

# Learner Characteristics and Syntactic and Lexical Complexity of Written Products

Shahin Vaezi

Assistant Professor of TEFL, Department of Foreign Languages

Iran University of Science and Technology

Iran University of Science and Technology Street

Hengam Street, Resalat Square, 16846-13114, Tehran, Iran

Tel: 98-217-322-5455      E-mail: sh\_vaezi@iust.ac.ir

Neda Babanezhad Kafshgar (Corresponding author)

MA in TEFL, Department of English Language and Literature

Allameh Tabataba'i University, Tehran, Iran

E-mail: neda.babanezhad@yahoo.com

Received: June 1, 2012      Accepted: June 19, 2012      Published: September 1, 2012

doi:10.5296/ijl.v4i3.2391      URL: <http://dx.doi.org/10.5296/ijl.v4i3.2391>

## Abstract

The purpose of this study was to search for the probable effects of learners' characteristics on linguistic properties of their writings. Learners' characteristics were studied via three main learner variables; affective, cognitive, and biological variables. Extroversion/ introversion (affective), reflectivity/ impulsivity (cognitive), and gender (biological) were selected as three variables via which the learners could be categorized into different groups. The linguistic properties of the learners' written performance were measured through Syntactic Complexity and Lexical Complexity. The participants were selected from a homogeneous group of university language learners whom were asked to write a composition. The compositions were then transcribed into available information for a computer. A computerized text analysis program (Word Smith Tools) was used to measure the linguistic properties of the written compositions. Syntactic complexity (ratio of subordination and average sentence length of the written texts) and Lexical complexity (lexical diversity and lexical density) were calculated by the program. Extroverts indicated to write in a more lexically complex way than introverts.

The results showed that there was not any significant difference between reflective and impulsive learners with respect to the linguistic properties of their writings. Female and male learners also indicated no such difference with regard to the linguistic characteristics of their written performance.

**Keywords:** Extroversion/Introversion, Reflectivity/Impulsivity, Linguistic characteristics, Lexical complexity, Syntactic complexity

## 1. Introduction

The need to create an effective learning environment has led educators to explore different dimensions of teaching, learning and assessment styles. When one considers the number and variety of variables involved in the development of second language skills, the enormous complexity of the problems facing theoreticians and researchers quickly becomes more apparent and more understandable (Chastain, 1988). There is an unending quest to determine approaches that work in the classroom. One focus area is the possibility of identifying factors outside the classroom, which impact students' performance. There are factors other than language proficiency that affect learners' performance. These factors may be responsible for systematic variance in language performance. Recent research in the field of second language acquisition increasingly has examined a multitude of variables that account for individual differences in foreign language achievement in an attempt to arrive at the most comprehensive explanation of the variance in performance. In recent years the focus in learning and instructional strategies research has shifted from attempts to identify strategies effective for all learners to identification of specific instructional techniques effective for students with certain characteristics confronted with particular criterion tasks. The fact that each individual brings to learning his own attitudes, beliefs, goals, and decisions, will reveal the importance of focusing on learners as dynamic human beings. It is apparent that these individual characteristics affect the learners' competence as well as performance. Learner variables are the most important factors other than proficiency level that can affect learners' performance in language tasks and tests. These factors have been found to account for a significant proportion of the variance in foreign language achievement.

Verhoven and Vermeer (2002) pointed that few researchers have looked at how the personality variables that L1 and L2 language learners bring to the task might affect their acquisition of communicative competence. As Brown (2000) cites from Keefe (1979), learning styles might be thought of as "cognitive, affective and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to environment". In this study, we focus on extroversion type of personality as an indicator of affective domain. Extroversion/Introversion (E/I) are two extremes of the same personality dimension. The other domain of personality is the cognitive domain. This study aimed to investigate the effect of the impulsivity/reflectivity type of cognitive styles on learners' performance in writings from a new perspective. Another aspect of learner variables is biological variables. The most pervasive part of this variable is gender. It means that by considering sex as a learning and learner variable, we accept the effectiveness of this variable on students learning styles and strategies. Another aim of this study was to search for the effect of learners' sex on their production of language (i.e. writing) from a different point of view.

Linguistic properties of a piece of writing may include syntactic complexity, lexical complexity, and grammatical complexity. However, in this study grammatical complexity was not probed into, each of the other two levels was assessed by two measures. Syntactic complexity of the texts was analyzed through calculation of average sentence length and ratio of subordination. Lexical complexity of the written performance of students was assessed by lexical diversity and lexical density.

