. Any given learner will be more ectenic or more synoptic, but any given ectenic learner is also likely to exhibit at least some weak synoptic traits and vice versa. Thus, for example, field independence would be seen as the far end of the continuum with field dependence being an increasingly greater absence of field independence as one moves toward the opposite end of the continuum, and the same would be true of field sensitivity versus insensitivity.¹⁷ The preference profiles for all of the subscales, taken together, represent learners' overall LEARNING STYLE PREFERENCE PROFILE, which can extend from ectasis (ectenic learning) to synopsis (synoptic learning) with an essentially infinite variety of possible individual profiles for the various subscales.¹⁸

4. Fields of the mind subscales of the E&L

As explained above, Ehrman and Leaver realized that the prevalent (especially prior to Ehrman 1996) definitions of field (in)dependence conflated multiple traits: the fields of cognitive control (field [in]dependence) and fields of cognitive manipulation (field [in]sensitivity).¹⁹ Moreover, field (in)dependence and field (in)sensitivity represented continua rather than toggles. Ehrman and Leaver were also confronted with two additional questions:

¹⁷ In fact, the prevalent view of field independence versus field dependence from the outset of research (cf. Asch and Witkin 1948a, 1948b) had been that it is a continuum.

¹⁸ The ten E&L subscales are (1) field sensitive–field insensitive, (2) field independent–field dependent, (3) leveling–sharpening, (4) global–local, (5) impulsive–reflective, (6) synthetic–analytic, (7) analogue–digital, (8) concrete–abstract, (9) random (non-linear)–sequential (linear), and (10) inductive–deductive (Leaver 2019). Version 3 (the current version) of the E&L questionnaire, along with a scoring template that contains brief definitions of each subscale and the overarching categories, can be found at <https://sites.google.com/view/fom-supplement/home>, see scannable QR code in the Appendix.

¹⁹ This same conflation had been problematically present in the then-accepted definitions of global and analytic learning (see Corin and Leaver 2019).

- (1) Do the fields of cognitive control and cognitive manipulation fit into the overarching categories of ectasis (ectenic learning) and synopsis, as suggested earlier in this article, and if so, how?
- (2) Is the Group Embedded Figures Test (GEFT) adequate for determining both fields of cognitive control and fields of cognitive manipulation—and would application of the results to L2 acquisition be valid?

4.1. Alignment of the cognitive fields with the overarching categories

Ehrman and Leaver had initially aligned field independence with ectenic learning and field dependence with the synoptic group of learning styles. However, correlation studies by Ehrman at the FSI (including an initial validation study with $n > 1300$) showed a consistently high correlation (as much as .8) between field independence and synoptic learning, as well as between field dependent learning and ectasis.²⁰ The results of testing by other researchers (Moslemi and Dastgoshadeh 2017; Yasuda 2019)²¹ also showed a consistent alignment with the overarching categories as in the FSI studies.²² A factor analysis by Yasuda (2019) on a group of 471 Japanese adult learners of English, including beginning to highly advanced levels of proficiency, showed a negative correlation between field dependence and field sensitivity, with both field independence and field sensitivity aligning with synoptic styles. Even more convincing was a finding by Kheirzadeh and Kassaian (2011), who conducted a study of success in acquiring listening comprehension in English as a Foreign Language (EFL). Based on the presentation of a global task, they had expected field-dependent learners to perform

²⁰ While FSI validation studies on the E&L have been mentioned in a number of publications (e.g., Ehrman and Leaver 2003), sharing of the actual data is difficult since the studies were conducted at a government institution and the results generally not made publicly available.

²¹ These correlational studies were done on three different L2-learning populations: Iranian, Turkish, and Japanese, respectively. In the case of the Iranian and Japanese students, the results fully paralleled the FSI results, showing strong positive correlations between field sensitivity and field independence. In the case of the Turkish students, where the n (102) was much lower and might therefore be less reliable, a strong positive correlation was found between field sensitivity and field dependence and a weak positive correlation between field sensitivity and field independence. Of course, culture could also have played an undetermined role.

²² These studies also supported their hypotheses that the fields were continua, not bipolar “toggles,” and not a singular trait (or two parallel traits), but a quadrangular nexus of traits.

better than field-independent learners. In fact, as in the E&L validation studies, they found the opposite: field-independent learners performed better, indicating an alignment between synoptic (global) and field-independent learning.

