



# Individual Differences in Language Learning and Teaching: a Complex/Dynamic/Socio-Ecological/Holistic View

語言學習與教學中的個體差異：一個複雜/動態/社會生態/整體之觀點

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## Abstract

This article begins by outlining the development of the individual difference concept, considering what should be included as an individual difference, and suggesting a definition. The authors then suggest 11 individual differences which occur regularly in the literature and which they have found to be salient features in their own classrooms. A brief overview of these 11 factors is provided, along with theoretical perspectives relevant to the individual differences issue. The article concludes with a small-scale investigation of teachers' perspectives of the importance of individual differences in language learning. According to the results, teachers consider motivation and strategy use the most important variables, but that all 11 factors are at least somewhat important. This conclusion emphasizes the need for a holistic view of these complex/dynamic, socio-ecologically influenced phenomena.

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## 摘要

本文首先介紹個體差異理論的發展，並在考慮應將哪些因素列為個體差異後，提出定義。筆者總共列出了11項個體差異，這些差異在過去的文獻中經常被提及，且許多先前的研究者也發現這些差異在課堂中有著顯著的特徵。本文將概述這11項個體差異的特點以及與其相關理論面向之議題回顧。最後，筆者針對教師對個體差異在語言學習中之重要性的看法為題進行了小規模調查。調查結果顯示：雖然教師視動機和策略的使用為最重要的變項，但這11項因素都佔有一定的重要性。這一結論強調了需要對這些複雜/動態的、受社會生態影響的現象採取一個整體的觀點。

**Keywords** Individual learner differences · Complex/dynamic systems · Socio-ecological context · Holism

關鍵字 個體差異 · 複雜/動態系統 · 社會生態系統 · 整體論

## Background

This article will primarily include a conceptual discussion of the role of individual differences in language learning, including definition and theoretical perspectives. In addition, it will also include some empirical evidence from a small-scale study regarding individual differences in language learning as perceived by language teachers, who might be considered to be in a good position to understand the role of learner individuality, since it is a reality with which they must deal on a day-by-day basis.

Early research in language teaching and learning tended to be concerned with establishing universal principles which could be applied across a wide range of individuals and contexts (e.g., Chomsky's universal grammar, Lenneberg's critical period hypothesis, Krashen's five hypotheses, Pieman's teachability hypothesis, Schumann's acculturation model). Of course, these ideas added considerably to the overall body of knowledge about how language is learnt and contributed to insights about how it should be taught, but they tended to overlook the basic fact that learners are individual, and no set of universal principles will ever apply to all of them.

One of the first to advocate the key role played by individual differences in language learning was Selinker [100] who declared: "a theory of ... language learning that does not provide a central place for individual differences among learners *cannot* be considered acceptable" (p.213, author's italics). A decade later, Wong Fillmore [126] observed: "Anyone who works with ... language learners, whether in teaching or in research, discovers quickly how much individual variation there is" (p.157). At the end of that decade, Skehan's [102] still influential book on individual differences appeared. By the end of the twentieth century, interest in individual differences was starting to gain momentum, generating a "veritable plethora of individual learner variables which researchers have identified as influencing learning outcomes" (p.472) [34]. In the last year of the old millennium, Horwitz [49] reminds us: "language learners are individuals approaching language learning in their own unique way" (p. 558). As we progressed into the new millennium, interest in the role of individual variables in language learning has continued unabated [1, 2, 17, 21, 25, 39, 43, 84, 94].

## What Should Be Included as an Individual Difference?

A review of the literature reveals that, even among those who are considered experts and who have published on the subject, consensus is far from absolute regarding what should be included as an individual difference. One of the first to deal with the subject at length was Skehan [102], who listed aptitude, motivation, language learning strategies, extroversion/introversion, risk-taking, intelligence, field in/dependence, and anxiety among the topics discussed. More than a decade and a half later, Dörnyei [25] included personality, aptitude, motivation, strategies, and beliefs. Arabski and Wojtaszek [2] considered strategies, autonomy, personality, gender, and self-efficacy, while Pawlak [84] dealt with aptitude, age, intelligence, affect, and motivation among the individual factors in his book. In the face of such variability, Griffiths and Soruç [43] define the concept fairly broadly as:

characteristics which make learners different from each other  
and which affect the way that they behave in the classroom and beyond.