There are many studies that investigate the variation among learners with different types of personality and also with different genders with respect to their performance in spoken or written modes of language. Of course the written mode, especially composition writing form, has been less well researched, due to the challenging issues that exist in evaluation of this mode of performance. The tendency in evaluating students' writings is toward giving a single mark to the piece of writing in all kinds of studies. The writings of learners are rarely considered as a source of text for text analysis purposes. Linguistic characteristics of a writing draft are rarely considered to be influenced by the writer's personality type or cognitive style. Although there are papers that investigate texts from a text analysis point of view but there are few that search the relationship between their text analysis findings and the characteristics of their writers. Based on findings of many researchers such as Brown (2000) and Chastain (1988), we expect a powerful relationship between characteristics of writers and characteristics of their productions. So there is an opportunity to investigate the possibility of predicting the characteristics of a writer from the properties of his writing, to some degree of confidence.

## **2. Theoretical Background**

### *2.1 Learner Variables*

While we all exhibit inherently human traits of learning, every individual approaches a problem or learns a set of facts or organizes a combination of feelings from a unique perspective. According to Williams and Burden (1997), it is undoubtedly true that learners bring many individual characteristics to the learning process which will affect both the way in which they learn and the outcomes of that process. Learner variables are the most important factors other than proficiency level that can affect learners' performance in language tasks and tests. A review of the literature on academic major decision-making suggests that personality traits are important antecedents and are important aspects of the decision-making process (Mastor& Ismail, 2004). Harmer (1991) argues that an understanding that there are different individuals in our classes is vitally important if we are to plan the kinds of activity that will be appropriate for them. As cited by Brown (2000), Keefe (1979) thought of learning styles as cognitive, affective and physiological traits that are relatively stable indicators of how learners perceive, interact with and respond to the learning environment. Learning styles seem to be relatively stable. However, according to Cohen and Dornyei (2002, cited in Schmitt, 2002), teachers can modify the learning tasks they use in their classes in a way that may bring the best out of particular learners with particular learning style preferences.

#### *2.1.1 Affective Factors*

As Chastain (1988) argues, of all the learner variables, the most influential are those related to the learners' emotions, attitudes and personalities. The word "affect" refers to emotion or feeling and the affective domain is in fact the emotional side of human behavior. As cited by Karbalaie (2008), Stern (1983) stated that the affective component contributes at least as much as and often more to language learning than the cognitive skills represented by aptitude assessment. "The affective domain plays a larger role in developing second language skills than does the cognitive, because the emotions control the will to activate or to shut down the cognitive functions" (Chastain, 1988, p.123). Brown (2000) suggested self-esteem, inhibition,

risk-taking, anxiety, empathy, extroversion and motivation as major personality or affective factors that influence second language learning and acquisition. We will discuss some of these affective factors briefly, and then we will explain the extroversion style in detail as our main focus of attention.

According to Adler and Stewart (2007) the broadest definition of self-esteem within psychology is Rosenberg's (1995) who described it as a favorable or unfavorable attitude toward the self. "Self-esteem is probably the most pervasive aspect of any human behavior" (Brown, 2000, p.145).

Inhibition is closely related to the notion of self-esteem. Brown (2000) argued that all human beings, in their understanding of themselves, built set of defenses to protect the ego. A newly born baby gradually learns to identify a self that is distinct from others. The growing degrees of awareness, responding, and valuing begin to create a system of affective traits that individuals identify with themselves. In the next phase, the physical, emotional, and cognitive changes bring about increasing in inhibitions to protect a fragile ego.

Risk-taking is also closely related to self-esteem concept. According to Brown (2000), learners have to be able to gamble a bit and try to make hunches about the language and take the risk of being wrong.

Self-esteem, inhibition, risk-taking and anxiety are intricately intertwined affective factors. Brown (2000) claims anxiety plays an important affective role in second language acquisition. Anxiety is associated with feelings of uneasiness, frustration, self-doubt, apprehension, or worry (Scovel, 1978, cited in Brown, 2000).

Empathy is often thought of as affective state that is mediated by an ability of persons to place themselves, mostly deliberately, but on occasion spontaneously, into observed others' emotional experiences (Zillmann, in Bryant & Vorderer, 2006). The resultant affections are construed as 'feeling with' or 'feeling for' the persons whose emotions were witnessed.

Williams & Burden (1997) presented a comprehensive definition of motivation; motivation may be construed as a state of cognitive and emotional arousal, which leads to a conscious decision to act, and which gives rise to a period of sustained intellectual and/or physical effort in order to attain a previously set goal (or goals).

#### 2.1.1.1 Extroversion

Extroversion/Introversion (E/I) are two extremes of the same personality dimension. This paper reviews the literature on Extroversion/Introversion as affective variables and examines the effect of these affective variables on students' writing from a text analysis perspective.