Though such results initially seemed counterintuitive—and might not hold for fields other than L2 acquisition—Ehrman and Leaver concluded that they were reasonable for their learner populations and revised their original quadrant approach to that shown in Figure 2.

Figure 2. Fields of mind quadrant of the E&L.

Synoptic	Ectenic
Field independence (Trait A/cognitive control): perceives material separately from its context	Field dependence (Trait A/cognitive control): requires context and does not focus on anything in isolation
Field sensitivity (Trait B/cognitive manipulation): picks up material as part of context by “osmosis” and uses it, as needed, for understanding or production	Field insensitivity (Trait B/cognitive manipulation): makes little or no use of the whole context and excludes “incidental” learning

Explaining the alignment of field independence with synopsis, Ehrman and Leaver supposed that both of these preferences, one narrower and one broader, shared an inner-focused (i.e., self-dependent) orientation (noted above also in respect to the early field [in]dependence research based on physical space). Specifically, field-independent learners *AUTONOMOUSLY PERCEIVE* salient parts of the text in a decontextualized way²³ whereas the field-sensitive learner *AUTONOMOUSLY USES* the full language environment, including the actual text, background knowledge pertinent to the text, and even the social environment in which the learner is located, to process the meaning of the text (Leaver, Ehrman, and Shekhtman 2005).

²³ Field-dependent learners, by contrast, tend not to make this type of separation and perceive the parts (words, syntax) together with the whole (text) as one piece, often memorizing, repeating, and using entire phrases in communication without regard to the grammatical or syntactic patterns within them.

4.2. E&L versus GEFT

The results of the validation studies stemmed from the use of the E&L Cognitive Styles Construct Questionnaire (Ehrman and Leaver 2002), which, for the fields of the mind subscales, focused exclusively on their application to verbal aspects of cognition and included both questions of perception and process.

The GEFT, on the other hand, had two weaknesses. First, it was originally proposed for students of mathematics and then stretched to include other areas of study, including application to L2 learning, without considering particular aspects of L2 acquisition that might make it different from acquisition of other kinds of knowledge. This included the emphasis on proficiency, rather than achievement, in contemporary classrooms. Second, it focused exclusively on field (in)dependence (perception), leaving questions of field (in)sensitivity (process) unexamined.

5. Critiques of the Fields of the Mind construct

The more articulated, quadrant-based delineation of the cognitive fields proposed by the E&L Construct, along with the associated validation and factor analysis studies conducted on it, provide answers to concerns raised in critiques by Khoury (2013), Yasuda (2016), Cárdenas-Claros (2005), as well as others with similar criticisms not included in this article. It also makes it possible to explain earlier studies on student success.

5.1. Khoury

Khoury (2013), arguing from theory, contended that the E&L should have posited field sensitivity as the opposite of field independence. That is, he considered field sensitivity and field independence to be two polar opposite values of a single category, equating the absence of a particular kind of cognitive control (field independence) with the presence of a particular kind of cognitive manipulation (field sensitivity). In so doing, he made the error of conflating perception and process that has frequently clouded an understanding of the cognitive field concepts.

As noted above, research has shown that the alignment of the cognitive fields with the overarching categories is counterintuitive. Quantitative research, exploratory factor analysis, and validation

studies have consistently demonstrated a positive correlation between field sensitivity and field independence,²⁴ not the negative correlation that would have been required by Khoury's proposed collapsing of the categories of cognitive control and cognitive manipulation. In Khoury's model (Option Two [Khoury 2013, 893]), field sensitivity would fall within the synoptic reaches of a collapsed cognitive field, but field independence would fall within the ectenic reaches, in contradiction to research findings.

Likewise, research about student preferences for error correction, conducted by Moslemi and Dastgoshadeh (2017), using the E&L, gave results in line with the predictions made by Ehrman and Leaver (2003) and Dörnyei (2005) that synoptic learners will tend to rely on subconscious control whereas ectenic learners will prefer to rely on conscious control. In line with these predictions, the results obtained from the Moslemi and Dastgoshadeh study showed that synoptic learners preferred indirect correction, while ectenic learners preferred to be corrected directly. According to Moslemi and Dastgoshadeh (2017), given that synoptic learners are often both field independent and field sensitive, they can be expected to be more autonomous, thereby explaining the desire for more indirect correction, whereas ectenic learners, as field insensitive and field dependent, could be expected to need and want direct correction.²⁵

5.2. *Yasuda*

Yasuda (2016) opined that many learning-style concepts, especially those of the cognitive fields, are ambiguous due to poorly defined and unvalidated categories. This shared concern prompted Ehrman and Leaver to further define the concept of cognitive fields.

