



Cognitive Style, Awareness, and Learners' Intake and Production of Grammatical Structures

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Abstract

This study investigated how awareness affected learners' intake and production in relation to their cognitive styles. It is assumed that learners' cognitive styles may affect their ability to notice particular features in the input and, consequently, their intake and production. Adult learners of English were exposed to four English structures through four sets of problem-solving tasks, followed by posttest assessment tests. The participants were asked to think aloud while performing the problem-solving tasks, and their voices were recorded. These online think-aloud protocols, along with postexposure questionnaires, were used to assess the three levels of awareness. Learners' cognitive styles were determined using the Ehrman and Leaver Learning Styles Questionnaire. Results indicated that (1) cognitive styles did not have any significant impact on levels of awareness reported in the think-alouds; (2) cognitive styles did not significantly affect the intake of the target structures; and (3) cognitive styles were not significantly related to the production of the target structures.

Keywords: awareness; noticing; understanding; cognitive style; intake; production.

Introduction

The role awareness plays in second language acquisition (SLA) has been the subject of much debate during the past two decades. Encouraged by Schmidt's (1990, 1994, 1995, 2001, 2010) noticing hypothesis and Tomlin and Villa's (1994) model of attention, majority of the SLA studies have attempted to address the issue of awareness from both theoretical and empirical perspectives. In general, the literature suggests a positive role for awareness (Ellis, 1997; Leow, 1997, 2000, 2001; Mackey, 2006; Robinson, 1995b; Rosa & Leow, 2004; Rosa & O'Neill, 1999), but the results are not conclusive, and controversies still exist (Carr & Curran, 1994; Tomlin & Villa, 1994; Truscott, 1998). As Leow (2002), Rosa and O'Neill (1999), Schmidt (2001, 2010), and Simard and Wong (2001) point out,

researchers need to further investigate how different levels of awareness impact learning and how individual differences affect what learners pay attention to in the input.

Awareness in SLA

How awareness affects the processing of L2 data has been a controversial topic in SLA research. On the one hand, several researchers (Tomlin & Villa, 1994; Truscott, 1998) have argued for the dissociation between awareness and learning. Drawing on the works of Carr and Curran (1994) and Curran and Klee (1993), Tomlin and Villa (1994) claim that "none of the central components of attention--alertness, orientation, or detection--require awareness, either to operate or as the result of processing" (p. 193). In other words, even detection, which is the level at which acquisition takes place, does not require awareness to operate. Similar-

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ly, Truscott (1998) and Cross (2002) argue that the concepts of noticing and awareness are vague, are based on intuition, and lack solid empirical support. They believe that noticing can result only in metalinguistic knowledge rather than the development of competence. Others, on the other hand, view awareness as a necessary condition for language learning (Robinson, 1995b; Schmidt, 1990, 1993, 1994, 1995, 2001, 2010). Schmidt's (1990) noticing hypothesis postulates that awareness at the level of noticing is "the necessary and sufficient condition for conversion of input into intake" (p. 129). Intake, the first stage in language acquisition, is needed for subsequent processing of L2 data (Ellis, 1997).

Schmidt (1990, 1993, 1994) distinguishes between two levels of awareness: *noticing* and *understanding*. Noticing refers to the "conscious registration of the occurrence of some event" (Schmidt, 1990, p. 29), whose objects are of surface structure, exemplars, and instances of language. Understanding represents a higher level of awareness, at which learners reflect on the objects of noticing and attempt to discover patterns and underlying rules. By the same token, Robinson (1995b), defining noticing as "detection plus rehearsal in short-term memory" (p. 295), claims that no learning can take place without awareness.

The positive role of awareness in language learning has received some empirical support. For example, Leow (1997, 2001), who studied the impact of three levels of awareness on learners' intake and production of Spanish morphological forms using problem solving tasks and online think-aloud protocols, found that more awareness led to more intake and more accurate written production of the target forms. Similarly, examining the intake and production of Spanish conditional sentences in the context of problem solving tasks, Rosa and O'Neill (1999) and Rosa and Leow (2004) concluded that awareness at the level of both noticing and understanding significantly affected learners' intake and production, and that understanding had a differential impact when compared to noticing.

Cognitive Styles and Awareness

A major problem in raising learners' awareness of properties of L2 data is that learners are not free to notice whatever they want and whenever they want. Teachers are not always successful in

drawing learners' attention to particular linguistic features in the input. The ability to notice something is constrained by such individual and instructional variables as cognitive styles (Skehan, 1998), aptitude (Robinson, 1995a), working memory (Sawyer & Ranta, 2001), motivation (Schmidt, 2010), task demands (Rosa & O'Neill, 1999), perceptual salience (Sharwood Smith, 1993), and readiness (Park, 2004).