Carl Jung was the first one who introduced the extroversion/introversion concept to psychology. The extrovert is characteristically the active person who is most content when surrounded by people. The introvert, on the other hand, is normally a contemplative person who enjoys solitude and the inner life of ideas and the imagination. According to Brown (2000), extroversion is the extent to which a person has a deep-seated need to receive ego enhancement, self-esteem, and a sense of wholeness from other people as opposed to receiving that

affirmation within oneself. Celce-Murcia (2001) quoted from Oxford that extroverts gain their greatest energy from the external world. They want interaction with people and have many friendships, some deep and some not. She also notes that introverts derive their energy from the internal world, seeking solitude and tending to have just a few friendships, which are often very deep.

Several studies have been carried out to investigate if E/I personality dimension plays any role in the process of language learning. Sharp (2004) claimed that there is some clear evidence that extroverts learn foreign languages better because of their willingness to interact with others and because of their reduced inhibitions. As he quoted from Ehrman and Oxford (1995), extroverts are more likely to prefer interactive role-plays and group work. Introverted personalities may not have so many friends, and have a preference for working in pairs or smaller groups. They may prefer individual activity, perhaps with one clear purpose. Working in groups may well be less successful, because of a reluctance to participate in speaking activities. However, like so much of the work in these areas, the results of empirical research are inconclusive. Many researches tapped into the effects of extroversion/introversion character type on the performance of learners on their writings. Some of these studies investigated the effect of this character type on general writing proficiency of the learners and also on writing strategies the learner used in different types of writings. Some other studies probed into more detailed aspects of students' writings and investigated the effect of students' character type on their produced texts from a different perspective (Myhill and Jones, 2007; Estival et al., 2007, Argamon, Dhawle, Koppel, and Pennebaker, 2005; Nowson, 2006; Gill et al. 2004). Since the aim of this project is to understand the effect of learner variables on linguistic properties of students' written performance, the researcher touched on these studies in Linguistic Characteristics section.

### 2.1.2 Cognitive Factors

A comprehensive review of research in cognitive psychology has indicated that people exhibit significant individual differences in the cognitive processing styles that they adopt in problem solving and other similar decision-making activities (Robertson, 1985).

There are many different definitions of cognitive style. Chastain (1988) proposes that the term cognitive style refers to the predispositions individuals have for using their intellect in specific ways to learn. Tennant (1988) defined cognitive styles as "an individual's characteristic and consistent approach to organizing and processing information" (p. 89). Witkin and Goodenough (1981) proposed that cognitive styles have some natural characteristics; formal, pervasiveness, consistency, polarity, and value neutral. Accordingly, cognitive styles are mainly concerned with form rather than content of cognitive activity and also cognitive styles are pervasive in all aspect of human life.

Different researchers emphasize different aspects of cognitive styles. Therefore, there are various terms encountered in the literature related to this area. Among the long list of cognitive styles, Brown (2000) enumerated field independence, left and right- brain functioning, ambiguity tolerance, visual and auditory styles, and reflectivity and impulsivity as potentially significant contributors to successful learning. There are a considerable number of studies that

have investigated the relationship between different cognitive styles and various aspects of second language learning and in most cases the relationships between general language proficiency and different aspects of learners' cognitive styles are investigated. But, among all cognitive styles, reflectivity/impulsivity was the main concern of this study and was investigated with respect to the most detailed aspects of learning a language (i.e. linguistic features of a written text).

### 2.1.2.1 Reflectivity and Impulsivity

Brown (2000) defined reflectivity/ impulsivity style as the degree to which, in the cognitive domain, a person tends to make either a quick or gambling (impulsive) guess at an answer to a problem or a slower, more calculated (reflective) decision. Studies in reflectivity and impulsivity domain began in the early 1960s with several researchers, such as Jerome Kagan. Kagan (1966) defined this variable as a conceptual tempo, or decision time variable. He proposed two criteria to classify the subjects; response time and errors. Impulsive learners reach decision and report them very quickly with little concern for accuracy. In the other hand, the other reflective ones are more concerned with accuracy and take more time to reach a decision and consequently make fewer errors. The implications of this cognitive style for language learning are numerous. For example, Kagan (1965, cited in Brown, 2000) found that children who are conceptually reflective tend to make fewer errors in reading than impulsive children. In another study, Kagan, Pearson, and Welch (1966) found that reflective learners used more inductive reasoning than impulsive ones. They concluded that inductive reasoning situations are more effective for reflective learners. According to Brown (2000), most of the research to date on this cognitive style has looked at American, mono-lingual, English-speaking children. A few studies have related reflective/ impulsive style to second language learning.