Yasuda's complaint that perceptual cognitive fields had been poorly defined and unvalidated for L2 learners could have been answered by the validation research conducted at the FSI if not for the unavailability of the data to the nongovernment academic community. Ultimately, Yasuda (2019) made a personal effort to validate the categories in the E&L, using the E&L definitions and including the full range of proficiency levels

²⁴ See Ehrman and Leaver (2002) and Yasuda (2019).

²⁵ Other correlative subscale categories could also explain or reinforce these preferences in that synoptic learners tend to be inductive learners (moving from examples to rule), and ectenic learners tend to be deductive (moving from rule to examples or application). This category may have had as strong an influence on the results as the cognitive fields credited by Moslemi and Dastgoshadeh.

among the respondents as in the FSI study.²⁶ An exploratory factor analysis of 471 Japanese students learning English confirmed the definition and alignment of the subscales within the E&L. Field dependence correlated negatively with field sensitivity and with all the synoptic categories, placing it within the reaches of ectasis, in keeping with the findings of Ehrman and Leaver and Moslemi and Dastgoshadeh and providing yet another response to Khoury's criticism.

5.3. Cárdenas-Claros

Based on a study of field-(in)dependent learners in a Computer Assisted Language Learning (CALL) environment, Cárdenas-Claros (2005) stated that no differences could be found between field-independent and field-dependent learners. Both groups displayed the same range of performance success, showed no statistical significance for preferred use of transcripts or for dictionary use, and exhibited no significant differences in tested behaviors.

The fact that Cárdenas-Claros did not find distinctions between field-independent and field-dependent learners does not mean that there are not distinctions in learning preferences associated with cognitive control and control manipulation. Cárdenas-Claros's failure to find preferences could stem from use of the GEFT, which was not developed with L2 learners in mind, or the results could have come from a skewed group in which more auditory learners were included than visual or motor learners. Yet another explanation could be that the study population came from a group highly balanced along the ectenic-synoptic continuum; even though the cognitive fields might not have been evenly distributed, the overwhelming influence of an ectenic-synoptic balance of the other eight subscales might have been sufficient to provide the study's result of no significant preference relative to cognitive fields.

6. Implications for learning and instruction

This more articulated definition of the cognitive fields provides a basis for teachers to better understand learners' ways of approaching L2 learning, as well as a guide for curricular and instructional adaptation to support

²⁶ Yasuda also expressed concern that the few cognitive field studies conducted on L2 learners inappropriately used the GEFT (which did not account for all aspects of L2 acquisition) and, more important, focused only on the lower levels of proficiency.

classroom diversity. Variability among students depending upon the strength of their field independence and field sensitivity has implications for teaching grammar, vocabulary, listening, reading, speaking, and writing. Instructors and program coordinators can make use of this kind of knowledge to minimize attrition and increase student success.

6.1. Grammar instruction

Grammar provides perhaps the clearest elucidation of all permutations of the field variants. Learning grammar as an abstract system out of context would be an example of a field-independent approach, while a field-dependent approach would involve learning grammar within its larger context, perhaps memorizing it as chunks of discourse. Field-sensitive learners would be able to determine grammar rules inductively through comparing a series of grammatical expressions or the appearance of a grammatical concept in multiple contexts. The field-insensitive learner may be uncomfortable doing this and need or prefer to have the grammar usage explained deductively by an instructor or textbook, unless that learner is also field dependent.

6.2. Vocabulary instruction

Similar differences prevail in the acquisition of vocabulary. In studies reported by Tinajero et al. (2011), field-independent learners used internal cues in the acquisition of new lexica, approaching the understanding of new words analytically, breaking them into component parts and restructuring them in ways that helped their comprehension and memorization. Field-dependent learners, on the other hand, approached the learning of new vocabulary through the mechanisms of passive data collection or trial and error. In some cases, field-dependent learners have misunderstood and misused vocabulary, even in their own language, for years before an “ah-ha moment” has hit them. Field-sensitive learners, who are usually broadly synoptic, can intuit the underlying lexical system of a language. Field-insensitive learners typically approach vocabulary learning in a rote fashion.