As experienced language teachers who have had to deal with individual differences in their own classrooms, Griffiths and Soruç [43] include 11 individual factors which they have found contribute to learner individuality:

**Age** The critical period hypothesis [43, 86, 66] tended to dominate the thinking on the question of age in language learning for quite a long time. More recent research, however, has tended to render assumptions made on the basis of this hypothesis open to doubt, since numerous studies have shown that mature learners are able to learn language very effectively [9, 52, 56, 73, 75, 89, 91, 74]. Despite the evidence from these studies, English continues to be promoted around the world at younger and younger ages in the belief that younger is better. As Griffiths and Soruç [43] point out, there may be numerous reasons why adults may fail to learn language as successfully as children, including motivation, identity, ecological/contextual issues, personal circumstances, family/employment demands, time and social constraints, and individual characteristics. These factors interact in complex and dynamic ways to influence the outcome of attempts to learn language, including limiting exposure to the language and the time and energy available. In spite of constraints, however, there are numerous examples of adults who do manage to learn a new language very successfully (as noted above), placing in serious doubt the existence of the previously hypothesized critical period, at least as some rigid and impenetrable barrier.

**Sex/Gender** Although these terms are often used interchangeably, strictly speaking “sex” refers to a biological characteristic (male/female), while “gender” is socio-culturally ascribed (masculine/feminine). Females are often believed to be better language learners than males, although evidence to confirm this belief has been elusive [34, 64]. There is some evidence that women have more nerve cells in the left half of the brain where language is centred, and, in addition, women often appear to use both sides of the brain [65]; consistent evidence for this, however, is also inconclusive,

although neurological studies are gaining momentum as the technology develops. Where differences according to sex/gender are in evidence, they may well be due as much to the complex and dynamic interaction with other factors such as motivation, investment, goal-orientation, socialization, personal circumstances, family expectations, and socio-ecological context and so on. As Nyikos [81] points out, individual differences in language learning according to sex/gender tend to be slight to non-existent, with far greater variation between individuals than between the sexes. Sunderland [108] therefore points out that it is important to avoid “oversimplification and unproductive generalizations” (p.149) along sex/gender lines. Research results to date tend to indicate that, given the right conditions, motivated males and females can learn language equally successfully.

**Race/Nationality/Ethnicity/Culture** These four terms are another set of concepts which are often confused and used interchangeably, but which are, in fact, distinct. Race is essentially genetic; ethnicity is socio-cultural; nationality is political; and culture refers to an individual’s beliefs, customs, and behaviour. The four terms may in fact be identical: it is possible for an individual to be racially, nationally, ethnically, and culturally Tongan, for instance. But it is also possible for an individual to belong to different categories: in New Zealand, for instance, there is a large group of people with NZ nationality who are racially and ethnically Chinese and who adhere to varying degrees to Chinese culture (e.g., their dress codes, festivals, and family occasions such as weddings). And the racial/national/ethnic/cultural background may also determine the language [57]. Moving from one racial/national/ethnic/cultural environment to another often results in what has been called “culture shock” [11]. These four overlapping concepts are likely to have a profound influence on the way people think and behave and to have a complex and dynamic interrelationship with other individual characteristics (e.g., age and gender) which may in turn affect the way they learn [35, 54, 59, 123].

**Aptitude** Language aptitude has been described as a stable characteristic of the individual which accounts for speed in language learning [13] or talent for [30, 120]. The degree to which language aptitude is considered an important factor in language learning has varied over the years, and many tests (such as the *Modern Language Aptitude Test* or MLAT) [14] have been designed to select students for language courses or to exclude those who did not score well. In more recent years, these practices have been discredited as anti-egalitarian [27]. Furthermore, questions have been raised regarding what it is, precisely, that aptitude tests measure, and the extent to which the measured factor may overlap with other factors such as intelligence/s [38, 122] or memory [4]. If we add to this the concepts of other individual differences (such as autonomy, motivation), we can see that the aptitude concept presents a somewhat intricate picture, utilizing various combinations of individual characteristics to form aptitude complexes [24, 95, 103, 106]. Not only that, but it is potentially dynamic and emerging [73, 101]. In spite of these controversial issues, aptitude continues to attract research attention [31].