Some researchers argue that cognitive styles, which are defined as "an individual's preferred and habitual modes of perceiving, remembering, organizing, processing, and representing information" (Dornyei, 2005, p. 124), are related to Schmidt's conceptualization of awareness. For example, in personal communication with Rosa and O'Neill (1999), Robinson hypothesizes that learners with higher linguistic analytic abilities tend to produce verbal reports demonstrating higher levels of awareness while memory-oriented learners may produce verbal reports containing lower levels of awareness. Similarly, Skehan (1998), in his dual-coding approach to learners and learning, proposes that there are two types of learners, analysis-oriented (or rule-based) and memory-oriented (or exemplar-based). Analysis-oriented learners tend to develop rule-based representations of language whereas memory-oriented learners tend to store lexicalized exemplars in their memory. He argues that these two cognitive styles may relate to the two levels of awareness proposed by Schmidt (1990, 1994, 1995).

The synoptic-ectenic cognitive style proposed by Ehrman and Leaver (2003) also seems to be related to the concept of awareness. According to Ehrman, Leaver, and Oxford (2003), synoptic learning is holistic and relies on intuition and subconscious control, whereas ectenic learning is atomistic and occurs under conscious control of the learner. According to Dornyei (2005), synoptic and ectenic cognitive styles bear a resemblance to Skehan's (1998) analysis-oriented and memory-oriented learners. Learners with synoptic style are more memory-oriented, while ectenic learners are more analytic in nature. The only difference is that the cognitive styles proposed by Skehan (1998) are more like abilities than preferences.

Sternberg and Grigorenko (2001), on the contrary, adopt a somewhat different position on the

conscious nature of styles. They claim that “at a basic level styles and strategies can be distinguished by the ‘degree of consciousness’ involved. Styles operate without individual awareness, whereas strategies involve a conscious choice of alternatives” (p. 3).

E&L Model of Cognitive Styles

A brief review of literature reveals that many models of cognitive styles have been proposed (Ehrman & Leaver, 2003; Oxford, 1995; Reid, 1995; Skehan, 1998). The latest and most comprehensive taxonomy of cognitive styles comes from Ehrman and Leaver (2003). Their model, labeled as E&L construct, consists of a superordinate construct, synopsis-ectasis, and ten subscales. These ten subscales are (1) field sensitivity-field insensitivity, (2) field independence-field dependence, (3) random-sequential, (4) global-particular, (5) inductive-deductive, (6) synthesis-analysis, (7) analogue-digital, (8) concrete-abstract, (9) leveling-sharpening, (10) impulsivity-reflectivity. The cognitive scales to the left of the model (i.e., the first component of each subscale) tend to be synoptic, while those to the right tend to be analytic and more comfortable with grammar rules (Ehrman & Leaver, 2003; Leaver, Ehrman, & Shekhtman, 2005).

Field independents prefer to separate what is intended to be learned from its context, whereas field dependents tend to deal with information in a more holistic way. Similarly, field-sensitive learners prefer to consider materials as part of context. Filed-insensitive learners, however, prefer not to make use of context but learn language in isolated rules (Ehrman, 1997).

Random learners develop their own approaches to learn language. Sequential learners, on the other hand, prefer to follow the order predetermined by the text book or syllabus. Globals have the tendency to attend to the whole picture and see the *big picture*. Particulars attend to discrete items and details first; that is, they move from form to meaning and use bottom-up processing (Oxford, 1995).

Inductive-deductive scale refers to how learners deal with language rules. Inductive learners tend to start with specific examples and move to more general rules. An opposing approach is preferred by deductive learners who prefer to form rules to specific examples (Dornyei, 2005). Synthetic-analytic scale refers

to the directionality of processing information (i.e., putting the information together or taking it apart). Synthetic learners tend to assemble known facts and build something new. Analytic learners, in contrast, prefer rules because they can break them down into smaller components. According to Ehrman and Leaver (2003) synthesizing is an unconscious process whereas analyzing is a conscious process.

Analogue-digital processing has been drawn from computer system processing. Digital thinkers rely on surface strategies like memorization. Analogue learners have strong preference for learning materials using deep strategies. Concrete-abstract style refers to the amount of hands-on experience an individual prefers (Ehrman et al., 2003). Concrete learners are experiential, control their learning consciously, and prefer real materials and examples. Abstract learners, on the contrary, like pictures and explanations. They learn better through theories, concepts, lectures, and books.

Leveling-sharpening style concerns how an individual commits materials to memory. Levelers are able to easily notice patterns in the language input and see the underlying rules. Sharpeners, on the other hand, tend to notice differences and distinctions. They seem to be at an advantage in noticing disparities and attending to subtle distinctions between form and meaning. Impulsivity-reflectivity scale refers to the speed and manner of processing information (Leaver et al., 2005). Impulsive learners tend to react spontaneously. They are liable to pay little attention to what is being said by others and by themselves. As a result, they may not notice errors in their production. Reflective learners, on the contrary, think before they respond. This makes them be more accurate in their language production and use.