6.3. Instructional adaptation

For teachers wishing to adapt instruction to the learning styles of their students, choices can be complex. Learners are typically not at one pole

or another but exhibit a combination of weak and strong preferences along parallel and intersecting continua of which the cognitive fields are just two, such that every student will present a different profile. Nonetheless, broad swaths of students can be reached by ensuring that activities and materials have something for everyone. For every mode of communication, adaptive teachers can find ways to incorporate activities and materials compatible with all cognitive field permutations in teaching reading, writing, listening, and speaking.²⁷

6.4. Error correction

Error correction studies, in general, have resulted in contradictory results. Some have concluded that learners should be corrected on the spot (e.g., Khansir and Pakdel 2018). Others have concluded that learners should not be interrupted while speaking but corrected after they have finished, if at all, or that only certain kinds of errors should be corrected (Amara 2015); some of those who support this approach to error correction fear that overt and immediate correction can lead to the development of an affective filter, impeding learners' willingness to speak (Lightbown and Spade 2006). Yet others, more aware that other variables might be involved, have noted that their studies are inconclusive (e.g., Tedick and de Gortari 1998).

Leaver, in conducting applications of the E&L in a number of venues in the United States and abroad, began to notice that the learning style composition of a studied group predicts the effects of various approaches to error correction. The E&L thus helps to clarify weaknesses in the research design of some error correction studies that ignore cognitive-style differences among the studied populations.²⁸ Consequently, Leaver proposed a decision-making tool (see Figure 3) for error correction, in which she differentiates between MISTAKE and ERROR. A mistake is an accident—misspeaking, misreading, miswriting, typo—in which case the correct form is known to the learner. An error

²⁷ Additional research and further elucidation of the concepts can be found in *Fields of the Mind* (Corin and Leaver 2019) along with specific suggestions for adapting instruction to cognitive field preferences. Suggestions for each of the modes of communication can also be found at <https://sites.google.com/view/fom-supplement/home>, see scannable QR code in the Appendix.

²⁸ Note the similar conclusion by Martinez (2006), who suggests learning styles as one of the unexamined components that can influence the results of error correction and error correction studies.

may be a direct translation from the native language, some form of incorrect learning, or even a guess, in which case the correct form is not known to the learner.²⁹

Figure 3. Error correction model.

	Synoptic	Ectenic
<i>Mistake</i>	DO NOT CORRECT	DO NOT CORRECT
<i>Error</i>	LATER	ON THE SPOT

Use of the grid, or model,³⁰ illustrated in Figure 3 has provided extensive anecdotal evidence³¹ that differences in cognition warrant parallel differences in error correction in accordance with these criteria.³² The model also reflects the findings of Moslemi and Dastgoshadeh (2017) in their error correction study exploring the relationship between cognitive fields and error correction preferences.

6.5. Variation with proficiency level

A search of the literature reveals no readily available research results correlating high levels of language skills, defined as native-like proficiency, with any of the cognitive fields. This is unsurprising for several reasons. Few subjects are available for study because few

²⁹ The distinction between error and mistake as a construct for correcting inaccurate language was introduced at the FSI in the 1980s; to the best of the authors' knowledge, the FSI has not chosen to share these concepts with the L2 field except through personal communications and first-hand knowledge of one of the authors.

³⁰ Although the model differentiates simply between the two poles of the overarching synoptic–ectenic category, the supposition is that most synoptic learners will display field-independent and field-sensitive traits and most ectenic learners field-dependent and field-insensitive traits. If only the fields of the mind are known, it would thus generally be safe for an instructor to use the whole (the overarching category) for the part (the cognitive field subscales).

³¹ While the model has been taught extensively throughout the countries of the former Soviet Union, the Middle East, and Latin America, including obtaining informal correlations of learning style and error correction preferences and effectiveness, formal validation studies have not taken place and are warranted.

³² This is derived from use with thousands of learners in government language programs in the United States and a wide variety of academic programs in at least twenty-four countries where Leaver conducted faculty-development workshops on the topic of teaching to diversity, including error correction.

learners reach near-native levels (Martin 2014), few programs teach to the near-native levels,³³ and the demand for research at this level is low. Moreover, by the time learners approach near-native proficiency, they have refined their strategies, compensated for their weaknesses, and developed strong metacognitive skills superordinate to any style preferences.