**Personality** If we add personality to this already complex and dynamic mix, we find that our individual is beginning to look more and more multifaceted. Personality has

traditionally been regarded as a relatively stable individual characteristic which develops at a young age and remains reasonably constant throughout an individual's life [127]. More recent research, however, has tended to support the idea that personality may not be entirely set in stone, but that it may develop dynamically in accord with other changes in an individual's life or environment [93]. An aspect of personality which is often believed to influence language learning is the introversion/extroversion dimension, which features in many of the well-known personality tests (e.g., the *Myers-Briggs Type Indicator* or *MBTI*) [77]. Since extroverts seem to show the strongest desire to communicate, they are often assumed to be better language learners than introverts; there is research, however, which suggests that this assumption may not be well-founded [33]. Other aspects of personality often included in research include willingness to communicate [70] and ego permeability [32]. However, although personality may be a salient characteristic in a classroom, there seems to be little evidence of a relationship between personality and successful language learning [104].

**Style** Learning style is sometimes believed to be an aspect of personality, and some of the factors overlap. Learning style is usually defined in terms of a learner's preferred way of learning, and over the years, there have been numerous instruments developed in attempts to measure it, such as Reid's [92] *Perceptual Learning Style Preference Questionnaire (PLSPQ)*, which was the first well-known questionnaire developed specifically for language learning. Learners can be quite distinct from each other in their learning style, which can present issues in a classroom environment (e.g., where students who like to work quietly on their own must try to concentrate on their work among kinaesthetic learners who want to move around and interact), and good learners seem to be more capable than less successful learners of style-stretching to suit a given learning situation [42]. However, as Nel [78] observes, there does not seem to be any one style which is typical of good language learners or which seems more likely than any other to lead to success. Factors which are often included under learning style and which interact to form a complex and dynamic relationship include cognitive style, in/tolerance of ambiguity, risk taking, and field in/dependence.

**Strategies** In turn, learning style is sometimes believed to be related to a learner's strategies, succinctly defined as actions chosen by learners for the purpose of learning language [40]. For instance, a student with a predominantly kinaesthetic style may prefer social or interactive strategies, whereas a student with a dominant auditory style may prefer to sit quietly listening to a tape and employing cognitive strategies to understand and remember the material. But these choices may change, of course, depending on the task and the context. In other words, a learner's choice of strategies is not fixed but depends on a complex and dynamic combination of contextual factors and the demands of the task combined with the learner's own individual preferences. The language learning strategy concept has been controversial since it was introduced to the language learning literature in the 1970s [96, 107]; indeed, at one point, it was threatened with extinction by those who questioned its very existence and who promoted the use of the alternative term *self-regulation* [25–27, 29]. However, others pointed that in order to self-regulate, learners need strategies [10, 125, 130], and strategies continue to attract vigorous research activity [16, 40, 41, 82].

**Autonomy** Strategies, in turn, have long been considered an essential tool for developing learners' autonomy or the ability to manage or control their own learning [45, 46, 121]. Autonomous learners are able to make decisions about their own learning, which take account of the complexities of the learning situation, the learning goal, and their own individual needs and characteristics [6, 7, 19, 22, 67, 109]. Autonomy is dynamic; that is, it develops according to factors such learner identity and agency (i.e., the ability to take action) [51] and helps to develop metacognition (i.e., the ability to think about thinking and manage the learning process) and self-regulation [37]. Although autonomy is often presumed to be a solitary and self-absorbed process, effective autonomy involves the learners' ability to negotiate and interact socio-culturally with others [8, 76]. Recent books about managing resources for autonomous learning [85], about fostering learner autonomy [68], and proposing new research agendas [15] attest to the ongoing interest in the autonomy phenomenon.