As revealed by literature, there are few studies which searched for the effects of reflectivity/ impulsivity on writing performance of learners. And almost all of these few studies were concerned with the overall writing proficiency of the learners and tried to give a single mark to each piece of writing (using different ways of scoring) and use this mark as a criterion for comparison of impulsive and reflective learners. One aim of this study is to investigate if there is any effect of learners' cognitive style (reflectivity/ impulsivity) on the linguistic properties of their writings instead of considering the overall writing proficiency. We did not want to know who writes better, but we hoped to find who writes longer sentences, who uses more lexically complex sentences, and so on.

### 2.1.3 Biological Factors

“In addition to the learners' emotions, cognitive abilities, and social relationships, their sex and age also influence the development of second-language skills” (Chastain, 1988). Age seems to be a major factor in language learning, including second languages. Some theorists explain that the advantage children have is due to their greater flexibility-psychologically, socially, and cognitively. This flexibility gradually disappears with age and this is due to the lateralization process of brain. Sepassi (2006) investigated the relationship between the age of Iranian EFL learners and the strategy they seek in their interpretation of sentences. A task was devised to

solicit either prosodically or syntactically motivated responses from two groups of participants aged 12-13, and 17 and over, respectively. Comparison of the different age groups' performance on the task revealed that younger learners were more inclined to follow prosodic cues and older learners were more inclined to follow syntactic ones.

One of other factors that can affect learners' performance is their gender. According to Chastain (1988), a carry-over from the past is the belief that females are better second language students than males. Brown (2000) proposed that many researchers noted the differences between males and females in terms of speaking. Among American English speakers, girls have been found to produce more standard language than boys. It is also noted that women appear to use language that expresses more uncertainty (hedges, tag questions, rising intonation on declaratives, etc.) than men. Men have been reported to interrupt more than women and to use stronger expletives, while the latter use more polite forms.

Gender as a biological variable, is the cause of many differences in learners' reception and production of language. Accordingly, many studies aimed to probe into the effects of this variable on different aspects of learning. One important aspect of language performance is writing. Jones and Myhill (2007) investigated the effect of gender on linguistic competence in writing. They compared gender differences in linguistic characteristics of writing at text and sentence level. There were some significant differences according to gender at both text and sentence level. As you see, different genders with their different affective and cognitive styles and characteristics perform differently in their writings in terms of linguistic characteristics.

## *2.2 Linguistic Characteristics of Writing*

Different researchers defined linguistic properties of a text in different ways. According to Li (2000), by linguistic characteristics of learners' writing, we mean syntactic complexity, lexical complexity and grammatical accuracy. Syntactic complexity is assessed by: (1) average sentence length, and (2) the ratio of subordinated structures. Average sentence length is obtained by calculating the average number of words per sentence in a given text. Ratio of subordination is measured by calculating the ratio of the number of subordinated structures to the combination of subordinated structures and coordinated structures in a piece of writing. Lexical complexity is assessed by: (1) lexical diversity, and (2) lexical density. Lexical diversity is calculated by having the number of different words including both content and function words divided by the total number of words in a piece of writing. Lexical density is calculated by having the number of lexical items excluding function words divided by the total number of words in a piece of writing. There are two ways to tap into grammatical accuracy: (1) the ratio of number of grammatical errors to the total number of sentences in a piece of writing, and (2) the ratio of types of grammatical errors to the total number of sentences in a piece of writing.

In this study, we followed Li's (2000) approach, and considered syntactic complexity and lexical complexity as linguistic characteristics of students' writings. This paper aimed to find the effects of learners' personality type (affective and cognitive style) and sex, if any, on these linguistic features of their compositions.



Many studies have investigated the relationships between learners' characteristics and linguistic characteristics of their written productions. Pennebaker and King (1999) using a word-based, computerized text analysis program, demonstrated that linguistic style is an independent and meaningful way of exploring personality. In another study, Argamon et al. (2005) tried to distinguish high from low neuroticism and extraversion in authors of informal text. They considered four different sets of lexical features for their purpose; a standard function word list, conjunctive phrases, modality indicators, and appraisal adjectives and modifiers. They found that appraisal use was the best predictor for neuroticism, and that function words worked best for extraversion.

Highly inspired by these studies, this paper hoped to find significant effects of learners' personality type such as extroversion and impulsivity and also gender on their use of linguistic features in their writings. Considering syntactic complexity and lexical complexity as two important linguistic properties of learners' written performance, the researcher tried to find any significant difference between extroverts and introverts, impulsive and reflective, and also as a third aim, male and female learners with regard to these linguistic characteristics of their writings.

### **3. Research Questions**

Q1: Is there any significant difference between extroverts vs. introverts in terms of lexical and syntactic complexity of their writings?