The little available research suggests that variation exists in how students reach the highest levels, including how any one student reaches the highest levels in two different languages, with both ectenic and synoptic approaches needed (i.e., flexibility in learning style is advantageous). One of the few studies that can provide some insight into what the role of cognitive field preferences might be was conducted on initial-acquisition Russian-language learners at the FSI (Leaver 1986). This study examined the relationship between left-brain and right-brain dominance,³⁴ the curve of improvement in L2 proficiency over time, and the level of achieved proficiency in one year of intensive study and, for some, a follow-on six-month advanced course.³⁵

Leaver found that left-hemisphere students (generally ectenic, most often field insensitive, and approximately 50% field dependent and 50% field independent) struggled at the beginning of courses taught via communicative language teaching. Once they reached professional levels of proficiency (ILR 3), however, they rapidly reached ILR 4. Of the 50% who did not reach ILR 4, most failed to reach even ILR 3. The successful left-hemisphere learners tended toward field independence, supporting some of the earliest cognitive field research, although most of that research focused on lower levels of L2 proficiency.

Most right-hemisphere dominant students (tending toward field independence and field sensitivity) encountered few obstacles at lower

³³ State Department and Department of Defense language training goals, as well as the national flagship language programs, where one might expect native-like output, aim only to the professional (ILR 3) level, not to the near-native level (ILR 4), and with the exception of the Language Flagships, it is difficult to find programs routinely producing students at and above the ILR 4 (ACTFL Distinguished) level of proficiency.

³⁴ Hemisphericity was determined by Your Style of Thinking and Learning (Torrance et al. 1978).

³⁵ All students who enrolled in the FSI six-month advanced course at a professional level of proficiency (ILR 3) in the years 1984–1990 achieved the course goals of near-native (ILR 4) proficiency. US government language proficiency level descriptions (ILR levels) can be found online at <https://www.govtilr.org/Skills/ILRscale1.htm>.

levels of proficiency, but few surpassed ILR 3. Leaver hypothesized that the obstacle at this higher level of proficiency was lack of time to overcome fossilization.³⁶ Whereas the ectenic, left-hemisphere, atomistic, field-dependent learner³⁷ focused too closely on details at lower levels of proficiency, slowing progress, the right-hemisphere dominant, holistic, field-sensitive learner focused on global meaning, and as a result their language could get messy (“awfully” fluent). The left-hemisphere learners’ detail-orientation allowed them to avoid fossilizing in the first place and provided them with approaches and strategies they needed to refine their speech at upper levels.

7. Conclusion

The intent of this article has been to elucidate the fields of the mind as a component of the E&L. Of the ten subscales, the two reflecting the fields of the mind have been the least understood and often not applied, distorting the significance of the E&L and detracting from its usefulness. This article has sought to remedy this situation by providing sufficient theoretical understanding, together with an overview of some areas of concrete applications, to enable classroom instructors to understand how they might adapt instruction to serve their diverse student body better. A fuller overview of practical applications is beyond the scope of this article.

Clearly, further research is needed to fill a number of glaring lacunae. Very little is known, for example, about the relation of fields of the mind to achieving upper levels of proficiency or to the development of speaking skills. Another fundamental lacuna in the literature concerns our understanding of the interaction between nature and nurture in individuals’ cognitive field styles. Beyond our awareness of the presence of both groups of factors (e.g., cultural and socioeconomic correlations and the malleability of styles on the nurture side), little is known.

How a learner performs differs from how well a learner performs, and no learning style profile ensures either success or failure. Greater success depends on numerous factors. One of these, to be sure, is the

³⁶ Ehrman (2002) delineated five kinds of fossilization: functional, iatrogenic, domain, affective, and strategic.

³⁷ The correlation of subscale styles has been validated by Bogen (1969), Gazzaniga (1970), and Torrance (1982).

degree of compatibility between learners' cognitive field preference profiles and the structure of their learning programs. This refers to both curriculum and instructional approach. The field preference profile of instructors can also play a role in student success. That role, moreover, can be a deleterious one unless instructors learn to modulate their manner of instruction to meet the needs of their learners.

Appendix

Supplementary materials can be found at <https://sites.google.com/view/fom-supplement/home> or via scanning the QR code below



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