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Factors Mediating Noticing: An Investigation into the Impact of the Complexity of Target Structures and Learners' L2 Proficiency Level

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Abstract

In order to establish the why of noticing, it is imperative to empirically explore the factors that potentially mediate noticing. This study aimed to explore two factors that are believed to affect noticing: the complexity of target structures and learners' second language (L2) proficiency level. English relative clauses (RCs) were selected as the target structures, and Accessibility Hierarchy Hypothesis (AHH) was taken as the measure of the complexity of the RCs. A sample of 113 freshmen English language majors were selected as the participants of the study. A test of English RCs was developed as the placement test, and Key English Test (KET) was used to classify the participants into three groups of High (N=38), Mid (N=37), and Low (N=38) L2 proficiency level. Note-taking was used as the measure of noticing. After administering the RC test and the proficiency test, the participants were given a number of authentic reading texts containing instances of RCs and were required to take notes during reading activity. The non-parametric Friedman's test demonstrated that the complexity of RCs positively affected the participants' noticing while the non-parametric ANCOVA indicated that the participants' L2 proficiency level had no significant effect on noticing. The findings of this study can be helpful to both teachers and material developers in providing learners with optimal conditions for noticing linguistic forms, which in turn, could facilitate L2 learning.

Key words: Accessibility Hierarchy Hypothesis, Attention, Mediating factor, Note-Taking, Relative Clause

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1. Introduction

1.1. Background

Attention as a cognitive process mediating L2 learning has received special interest in the field of second language acquisition (SLA). Many SLA researchers have reached a general consensus that paying attention to the linguistic form in the input is a necessary condition for its sustained processing and, as a result, for learning (Robinson, 1995, 2017; Schmidt, 1990, 1992, 2001, 2012; Sharwood Smith, 1993; Tomlin & Villa, 1994; VanPatten, 1990, 1996, 2002).

Schmidt's proposal of noticing hypothesis in 1990s has generated important theoretical and empirical debates in SLA. Considerable support, as well as criticism, has been put forth by various researchers (e.g., Leow, 2015; Truscott, 2015). Leow (2015) argues that the noticing hypothesis does not appear to acknowledge several other variables potentially associated with the process of noticing. He refers to two constructs comprising the two sides of noticing, i.e., focal attention and awareness, and asserts that the current concern is whether these two constructs are separable. Yet, there exist substantial empirical studies that confirm the facilitative role of noticing in L2 learning (e.g., Amini et al., 2019; Lee, 2007; Mackey, 2006; Naseri & Khodabandeh, 2019; Russell, 2014; Simard, 2009). Therefore, there seems to be a general consensus that noticing facilitates, if it is not necessary to, L2 learning. Accordingly, we need to move from exploring whether noticing is necessary for learning to investigating such more fine-grained questions as why learners notice what they notice and what factors mediate learners' noticing of linguistic forms.

Language learners are not free to notice whatever they wish. Rather, what they notice is affected by such factors as motivation, aptitude, and language learning history (Schmidt, 2012). We need to clarify the way these factors affect noticing in order to facilitate L2 learning. Some studies have examined the impacts of the level of L2 development (e.g., Peace, 2019; Philp, 2003), task variables (e.g., Hama, 2012; Lai et al., 2008), memory capacity (e.g., Indrarathne & Kormos, 2018; Lai et al., 2008), and linguistic item features (e.g., Park & Nassif, 2014; Nassif, 2019) on noticing. However, little is known about the effects of different internal and external variables on noticing. More research studies are needed to clearly establish the effects of these variables. The present

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study attempts to investigate two less-examined factors that are believed to mediate noticing, namely the complexity of the target structures and the learners' L2 proficiency level.

1.2. The noticing hypothesis

Schmidt's studies on consciousness, attention, and awareness (1990, 1992, 2001) led to the emergence of the noticing hypothesis, claiming that "intake is that part of the input that the learner notices" (Schmidt, 1990, p. 139). As such, Schmidt views noticing, which requires learners' focal attention and awareness, as a necessary condition for L2 learning. However, Schmidt (2001) posits a weaker claim, stating that "people learn about the things that they attend to and do not learn much about the things they do not attend to" (p. 30). Noticing is defined as "allocation of attentional resources to some stimulus and identifies the level at which perceived events are subjectively experienced and are reportable by the person who experiences them" (Schmidt, 1992, p.24). According to Schmidt (2001), noticing represents a lower level of awareness and is distinguished from understanding which represents a higher level of awareness and includes generalizations across instances, knowledge of rules, and metalinguistic awareness.