Q2: Is there any significant difference between reflective vs. impulsive learners in terms of lexical and syntactic complexity of their writings?

Q3: Is there any significant difference between male vs. female learners in terms of lexical and syntactic complexity of their writings?

### **4. Method**

#### *4.1 Participants*

112 adult university students from Ghaemshahr and Babolsar Universities, who were in semesters 7 and 8 of English Literature and English Translation, participated in this study. In order to have a homogeneous group and eliminate the proficiency factor, a version (1995) of TOEFL test was administered and 98 intermediate students whose scores were between one standard deviation above and below the mean of the test namely were selected.

#### *4.2 Instrumentation*

In order to have a homogenous sample and classify participants into different groups, three tests were used in this study.

##### *4.2.1 TOEFL*

To have a homogenous group of participants, a version of the paper-based TOEFL (1995) that included structure, vocabulary, and reading sections was administered. The TOEFL comprised 100 questions; 40 structure questions, 30 vocabulary questions and 30 reading questions. The

time for this test was 90 minutes. Based on the results of this test, the intermediate students were selected to participate in the study. The mean score for TOEFL was 33.46 and standard deviation was 10. So the students who scored between 23 and 43 in TOEFL were selected as participants of the study.

#### 4.2.2 Eysenck Personality Questionnaires

In order to estimate learners' personality type and cognitive style and assign them to different groups (extrovert, introvert, impulsive, and reflective groups), two personality questionnaires were administered. The first one was a questionnaire prepared by Eysenck and Eysenck (1975) to assess the subjects' degree of impulsivity /reflectivity. It included 30 items and in front of each item three options including *Yes*, *No*, and ? were presented. The subjects were instructed to answer each item by putting a circle around the *Yes* or *No* as quickly as possible. They were also instructed to put a ring around the ?, if they found it impossible to decide one way or the other for any reason.

The second one was Eysenck's personality questionnaire for extroversion/ introversion personality type that comprised 24 *Yes/No* questions. The original test contained more questions, but some of them were deleted due to the fact that they would not be appropriate in our culture. Also the questions were translated into Persian in order to avoid any possible misunderstanding. So the Persian re-standardized form of the adult EPQ (Eysenck Personality Questionnaire) was used to measure the degree of extraversion in the study. This measure is an internationally reliable instrument which has been translated and validated in Iran (Kiany, 1997; Nikjoo, 1982).

#### 4.2.3 Compositions

The students were also asked to write a composition on the topic of "*If you could travel back in time or into the future, which would you choose and what exact period of time would you like to experience?*" and the produced texts were used as data sources for text analysis procedure.

#### 4.2.4 Wordsmith Tools

Then, a computerized text analysis program (Wordsmith Tools, Scott, 2009) was used to analyze the data. Wordsmith Tools is an integrated package of text analysis programs designed to examine how words behave in texts (Li, 2000). Wordsmith Tools has three major programs i.e. Wordlist, Concord, and Keywords. In the present study Wordlist and Concord were used for the analysis of the texts. Wordlist was used for the analysis of syntactic complexity in terms of average sentence length of a given text (see appendix D). Also, Wordlist was used for the lexical analysis in terms of lexical diversity and lexical density because this program has a statistic function that provides statistics of type/ token ratio. It also provides ready information for sentence length. The concord program was used to search for the occurrences of subordinated and coordinated structures for the calculation of ratio of subordination used in a given text as a secondary measure of syntactic complexity. This software is able to count the number of subordinate and coordinate structures of a given text. For this purpose, three lists of functional, subordinate, and coordinate words were given to the program and also all the compositions were converted to available information to the computer. So, the software was

able to count the number of functional, subordinate, and coordinate structures and also average sentence length and total number of words of each composition. Then the researcher was able to calculate ratio of subordination, lexical diversity, and lexical density based on the related formulas.

#### 4.3 Procedure

The 112 students of different classes in two university of Ghaemshahr and Babolsar were instructed to write a 250-350 word composition. Then they were asked to fill out the Eysenck impulsive/ reflective questionnaire. They were instructed not to spend too much time to answer the questions and if there is not any answer appropriate in their minds to choose the? item. After one week, the same students were asked to participate in the TOEFL and also Eysenck extrovert/ introvert questionnaire. The two personality questionnaires were administered with a week interval because the researcher hoped to reduce the test effect of the first administered questionnaire on the second one. The collected data were used to estimate the measures of linguistic properties of written productions for each group of students. Then the calculated linguistic indices for each group were compared with each other through three independent sample t-tests.