Rational and Research Questions

Given that awareness plays an important role in SLA and that learners’ ability to notice linguistic forms in the input is constrained by a number of instructional and learner variables, the present study aimed at investigating the role of cognitive style in raising learners’ awareness of target linguistic structures and, subsequently, the intake and production of those structures. The impetus for the present study was provided by Schmidt (1990, 2001), Leow (2002), Rosa and O’Neill (1999), Simard and Wong (2001), Skehan (1998), and Dornyei (2005).

Following Dornyei, it was assumed that Ehrman and Leaver's (2003) synoptic-ectenic classification was related to the two levels of awareness proposed by Schmidt (1990). Synoptic learners tend to rely on subconscious processing, whereas ectenic learners are more prone to conscious processing. To the best of the authors' knowledge, no study has yet addressed the relationship between cognitive styles (as preferences) and awareness in SLA.

The research questions addressed in this study were:

1. Does synoptic-ectenic cognitive style have any statistically significant impact on the levels of awareness reported during task performance?
2. Does synoptic-ectenic cognitive style significantly affect the learners' intake of the target structures?
3. Does synoptic-ectenic cognitive style significantly affect the learners' semi-controlled production of the target structures?

Method

Participants

Participants of the present study were 123, including 16 male and 107 female, first-year university students of English Translation and English Teaching. These participants were drawn from a subject pool of 249 learners. One hundred and twenty six learners were eliminated at different phases of the study for a variety of reasons including prior familiarity with the target structures, incomplete or lack of verbalization, incomplete task performance, or subject attrition. Participants were also homogenized on their language proficiency level using the Babel English Language Placement Test. They were found to at pre-intermediate level of proficiency.

Instruments

Target Grammatical Structures

Four English grammatical structures were selected for this study. Their selection was guided by a number of reasons. First, as far as the researchers' knowledge goes, no study has yet examined awareness in relation to English sentences. Second, the results of a pilot study revealed that most learners demonstrated little or no familiarity with them. Third, these structures seemed to fit in the same type of tasks (i.e., multiple choice puzzle tasks) used in the

present study.

On the basis of the criteria mentioned above, the four grammatical structures were:

1. Subjunctive
I suggested that he have dinner with me.
2. Causative construction
I could get her to understand the problem.
3. Conditional sentence type II
If I had some money, I would lend you a few dollars.
4. Wish + past simple

I wish you were here.

The first construction is present subjunctive that indicates hope and likelihood. The second is a causative construction, which expresses the idea of someone causing something to take place. The third one is conditional II, which refers to an action in the present time that could happen if the present situation were different. The last construction is a past subjunctive that is associated with unreality or unlikelihood in the present time. These structures seemed to be at different levels of perceived complexity for the learners. For the purpose of simplicity, these structures are referred to as *Subjunctive*, *Get*, *If* and *Wish* constructions, respectively, in the present study whenever needed.

Treatment Tasks

In order to expose the participants to each of the target structures, ten problem-solving tasks in the form of multiple choice puzzles (Figure 1), adapted from Rosa and O'Neill (1999), were used. Seven of the puzzles contained the target structure and three acted as distractors. Since this study included four grammatical structures, four sets of puzzles were used, each focusing on one of the structures.

For each puzzle, one picture, depicting the meaning of the sentence, and the first part of the grammatical structure were printed. Then, four movable cards that contained the second part of the structure, differing only in the tense form of the verb, were attached onto the page using a weak adhesive. On the right, next to the first part of the structure, there was a slot, where one of the movable cards could grammatically fit. The participants' task was to complete each puzzle by moving one of the cards and fitting it into the slot.

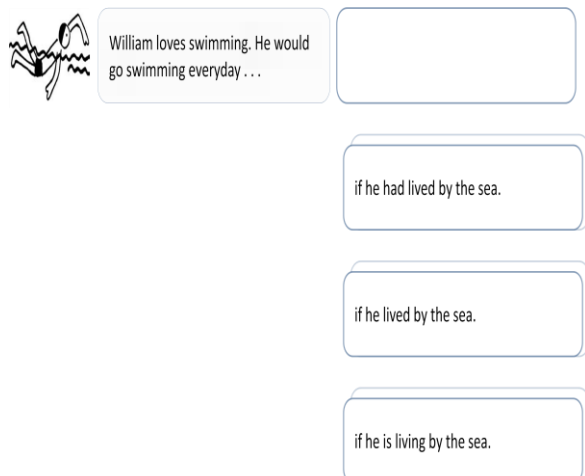


Figure 1. A Sample Puzzle Task

Assessment Tasks

The Babel English Language Placement Test

The Babel English Language Placement Test consists of four sections of 25 reading, grammar, and lexical items. This test can accurately indicate the general language proficiency of the learners. Its reliability and item characteristics were examined through a pilot study.