**Beliefs** The effect of beliefs on language learning was first brought to wide attention by Elaine Horwitz [48], who produced the *Beliefs about Language Learning Inventory* or *BALLI*, which has been used in many studies in the years since. Beliefs might be defined as something which an individual holds to be true [43], such as "I have no aptitude for language" and "I am too old to learn language". Beliefs have the potential to profoundly influence the effectiveness of language learning, and they are shaped in part by the complex interaction of learners' own individual characteristics and the cultural norms and expectations into which they were born and/or in which they operate. Although beliefs are often assumed to be a relatively stable individual characteristic, there is some evidence that they are dynamic and that good language learners are capable of adapting their beliefs to maximize the affordances of particular learning situations and opportunities [124, 129]. From an ecological perspective, Peng [87] found that beliefs about language learning "are subject to contextual mediation" (p.314), and an interesting change in learner beliefs is reported by Kaypak and Ortaçtepe [55], who found that participants shifted their focus from accuracy to intelligibility during a study abroad experience.

**Affect/Emotion** Learners sometimes claim that they do not permit their emotions to disturb their learning, insisting they focus on their work and do not consider their feelings; nevertheless, although learners may believe this to be the case, it has been shown that affect actually has a complex and dynamic influence on the way students learn [3, 58, 98]. Affect includes a number of different areas, such as anxiety [50], attitude [5], attribution [118, 119], empathy [44, 71], inhibition [96], and self-concept (including self-confidence, self-efficacy, self-esteem, and self-image) [72]. In recent years, there has been a move to what has been labelled positive psychology, which, rather than focusing attention on negative behaviour and thinking, highlights creativity and constructive attitudes [20, 88, 99]. Although not everything related to students' emotional states may be within a teacher's control (e.g., their family situations), it would seem to be important for teachers to do whatever they can to minimize anxiety, to promote positive attitudes, to encourage productive attributions, to nurture empathy, to reduce inhibitions, and to facilitate positive self-concepts among their students in order to achieve a pleasant and harmonious classroom environment which will bring emotional satisfaction to both teacher and students.

*Motivation* has been shown to be perhaps the most important factor in successful language learning [28, 60]. Traditionally, motivation has been perceived as dichotomous: intrinsic versus extrinsic and instrumental versus integrative. Over the years, claims have been made that one or other of these motivational types is the most important for successful language learning, but motivation is complex, and it is possible that all of these motivational types may have a part to play in the outcome of language learning endeavours [111]. Not only that, but motivation is dynamic [29]; that is, it can change, so just because a learner is or is not motivated at one point in time, this motivational level can fluctuate according to other individual factors, variations in the background of the learner's life (e.g., job, family, health), ecological changes, changes in goal-orientation, or interaction with other individuals. All of these variables may affect a learner's willingness to invest [79, 80] time and effort in the language learning endeavour. If the will to continue investing begins to fade in the face of difficulties, learners may need to engage their motivational self-system [112] or utilize volitional strategies, which are undertaken in order to help the learner persevere in the face of difficulties [18] to maintain motivation.

Of course, some of these individual differences might be considered to be of an essentially different nature from others. Age, sex, and race, for instance, are basically biological, while others are socio-cultural and/or ecological (especially nationality and culture), while yet others (perhaps the majority) are psychological. Nevertheless, as any teacher knows, all of these factors can interact with each other in complex ways to affect classroom dynamics, and for this reason, they deserve to be included when considering the role of individual differences in language development.

## Theoretical Perspectives

### Complex/Dynamic Systems

Complexity theory, which was developed in other disciplines (such as the physical sciences), was introduced to language learning by Diane Larsen-Freeman [62], who explains that language can be described as a complex system because it consists of many distinct but interdependent subsystems (grammar, vocabulary, phonology, semantics, etc.). Therefore:

A change in any one of them can result in a change in the others ... In other words, the behaviour of the whole emerges out of the interaction of the subsystems. Thus, describing each subsystem tells us about the subsystems, it does not do justice to the whole of language (p.149).