In this study the researcher tried to assess students writing in a somehow new way i.e. objective scoring. The students' writings were scored based on the linguistic characteristics of their writings. By linguistic characteristics of learners' writing we mean syntactic complexity and lexical complexity. Syntactic complexity is assessed by: (1) average sentence length, and (2) the ratio of subordinated structures. Lexical complexity is assessed by: (1) lexical diversity, and (2) lexical density (Li, 2000). According to Li (2000), average sentence length is calculated by average number of words per sentence. The statistic function of Wordlist provides information on the average sentence length of a given text.

Li (2000) also notes that Ratio of subordination is calculated by the ratio of the number of subordinated structures to the combination of subordinated structures and coordinated structures in a piece of writing. Using the Concord program, finding the number of subordinated structures and coordinated structures is possible. The Concord program was used to search the occurrences of subordinated and coordinated structures for the calculation of the ratio of subordination used in a given text as a secondary measure of syntactic complexity.

*Ratio of Subordination= number of subordinated structures/ combination of subordinated structures and coordinated structures*

Li (2000) also calculates lexical diversity by having the number of different words including both content and function words divided by the total number of words in a piece of writing. The Wordlist program provides ready information on the type/ token ratio. The formula for calculating lexical diversity is as follows;

*Lexical Diversity= number of different words (type) ×100/ total number of tokens*

Lexical density is calculated by having the number of lexical items excluding function words divided by the total number of words in a piece of writing (Li, 2000). The formula for calculating lexical density is as follows;

$$\text{Lexical Density} = \text{number of different lexical words} \times 100 / \text{total number of tokens}$$

Measures of lexical density, lexical diversity, average sentence length, and ratio of subordination were calculated by Word Smith Tools software for each piece of writing and then the effects of learners' personality types, cognitive style and gender on each of these linguistic properties were investigated through three independent sample t-tests. The probability level of significance for independent sample t-tests is set at .05.

## 5. Results

To answer the research questions and examine the significance of the difference among the mean scores of these three dichotomous groups, students' written production was analyzed through three independent samples T-test. The information provided by this analysis is presented in Tables 1, 2 and 3.

To examine the first research question the linguistic scores of these two groups of learners were analyzed by an independent sample T-test and the result of this analysis is shown in Table 1.

Table 1. Differences in the linguistic measurements of writings of Extroverts and Introverts

variables	extroverts mean	introverts mean	t-test	p value
sentence length	17.39	16.74	-0.71	0.48
ratio of subordination	0.41	0.41	0.20	0.84
lexical diversity	53.88	50.68	-2.11	<b>0.038*</b>
lexical density	0.71	0.71	0.81	0.42

\*Significant at  $P < 0.05$ .

As indicated in Table 1, a significant difference at the probability level of  $P < 0.05$  ( $df = 84$ ) was found between the extroverts and introverts in the means of lexical diversity. Such results suggest variation in extroverts and introverts at lexical complexity level.

To examine the second research question the linguistic indices of these two groups of learners were analyzed by another independent sample T-test and the result of this analysis is shown in Table 2.

Table 2. Differences in the linguistic measurements of writings of Impulsive and Reflective learners

variables	Impulsive	Reflective	t-test	p value
sentence length	17.90	16.36	1.71	0.09
ratio of subordination	0.40	0.41	-0.35	0.73
lexical diversity	53.06	51.86	0.79	0.43
lexical density	0.71	0.70	0.55	0.59

As it is obvious in Table 2, reflective and impulsive learners did not have any significant difference in terms of their writings' linguistic features. It means that, being reflective or impulsive makes no difference in linguistic characteristics of students' performance.

To examine the third research question the linguistic scores of these two groups of learners were analyzed by another independent sample T-test and the result of this analysis is shown in Table 3.

Table 3. Differences in the linguistic measurements of writings of Female and Male learners

variables	Female	Male	t-test	p value
sentence length	17.43	16.51	1.01	0.32
ratio of subordination	0.42	0.383	1.18	0.24
lexical diversity	52.84	51.70	0.68	0.50
lexical density	0.71	0.70	0.98	0.33

There was not any significant difference among male and female learners in terms of mean score of linguistic features of their writings. So we can surely accept the null hypothesis and say that learners' gender does not have any effect on linguistic characteristics of their writings.

## 6. Discussion

This study aimed to investigate the possible difference among different groups of learners in terms of linguistic characteristics of their writings. The linguistic characteristics specified for this study were sentence length, ratio of subordination, lexical diversity and lexical density.