Multiple Choice Recognition Tests

In order to measure the learners' intake of the target structures, the researchers constructed four multiple choice recognition tests, each containing one of the structures. Each test consisted of eleven items, of which eight sentences contained the target structure and three were distractors. The tests were piloted and the reliability, as well as the item difficulty and discrimination, indexes were examined prior to pretesting.

Semi-Controlled Production Tests

In order to investigate whether exposure to the L2 data led to processing beyond the initial stage of intake (i.e., production), the researchers developed four semi-controlled 9-item production tests. Six of the items contained targets and three were distractors. These tests were also piloted and analyzed for reliability after assigning scores to successfully completed sentences.

Post-Exposure Questionnaires

Data from these questionnaires, adapted from (Rosa & Leow, 2004), were used as a complementary source to determine (1) whether participants were familiar with the target structures at the outset of the study, (2) whether they noticed anything special in the puzzles, or

(3) whether they could verbalize any rules in relation to the puzzles. Participants' prior familiarity with the target structures was mainly controlled during the pretest through the multiple choice and production tests, and their levels of awareness while performing the tasks were mainly determined through online think-aloud protocols.

The E&L Learning Style Questionnaire

For the purpose of identifying participants' cognitive styles, the researchers used the Persian Translation of the E&L Learning Style Questionnaire (Appendix A), developed by Ehrman and Leaver (2002). According to Ehrman and Leaver (2003), the English version of the questionnaire has been developed based on the E&L model of cognitive styles and has undergone the validation process at the Foreign Service Institute for several years. No psychometric properties have, however, been reported by the authors. It consists of thirty 9-point semantic differential items, three items for each of the ten subscales. It gives an estimate of the individual's cognitive style on a superordinate scale of synoptic-ectenic and ten subscales.

Procedure

The Pretest Phase

The pretest phase of the study took place two weeks before the experiment. During the pretest, participants were given the Babel English Language Placement Test, four multiple choice recognition tests (each test containing one target structure), four semi-controlled production tests (each test containing one target structure), and the E&L Learning Styles Questionnaire. The data from the recognition tests and semi-controlled production tests were used to control the participants' prior familiarity with the target structures. The participants who scored above the expected chance score (e.g. 2 out of 8) were excluded from the study. Based on the findings of a pilot study, the participants were allowed to complete each of the recognition and semi-controlled production tests in about four and eight minutes, respectively.

Prior to pretesting, the E&L Learning Styles Questionnaire was translated into Persian and the reliability of the whole and each of the subscales was investigated through a pilot study. Some modifications were made to the wording of some items based on the results of the pilot study

and the written feedback received from the participants. Using the data from the pretest, the reliability of the questionnaire was reexamined. The reliability of the whole questionnaire was found to be 0.778, whereas the reliability indexes of the subscales ranged between 0.571 and 0.853. The data from this questionnaire were used to determine the cognitive styles of the participants.

The Experiment and Posttest Phase

The experiment (i.e. exposing learners to the target structures) and posttest (i.e. administering the recognition and semi-controlled production tests) were carried out in two sessions, each for two of the structures. Two measures were taken in order to minimize the practice effect. First, about half of the participants received “Subjunctive and Get” during the first session and “If and Wish” during the second session. The other half, on the contrary, received “If and Wish” during the first session, and “Subjunctive and Get” during the second session. Second, two randomly ordered versions of all puzzle tasks and the assessment tests were prepared and used. Based on the finding of a pilot study, the participants were given ten minutes to complete the puzzles.

On the day of the experiment, the participants were collectively taken to the language laboratory, where their think-alouds could be recorded while they were performing the puzzle tasks.

In the laboratory, the participants received a pack containing ten puzzle tasks, one postexposure questionnaire, one multiple choice recognition test, and one semi-controlled production test for each structure. Before the experiment began, one of the researchers first provided explanations on how to proceed through the experiment (e.g., how to move the cards in order to complete the puzzles) and then instructed them to think aloud while performing the puzzle tasks. They were asked to speak loudly and clearly to their microphones as their voices were being recorded. Following Camps (2003), the same researcher performed an example of think-aloud using a multiplication task. Throughout the experiment, the participants were reminded of thinking aloud from time to time. These recorded think-aloud protocols were later used to determine the participants’ levels of awareness.