Because of this complexity, Diane Larsen-Freeman [63] argues that “we cannot get a true measure of the influence of a factor if we isolate it from the others and examine it one at a time” (p.14).

Furthermore, since the components of a complex system are constantly interacting, it is also dynamic; that is, it is susceptible to change [23]. This suggests that a change in any particular individual factor (e.g., age) is likely to result in changes elsewhere in the system (e.g., motivation, beliefs).

## Socio-Ecological Context

In recent years, the fundamental role of context, which may be both social and ecological, has been increasingly recognized for its key effect on language learning [12, 36, 57, 83, 97, 113]. These researchers drew attention to the dynamic relationship between individual differences and learning situation, pointing out that learners may need to adapt not only according to their own characteristics but according to changes in their environment. This might apply to students who decide to study abroad [53], who marry into a new cultural/linguistic context (e.g., Julie) [52], or who move from a first language (L1) environment to one where English is the medium of instruction, EMI [69, 105]. In fact, it is impossible to separate an individual from his or her context: the socio-ecological environment to which the individual belongs and in which s/he operates will exert an influence whether it is recognized or welcomed or not.

It is generally Vygotsky [116, 117] who is credited with raising the awareness of the importance of social context (e.g., the family and the culture within which the family operates). According to Vygotsky, learning occurs by means of more knowledgeable others (e.g., parents, teachers, or more informed adults or peers) who guide the learner through the zone of proximal development (the ZPD). In the years since, Vygotsky's ideas have been further developed by scholars such as Lantolf [61] and Toohy and Norton [110].

The term “ecological” was introduced to language learning by scholars such as Holliday and Cooke [47] and Van Lier [114] to argue that for effective language teaching and learning to occur, the whole context should be taken into account. According to Van Lier [115], the ecological approach is a way “to look at the learning process, the actions and activities of teachers and learners, the multi-layered nature of interaction and language use, in all their complexity and as a network of interdependencies among all the elements in the setting, not only at the social level, but also at the physical and symbolic level” (p.3). An ecological perspective, however, does not necessarily suggest that the context is dominant, and that the learner is powerless, since learners can manipulate the environment to suit their own needs, as well as being affected by it.

## Holism

From an individual difference point of view, complex/dynamic systems theory makes intuitive sense: of course, individuals are complex, and of course, they develop dynamically over time and space and in socio-ecological contexts. It can create a dilemma from a research point of view, however. Although it is not difficult to agree that variables must be considered relative to each other over time and in context if they are to be meaningful, it is simply practically impossible to research all conceivable factors at the same time [113]: the possible permutations of the factors involved are almost infinite. It is therefore necessary to make pragmatic judgements to limit the number of factors under consideration in any one study to prevent data overload which might become difficult or impossible to analyse meaningfully. It is nevertheless essential to remember that, after examining variables one at a time (as this article has done above), it is vital to relate the individual differences back to the complex/dynamic/socio-ecologically situated whole, as the study reported next attempts to do.

## Teachers' Perceptions of the Relative Importance of Individual Differences

Research included in Griffiths and Soruç [43] reported the results of a study which investigated teachers' perceptions of the relative importance of students' individual differences. The study reported was conducted in two stages at educational institutions in Istanbul, Turkey. Stage one involved a group of 12 practising teachers at a K12 school, of whom 9 were female and 3 male, 3 were in their 20s and 9 were 30+, and teaching experience ranged from 4 to 28 years. The second stage involved a group of 29 pre-service teachers studying at university level, of whom 22 were female and 7 male, with 28 in their 20s and just one in his 30s.

A questionnaire was constructed using the 11 individual differences identified in this article (motivation, aptitude, strategies, gender, beliefs, autonomy, personality, style, age, affect, culture/nationality/ethnicity/race), and participants were asked to rate the items on a Likert scale from 5 = strongly agree to 1 = strongly disagree according to how strongly they agreed or disagreed that the individual characteristic is important for language learning.