As it is indicated in Table 1, extroverts tended to use more words in their sentences and so they wrote in longer sentences. Although this difference did not show the favorable level of significance, it does appear to mirror the findings of earlier studies in this field (i.e. Gill and Oberlander, 2002). As cited in Gill and Oberlander (2002), Carment, Miles, and Cervin (1965), proposed that extroverts can be described as individuals who think out loud, do most of the talking, are less self-focused, and tend to skip from topic to topic. This willingness to do most of the talking or in our case writing (expressing oneself in general) may have led our extroverts to write longer sentences. With regard to the other measure of syntactic complexity, though not significantly, introverts' written performance showed larger ratio of subordination. It means that introverts used more subordinate structure in their writings. As it is obvious, one of the two measures of syntactic complexity is larger in extroverts and the other is larger in introverts. Since no one of these differences is significant, the first hypothesis cannot be rejected in case of syntactic complexity. So, there is not any significant effect of extroversion/ introversion personality type of learners on syntactic complexity of their compositions.

The other linguistic property is lexical complexity and it is measured via lexical diversity and lexical density. As it is marked with an asterisk, the *p* value of lexical diversity points to the significant difference between extroverts and introverts, regarding this measure of lexical complexity. Significantly, extroverts used a larger variety of words to express themselves than introverts. So, the extroverts used more different types of words in their writings. Considering extroverts as "expressive" (Eysenck, 1999), it seems somehow natural for these learners to use more different types of words to express themselves.

With regard to lexical density, there was no significant difference between extroverts and introverts. The results showed the same number of lexical density for introverts and extroverts, so there was no significant difference. However, Gill (2003) concluded from previous research that extrovert language contains more adverbs, pronouns, and verbs (i.e., more 'implicit'), and has a lower lexical density (Type-Token Ratio); it contains fewer nouns, modifiers and prepositions (less 'explicit'), and is less formal. Apparently, in case of lexical complexity, like syntactic complexity, one measure (lexical diversity) is larger in extroverts and the other measure (lexical density) is larger in introverts. Since in case of lexical density the difference between extroverts and introverts was not significant, we can reject the first hypothesis in this case and propose that extrovert/introvert type of personality does have effect on lexical complexity of learners' writings. So, extroverts write in more lexically complex way.

As indicated in Table 2, impulsive learners wrote longer sentences than reflective learners. Also, though not significantly, the amount of lexical diversity and lexical density mean scores in impulsive learners' writings are larger than those of reflective learners. In three of four cases the impulsive subjects had larger measures of various linguistic features in their writings; however, none of these differences were significant. So we can reject the second hypothesis

and claim that there is no effect of reflectivity/ impulsivity personality type of learners on linguistic characteristics of their written production.

With regard to the third research question, females' written productions indicated larger measures of linguistic properties in all of its variables than males; however, none of these differences were significant (Table 3). According to Jones and Myhill (2007), only limited evidence supported the argument that, in terms of the linguistic characteristics of the written outcomes, boys and girls are differently literate. This study, along with many other studies in this field, supported the notion of instability of statistically significant data in terms of gender and writing; those differences that have arisen in one study may not be replicable, and a further study in a different year with different writing tasks might furnish different results.

To sum up, among different aspects of learner characteristics that were investigated in this study, the emotional side of human behavior was found to be the most influential in written performance of learners. This study obviously supported the notion that affective components contribute more to language learning than cognitive skills (Stern, 1983, Chastain, 1988). We have searched for the effects of learner variables on linguistic characteristics of the written performance of learners. Among all of these variables, the affective factor extroversion/introversion seems to play an important role in the most detailed aspects of person's performance. Lexical complexity of learners' writings was the most sensitive feature of the produced text to the personality of the producer of the text. Extroverts and introverts do write differently in terms of lexical complexity of their written work. These findings are in line with the central notion of language psychology that the words people use reflect who they are. Other learner variables such as cognitive factors and biological factors did not reveal any significant difference in learners' writings in terms of linguistic properties.

In a nutshell, this study found learner variables to be influential factors in learning second language and consequently in learning outcomes. The findings showed that extroversion/introversion type of personality of the learner is an important factor in determining how they use words in their compositions. The extroverts tended to use more various types of words in their writings and accordingly they had more lexical complexity in their productions.

The most apparent advantage of personality factors research is that it helps teachers to bear in their minds that personality factors have significant effects on language learning. In order to provide successful instruction, teachers need to learn to identify and understand their students' individual differences. Language learning success is intricately interwoven with a range of factors, including age, sex, motivation, intelligence, anxiety, learning strategies, and language learning styles.

As it was mentioned before, different researchers defined linguistic properties of a text in different ways. In this study we followed Li's (2000) approach to linguistic properties and selected lexical complexity and syntactic complexity as two measures of linguistic characteristics of learners' writings. Grammatical accuracy is another linguistic property that can be investigated through written performance of learners with different types of personalities. Our study searched for the various linguistic properties at sentence level. Further, more technically sophisticated analyses can be carried out. In order to have a more

comprehensive understanding of the characteristics of second language writing, future investigation should also take into account discourse-level written features such as coherence, development of main ideas and organization.