Operationalization of Awareness, Intake, and Production

The researchers closely followed the guidelines

and criteria set forth by Allport (1988), Schmidt (1990, 1994, 1995), Rosa and O’Neill (1999), and Rosa and Leow (2004) to determine the levels of awareness reported by the participants in their think-aloud protocols and post-exposure questionnaires. The think-aloud protocols were coded and the participants were classified as No Report (NR), Noticing (N), or Understanding (U). Participants who did not provide any verbal evidence that they were aware of the target structures were coded as NR. They were classified as N when they demonstrated any verbal reference to the target structures without any mention of rules underlying them. When the participants provided some form of metalinguistic description or explicit formulation of the rules underlying the target structures, they were coded as U. The post-exposure questionnaires acted as a complement. The think-alouds were transcribed, coded, and the inter-rater reliability was estimated. For this purpose, 25% randomly selected think-alouds were coded by one of the researchers and another rater. The Cohen’s Kappa was found to be $Kappa = 0.967$, $p = 0.000$. The coding procedure was determined a priori to the collection of think-alouds.

Following Leow (1997, 2001) and Rosa and Leow (2004), intake, which is the first stage in L2 learning process, was measured through multiple choice recognition tests administered immediately after the completion of the puzzles and post-exposure questionnaires. Learners’ production (i.e. the ability to process the L2 data beyond the initial stage of intake), was assessed through semi-controlled production tests, administered after the recognition tests.

Results

Learners were codified as either synoptic or ectenic based on their responses on the E&L Learning Styles Questionnaire (Ehrman & Leaver, 2002), and then compared in terms of the levels of awareness reported in the think-alouds, intake, and production.

In order to answer the first research question, four separate Chi Square analyses were conducted. Table 1 presents the distribution of awareness categories (i.e., NR, N, and U) in relation to the ectenic and synoptic cognitive styles separately for Subjunctive, Get, If, and Wish structures.

Table 1.
Frequency Table for Awareness in Relation to Cognitive Styl

		Subjunctive			Total	
		NR	N	U		
CogStyle	Ectenic	Count	33	13	15	61
		Expected Count	36.2	11.4	13.4	61.0
		Std. Residual	-.5	.5	.4	
	Synoptic	Count	40	10	12	62
		Expected Count	36.8	11.6	13.6	62.0
		Std. Residual	.5	-.5	-.4	
Get						
CogStyle	Ectenic	Count	28	11	22	61
		Expected Count	28.3	13.9	18.8	61.0
		Std. Residual	-.1	-.8	.7	
	Synoptic	Count	29	17	16	62
		Expected Count	28.7	14.1	19.2	62.0
		Std. Residual	.1	.8	-.7	
If						
CogStyle	Ectenic	Count	26	15	20	61
		Expected Count	24.8	16.4	19.8	61.0
		Std. Residual	.2	-.3	.0	
	Synoptic	Count	24	18	20	62
		Expected Count	25.2	16.6	20.2	62.0
		Std. Residual	-.2	.3	.0	
Wish						
CogStyle	Ectenic	Count	26	13	22	61
		Expected Count	25.8	12.9	22.3	61.0
		Std. Residual	.0	.0	-.1	
	Synoptic	Count	26	13	23	62
		Expected Count	26.2	13.1	22.7	62.0
		Std. Residual	.0	.0	.1	

The results of the Chi Square analyses (Table 2) did not show any statistically significant relationship between synoptic-ectenic cognitive style and the levels of awareness. Therefore, considering the Chi Square values of : $X^2(2, N = 123) = 1.388, p = 0.500$ for Subjunctive;

$X^2(2, N = 123) = 2.243, p = 0.326$ for Get; $X^2(2, N = 123) = 0.345, p = 0.842$ for If; and $X^2(2, N = 123) = 0.014, p = 0.993$ for Wish, it was concluded that synoptic and ectenic learners did not differ in terms of their levels of awareness.

Table 2 .
Chi Square Test Results for Awareness in Relation to Cognitive Style

		Value	df	Asymp. Sig. (2-sided)
Subjunctive	Pearson Chi-Square	1.388 ^a	2	.500
	Likelihood Ratio	1.391	2	.499
	Linear-by-Linear Association	1.110	1	.292
	N of Valid Cases	123		
Get	Pearson Chi-Square	2.243 ^a	2	.326
	Likelihood Ratio	2.256	2	.324
	Linear-by-Linear Association	.505	1	.477
	N of Valid Cases	123		
If	Pearson Chi-Square	.345 ^a	2	.842
	Likelihood Ratio	.345	2	.842
	Linear-by-Linear Association	.048	1	.826
	N of Valid Cases	123		
Wish	Pearson Chi-Square	.014 ^a	2	.993
	Likelihood Ratio	.014	2	.993
	Linear-by-Linear Association	.011	1	.915
	N of Valid Cases	123		

The second research question addressed the effect of the cognitive style on learners' intake. An independent t-test analysis was run to compare the amount of intake between synoptic and ectenic learners. As Table 3 shows, the means scores of both ectenic ($M = 3.73$) and synoptic ($M = 3.92$) groups are very close. The results of

the t-test analysis, $t(121) = 0.544$, $p = 0.587$, further confirmed that the difference was not significant (Table 4). Synoptic and ectenic learners did not differ in relation to the intake of the target structures; therefore, it can be stated that there is no statistically significant relationship between synoptic-ectenic cognitive style and the amount of intake.