Ethical requirements were satisfied prior to data collection by obtaining permission from the school and university authorities. In addition, participants in both groups attended a seminar prior to completing the questionnaire to ensure that the concepts were understood and they were asked to provide signed consent.

Data were analysed for reliability which provided an alpha coefficient of 0.7, considered sufficient in the social sciences [26]. Since Likert scales produce ordinal data, non-parametric tests (medians and Mann-Whitney *U*) were used for analysis [26].

Results indicated that over both groups (practising and pre-service teachers), agreement was strongest (rating = 5) regarding the importance of motivation and strategies. Aptitude, beliefs, autonomy, personality, style, age, and affect were all rated 4 (agree). Responses were neutral (3) regarding gender and culture/nationality/ethnicity/race, suggesting that overall, teachers do not have strong opinions either way regarding these two factors. There were no items in the disagree range, suggesting that teachers feel that all of these individual differences are at least somewhat important. These results are set out in Table 1.

**Table 1** Median levels of agreement for levels of importance of individual differences in successful language learning for all participants ( $N = 41$ ), ordered according to rating

Item	Individual difference	Rating
1	Motivation	5
2	Strategies	5
3	Aptitude	4
4	Positive beliefs	4
5	Autonomy	4
6	Personality	4
7	Style	4
8	Age	4
9	Affect/emotions, feelings	4
10	Gender	3
11	Culture/nationality/ethnicity/race	3

According to the results of a Mann-Whitney  $U$  test over all participants, there were no differences according to participants' gender. The inexperienced group of trainee teachers ( $N = 29$ ) expressed significantly stronger agreement about the importance of aptitude ( $p = .039$ ,  $r = .377$ ), representing an effect size of 14.2% of variance [128], which is a small but approaching moderate effect size [90]. Experienced teachers ( $N = 12$ ) were more strongly in agreement about the importance of affect ( $p = .026$ ,  $r = .408$ , 16.6% of variance, which is a low-medium effect size). The differences between the inexperienced (and mostly younger) and experienced (mostly older) groups might suggest the effect of context (university versus K12 environments) and experience.

## Conclusion

This article began by defining individual differences as characteristics which make learners different from each other and which affect the way that they behave in the classroom and beyond. It then examined the literature on the topic and identified 11 key characteristics that the authors have found to influence classroom interaction and successful learning (motivation, aptitude, strategies, gender, culture/nationality/ethnicity/race, beliefs, autonomy, personality, style, age, affect). Relevant theoretical perspectives were also considered (complex/dynamic systems, socio-ecological context, and holism), and a study of teachers' perceptions of the relative importance of learner individual differences reported.

The teachers in the study reported viewing all 11 individual differences as at least somewhat important. Although motivation and strategies received the highest ratings (5 = strongly agree), the teachers did not actually disagree with any of the individual items. This suggests that teachers are aware of the complex mixture of individual differences which exist among their students and that they recognize learner individuality. In terms of practical implications, it is important that transfer of this awareness into the classroom is encouraged and facilitated so that our complex, dynamic, and socio-ecologically situated individual students might all be enabled to learn to the best of their own abilities and that their journey towards successful language learning might be adequately and appropriately supported.

Although the literature on individual differences in language learning has expanded in recent years, much remains to be done. Many individual differences remain under-researched; in particular, the role of aptitude remains problematic, and research on personality is surprisingly difficult to find. In addition, the complex and dynamic interaction between and among the various individual factors and with the socio-ecological context requires much more investigation in order to derive meaningful implications for the promotion of successful language learning for our infinitely variable and multifaceted learners in widely varying contexts.

**Data Availability** We can provide the data to anyone who wants it.

**Code Availability** Not applicable

## Declarations

**Ethics Approval** Ethical requirements were satisfied prior to data collection by obtaining permission from the school and university authorities. In addition, participants in both groups attended a seminar prior to completing the questionnaire to ensure that the concepts were understood, and they were asked to provide signed consent.

**Consent to Participate** A consent letter was given to the participants and all agreed and signed.

**Consent for Publication** The participants also agreed to the publication of the results and signed the consent letter.

**Conflict of Interest** The authors declare no competing interests.

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