## References

- Adler, N., & Stewart, J. (2007). Self-Esteem. Revised November 2, 2007 from Psychological Working Group. [Online] Available: <http://www.macses.ucsf.edu/Default.htm>
- Argamon, S., Dhawle, S., Koppel, M., & Pennebaker, J. W. (2005). Lexical predictors of personality type. In *Proceedings of the 2005 Joint Annual Meeting of the Interface and the Classification Society of North America*.
- Brown, H. D. (2000). *Principles of language learning and teaching*. White Plains: Pearson Education.
- Bryant, J., & Vorderer, P. (2006). *Psychology of entertainment*. London: Routledge.
- Celce-Murcia, M. (2001). *Teaching English as a second or foreign language*. New York: Thomson Learning.
- Chastain, K. (1988). *Developing second language skills: Theory and practice*. Florida: Harcourt Brace Jovanovich.
- Eysenck, H. J., & Eysenck, S. B. G. (1975). *Manual of Eysenck personality questionnaire (junior and adult)*. London: Hodder and Stoughton.
- Gill, A. (2003). *Personality and Language: The projection and perception of personality in computer-mediated communication*. Ph.D. thesis, University of Edinburgh, Edinburgh, UK.
- Gill, A., & Oberlander, J. (2002). Taking care of the linguistic features of extraversion. In *Proceedings of the 24th Annual Conference of the Cognitive Science Society*, 363-368.
- Harmer, J. (1991). *The Practice of English Language Teaching*. London & New York: Longman.
- Kagan, J. (1966). Reflection- impulsivity: the generality and dynamics of conceptual tempo. *Journal of Abnormal Psychology*, 71, 17-24. <http://dx.doi.org/10.1037/h0022886>
- Kagan, J., Pearson, L., & Welch, L. (1966). Conceptual impulsivity and inductive reasoning. *Child Development*, 37, 538-594.
- Karbalaei, A. (2008). Who is in Advantage: Extrovert or Introvert? *South Asian Language Review*, 18(1), 17-27.
- Kiany, G. (1999). Performance on different test methods as a function of extroversion and pedagogical setting. *IJALT*, 4(1), 37-101.
- Li Y. (2000). Linguistic characteristics of ESL writing in task-based e-mail activities. *System* 28, 229-245. [http://dx.doi.org/10.1016/S0346-251X\(00\)00009-9](http://dx.doi.org/10.1016/S0346-251X(00)00009-9)



- Mastor, K., A., & Ismail, A., H. (2004). Personality and cognitive style differences among matriculation engineering and information technology students. *World Transactions on Engineering and Technology*, 3(1).
- Nikjoo, N. (1982). Factorial Structure of the EPQ in Iran. Unpublished Ph.D. dissertation, University of Ulster.
- Nowson S. (2006). The Language of Weblogs: A study of genre and individual differences. Unpublished Ph.D. thesis, University of Edinburgh.
- Pennebaker, J. W., & King, L. A. (1999). Linguistic styles: language use as an individual difference. *Journal of personality and social psychology*, 77(6), 1296-1312. <http://dx.doi.org/10.1037/0022-3514.77.6.1296>
- Robertson, I. T. (1985). Human information-processing strategies and style. *Behavior and Information Technology*, 4(1), 19-29. <http://dx.doi.org/10.1080/01449298508901784>
- Schmitt, N. (2002). *An Introduction to Applied Linguistics*. New York: Arnold Publishers.
- Scott, M. (2009). *Wordsmith Tools*. Liverpool: Lexical Analysis Software.
- Sepassi, F. (2006). Age-related Variations in E.F.L Learners' Attentiveness to Prosodic vs. Syntactic Cues of Sentence Structure. *The Asian EFL Journal Quarterly*, 8(2).
- Sharp, A. (2004). Language learning and awareness of personality type in Chinese settings. *Asian EFL Journal*, 1, 1-13.
- Tennant, M. (1988). *Psychology and adult learning*. London: Routledge. <http://dx.doi.org/10.4324/9780203441619>
- Verhoeven, L., & Vermeer, A. (2002). Communicative competence and personality dimensions in first and second language learners. *Applied Psycholinguistics*, 23.
- Williams, M., & Burden, R.L. (1997). *Psychology for Language Teachers: A Social Constructive Approach*. Cambridge: Cambridge University Press.
- Witkin, H. A., & Goodenough, R. D. (1981). *Cognitive styles: Essence and origin*. New York: International University Press.