Table 3.
Descriptive Statistics for Intake in Relation to Cognitive Styl

	CogFactor	N	Mean	Std. Deviation	Std. Error Mean
PostIntake	Ectenic	61	3.73	1.930	.247
	Synoptic	62	3.92	1.937	.246

Table 4 .
T-Test for Intake in Relation to Cognitive Style

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	.220	.640	-.544	121	.587	-.190	.349
Equal variances not assumed			-.544	120.981	.587	-.190	.349

The third research question, which aimed at investigating the synoptic-ectenic cognitive style in relation to the written production of the four target

grammatical structures, was examined using descriptive statistics, presented in Table 5, and an independent samples t-test analysis, presented in Table 6.

Table 5 ,
Descriptive Statistics for Semi-Controlled Production in Relation to Cognitive Style

	CogFactor	N	Mean	Std. Deviation	Std. Error Mean
PostProduction	Ectenic	61	1.9877	1.28811	.16493
	Synoptic	62	2.3911	1.26962	.16124

Examining the mean column of Table 5 indicated that the mean score of synoptic learners was higher than that of ectenic learners. The results of the t-test analysis (Table 6), however, revealed that the difference was not statistically

significant, $t(121) = 1.749$, $p = 0.083$. Ectenic learners were not significantly different from synoptic learners in terms of their semi-controlled production mean scores.

Table 6 .
T-Test Results for Semi-Controlled Production in Relation to Cognitive Style

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	.321	.572	-1.749	121	.083	-.40342	.23062
Equal variances not assumed			-1.749	120.885	.083	-.40342	.23065

Discussion

The researchers were not able to locate any study that addresses the relationship between synoptic-

ectenic or other taxonomies of cognitive style and the levels of the awareness. The findings, however, seem to run counter to the predictions made

by Ehrman et al. (2003) and Dornyei (2005). Contrary to what they argue, ectenic learners were not found to be more aware of the target structures than synoptic learners. Ehrman et al. (2003) and Dornyei (2005) propose that synoptic learning is holistic and relies on subconscious control, whereas ectenic learning is atomistic and occurs under conscious control of the learner. Synoptic learners tend to store exemplars (i.e., the objects of noticing) in their memory, whereas ectenic learners tend to focus on the rules underlying language (i.e., the objects of understanding). In other words, their prediction that synoptic learners are more inclined to demonstrate awareness at the level of noticing, while ectenic learners are generally expected to demonstrate higher levels of awareness (i.e. understanding) did not receive empirical support in the present study.

The lack of statistically significant relationship between synoptic-ectenic cognitive style and awareness might be for at least two reasons. First, as Sternberg and Grigorenko (2001) argue, styles probably are not directly related to consciousness. According to these authors, styles do not operate within awareness, whereas the use of strategies involves conscious choice of alternatives. In other words, conscious processes used by learners while receiving, storing, and retrieving information represent specific strategies rather than styles, which are more general in nature. Therefore, if what Sternberg and Grigorenko claim holds true, then it might not be surprising if no significant association can be found between cognitive styles and awareness.

Second, it may be assumed that styles as preferences, as in Ehrman and Leaver's (2003) taxonomy, do not reflect conscious processes, while styles as abilities have close relationship with awareness. An individual may prefer to receive and process information in a certain way, this preference, however, may not always be reflected in the actual mental experience (e.g. awareness) he/she undergoes. Probably, if the present study had investigated the association of ability-like cognitive styles, like those proposed by the dual-coding system of Skehan (1998), the results might have been different. In Skehan's dual-coding system, analysis-oriented learners tend to demonstrate higher levels of awareness in their attempts to abstract the underlying rules of language, whereas memory-oriented learners tend to store a larger number of exemplars in their memory, which represents awareness at a lower level.

Comparing the results presented in Table 4 and Table 6 with those of Rosa and O'Neill (1999) and Rosa and Leow (2004), it might be appropriate to hypothesize that the lack of significant differences in the intake and semi-controlled production of synoptic and ectenic learners were due to the fact that synoptic and ectenic learners were not different in terms of their levels of awareness. In contrast to what we expected, ectenic learners did not demonstrate significantly higher levels of awareness compared to synoptic learners. It might, then, be appropriate to conclude that it is awareness that produces different results; that is, awareness plays as a mediating factor. Any factor that results in higher levels of awareness will also result in higher amounts of learning. Similar justifications have been provided by Robinson (2005) and Long (1996) concerning the roles of explicitness and interaction in language learning. Robinson (2005) argues that differences in the amount of learning under explicit and implicit conditions are because of the differences in the levels of awareness raised by those conditions. Similarly, in an attempt to elaborate his interaction hypothesis, Long (1996) claims that interactions may direct learners to notice things they would not notice otherwise. Through interactions, things may be brought to the learners' focal attention, providing opportunity for further processing.

Conclusion

The major goal of this study was to investigate the relationship between the learner variable of cognitive style and the levels of awareness. The results could not provide support for the claim that levels of awareness reported during task performance and, subsequently, intake and production of learners are affected by their cognitive styles. The results, however, contribute to the theoretical debate on the role of awareness and its constraints in L2 development. One possible theoretical implication concerns the processes by which instructional and learner variables affect learning. Instructional and learner variables have long been documented to impact language learning. This impact, however, may not be a direct one; that is, it is not the instructional or learner variables themselves that directly affect learning, rather they give rise to different levels of awareness, which, in return, impact what is received and processed by the learners.

The synoptic-ectenic cognitive style investi

gated in the present study reflects preferences rather than actual abilities. No significant positive relationship was found between this taxonomy of cognitive style and awareness. Researchers may replicate this study to verify the result obtained here, or include other taxonomies of cognitive styles, particularly the ability-like cognitive styles proposed by Skehan (1998). Further research can also focus on other instructional and individual variables, such as task type, motivation, aptitude, working memory, learning history, proficiency, and the knowledge of L1.

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Appendix

The E&L Learning Styles Questionnaire (Persian, Version A)

نام و نام خانوادگی دانشجوی سال سن جنسیت
 آیا تابحال در کلاسهای موسسات آموزش زبان شرکت کرده اید؟ خیر حدوداً " چه مدت؟

در هر مورد با توجه به اینکه فکر می کنید شبیه کدامیک هستید یکی از خانه های بین جملات را علامت بزنید. مثلاً اگر دو چرخه سواری را خیلی بیشتر از شنا دوست دارید شاید خانه شماره ۸ (و یا حتی ۹) را علامت بزنید:

دو چرخه سواری را دوست دارم. شنا را دوست دارم.

بیشتر شبیه این هستم ۱ ۲ ۳ ۴ ۵ ۶ ۷ ۸ ۹ **بیشتر شبیه این هستم**

اگر شنا را کمی بیشتر از دو چرخه سواری دوست دارید، ممکن است خانه شماره ۴ را علامت بزنید:

دو چرخه سواری را دوست دارم. شنا را دوست دارم.

بیشتر شبیه این هستم ۱ ۲ ۳ ۴ ۵ ۶ ۷ ۸ ۹ **بیشتر شبیه این هستم**

اگر فکر می کنید در وسط قرار دارید و واقعاً هر دو را به یک اندازه انجام می دهید، شماره ۵ را علامت بزنید. در صورت امکان خانه شماره ۵ را کمتر استفاده کنید.

دو چرخه سواری را دوست دارم. شنا را دوست دارم.

بیشتر شبیه این هستم ۱ ۲ ۳ ۴ ۵ ۶ ۷ ۸ ۹ **بیشتر شبیه این هستم**

- این یک پرسشنامه است و بنابراین در آن پاسخ درست یا غلط وجود ندارد.

روی هیچ یک از سوالات زمان زیاد صرف نکنید بلکه احساس فوری خود را علامت بزنید. پرسشنامه را در حدود ۱۲ دقیقه تکمیل کنید.

وقتی کلمات و مفاهیم جدید را در متن می بینم معنی آنها را بدون برنامه ریزی قبلی و خود به خود یاد می گیرم.	از خواندن کلمات و مفاهیم در متن چیز زیادی دستگیر نمی شود مگر اینکه توجه کافی به آنچه که انجام میدهم داشته باشم	بیشتر شبیه این هستم <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشتر شبیه این هستم <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
اگر مطلب جدید در داخل مطالب اضافی دیگری ارایه شده باشد، نکات مهم را به راحتی پیدا کرده یاد می گیرم.	اگر علاوه بر مطلب جدید مورد نظر اطلاعات زیاد دیگری نیز داده شده باشد، تشخیص نکات مهم برایم سخت است. به نظر می رسد که گاهی مطالب به هم تنیده است و جدا کردن آنها از هم سخت است.	بیشتر شبیه این هستم <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشتر شبیه این هستم <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
دوست دارم به تفاوت ها توجه نکنم و بدنبال تشابهات بگردم.	دوست دارم بیشتر تفاوت ها و اختلاف بین چیز ها را مورد بررسی و توجه قرار دهم.	بیشتر شبیه این هستم <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشتر شبیه این هستم <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

۴	اغلب به تصویر و چهارچوب کلی مطلب توجه می‌کنم.	توجهم سریعاً به جزئیات و نکات ریز جلب می‌شود.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۵	سریعاً عکس العمل نشان می‌دهم	قبل از هر عکس العملی فکر می‌کنم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۶	زمانی بهتر یاد می‌گیرم که مطالب و اجزاء جدا از هم را ترکیب کرده و یک کل بوجود بیاورم.	زمانی بهتر یاد می‌گیرم که مطلبی را به اجزاء ریز آن تجزیه کنم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۷	معمولاً چیزها را از طریق تشبیهات و تمثیلات یاد می‌گیرم.	دوست دارم افراد منظورشان را واضح و مستقیماً بیان کنند.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۸	برای یادگیری، دوست دارم با دنیای بیرون ارتباط داشته باشم.	دوست دارم از طریق مفاهیم و ایده های ذهنی یاد بگیرم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۹	زمانی بهتر یاد می‌گیرم که بتوانم روش خاص خودم را پیدا کنم. حتی اگر این روش با روش های ذکر شده در کتاب یا درس متفاوت باشد.	زمانی بهتر یاد می‌گیرم که ترتیب و مراحل انجام کار ارایه شده باشد. در این صورت می‌توانم کارها را با نظم و ترتیب انجام دهم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۱۰	در یادگیری، از مثال های خاص یا تجربیات خود شروع می‌کنم و بعد قواعد را از آنها استخراج می‌کنم.	در یادگیری، اغلب قواعد و قوانین کلی را ابتدا یاد گرفته و از آنها برای یادگیری مثال های خاص استفاده می‌کنم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۱۱	بیشتر اوقات متوجه می‌شوم که بدون اینکه خود بدانم کلمات و عبارات جدید و غیره را یاد گرفته ام.	معمولاً برای یادگیری نکات و عبارات جدید باید روی آنها تمرکز کنم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۱۲	مطالب خارج از متن مثلاً قواعد گرامری را دوست دارم.	یادگیری قواعد گرامری و مطالب زبانی خارج از متن برایم دشوار است.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۱۳	اغلب وجه تشابه بین چیزها را مورد توجه قرار می‌دهم.	تفاوت بین چیزها، حتی تفاوت های جزئی، را سریعاً تشخیص می‌دهم.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
۱۴	خود جنگل را قبل از درختان آن می‌بینم.	درختان جنگل قبل از خود جنگل توجهم را جلب می‌کند.	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	بیشترشبیبه این هستم	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

۱۵	زمان زیادی برای آماده شدن جهت انجام کارهایم نیاز ندارم. بلکه سریعا انجام آنها را شروع می کنم.	قبل از شروع هر کاری باید خودم را برای انجام آن آماده کنم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۱۶	در اغلب موارد با استفاده از دانش زبانی خود جملات و کلمات جدیدی می سازم.	با تجزیه کلمات و جملات در ذهن خود تلاش می کنم قواعد مربوط به آنها را بفهمم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۱۷	دوست دارم چیزها را از طریق ایجاد ارتباط بین آنها یاد بگیرم.	ترجیح می دهم از طریق تمرین و تکرار یاد بگیرم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۱۸	دوست دارم به صورت عملی یاد بگیرم.	دوست دارم از طریق بررسی و توضیح قواعد گرامری یاد بگیرم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۱۹	تاکید زیاد بر برنامه و کتاب درسی می تواند یاد گیری مرا دچار مشکل کند.	کتابهای درسی و برنامه های منظم واقعا به من کمک میکند.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۲۰	دوست دارم قواعد گرامری را خودم پیدا کنم.	ترجیح می دهم قواعد گرامری را از معلم و یا از کتاب بدست بیاورم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۲۱	وقتی مطلب جدید در داخل بافت و متن معنی دار مثلا داستان یا مکالمه قرار دارد بهتر یاد می گیرم.	دوست ندارم زبان را فقط از طریق مکالمات روزمره، و یا متون اصلی که برایشان آمادگی ندارم یاد بگیرم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۲۲	در مواجهه با مطلب زبانی جدید، آن را در ذهن خود تغییر می دهم تا برایم قابل فهمیدن باشد.	آنچه برایم ارایه می شود قبول می کنم و آن را همانطور که ارایه شده یاد می گیرم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۲۳	معمولا تفاوت های ریز مثل تفاوت بین کلمات مشابه را به خاطر نمی آورم.	تفاوت های ظریف مثل تفاوت بین کلمات مشابه را به راحتی در ذهن خود نگه می دارم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم
۲۴	اول کارم از نکات اصلی شروع می کنم و بعد به سراغ جزئیات می روم.	ابتدا از جزئیات شروع می کنم و بعد به نکات اصلی می رسم.	بیشترشبيه اين هستم	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	بیشترشبيه اين هستم