Over the last two decades, the noticing hypothesis has been considered as one of the most influential theoretical underpinnings in SLA, contributing remarkably to the centralization of the roles of attention and awareness in L2 learning (Leow, 2019). There are numerous empirical studies that have addressed the issue of noticing in SLA, with the earlier ones mostly focusing on the relationship between noticing and/or awareness and learning and the more recent ones exploring the why and what of noticing as well as the issues of measurement.

In order to establish the why of noticing, it is necessary to empirically explore the factors that potentially mediate noticing. A variety of factors have been suggested to mediate noticing. Considering noticing as dependent initially on available attentional resources, Philp (2003) refers to a number of other factors that could potentially affect noticing of linguistic forms, including the learner readiness; frequency of the linguistic item; saliency of the linguistic item; influence of first language; novelty or familiarity of the target form; linguistic content of the input; the degree to which the discourse is understood; and the degree to which the task is automatic, distinctive and complex. What follows is a brief review of two factors, which are focused in this study.

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1.3. Learners' L2 proficiency level

Previous researches suggest that L2 learners' noticing of linguistic features may be influenced by several cognitive factors, including their L2 proficiency. Bialystok's (1993) information processing theory, for example, proposes a relationship between learners' proficiency and their selective attention in L2 input processing. Philp (2003) considers the learner's L2 proficiency level a crucial factor mediating noticing on two grounds: the increasing automaticity as a result of repeated practice, which allows more experienced learners to give their attention to higher order aspects of input processing, and learner's readiness in that learners might not give attention to the input that is beyond their current level of learning. Also, Philp (2003) refers to the results of the studies that examined readiness in terms of the learner's prior knowledge of and familiarity with linguistic items as suggestive of the effect of learners' readiness on noticing.

Some of the studies conducted on noticing reported that more proficient learners were able to attend to linguistic features more than less proficient learners (Hanaoka, 2007; Leeser, 2004; Peace, 2019; Philp, 2003). Other studies, however, did not find any significant effect of learners' L2 proficiency on noticing (Sato & McDonough, 2020; Tajeddin & Ebadi, 2011; Takahashi, 2005). These mixed findings raise the question of whether or not learners' L2 proficiency level influences their noticing of linguistic features.

A number of studies empirically examined the potential effect of learners' L2 proficiency level on noticing of linguistic items. Philp (2003) examined learners' L2 proficiency level, in addition to recast length as well as the degree to which the recast is different from learners' utterance, as an independent variable affecting noticing of recasts. The findings indicated that the learners' L2 proficiency level significantly affected immediate recall of recasts. Also, Leeser's (2004) study on learners' proficiency level and dictogloss task indicated that the participants who had acquired high proficiency in L2 produced greater language-related episodes. Finally, the results from the participants' notes in a study by Peace (2019) indicated that L2 proficiency level did affect the amount of noticing reported by the participants.

However, Takahashi (2005) did not find any significant effect of learners' L2 proficiency level on their awareness of linguistic features. She examined the potential interrelationship between motivation, proficiency and attention and found that motivation overrode proficiency in noticing pragma-linguistic features. In line with Takahashi (2005), Tajeddin and Ebadi's (2011) findings

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revealed that unlike leaners' motivation, their proficiency level was not significantly associated with pragma-linguistic awareness. Furthermore, Sato and McDonough (2020) examined whether three individual difference variables, L2 proficiency, language analytical ability, and interaction mindset could predict learners' report on noticing L2 errors produced by other learners. The results indicated that while two subconstructs of interaction mindset were significant predictors, the L2 proficiency level played a minimal role in mediating the amount of noticing of L2 errors by the participants.

1.4. The linguistic item features

All linguistic forms are not noticed or learned in the same way (Cintrón-Valentín & Ellis, 2016; Ellis, 2016, 2018; Han et al., 2008; Nassaji, 2017). The type of the linguistic form and its characteristics seem to function as determining factors in whether it is noticed by learners or not. This is also acknowledged by Robinson et al. (2012) as they assert that learners tend to pay more attention to morphophonological cues than syntactic cues when they process grammatical gender. Characteristics of linguistic forms have been described using such parameters as formal complexity, perceptual salience, and communicative value of the linguistic forms (Han et al., 2008).

The communicative value of linguistic forms has also been referred to as mediating noticing. Han et al. (2008), reviewing the research on textual input enhancement (TIE), conclude that the communicative value of the enhanced form was one of the factors that determined the effectiveness of TIE in promoting noticing. In these studies, learners were more likely to process linguistic items with greater communicative value than those with lower communicative value. Han et al. refer to the studies that did not find a positive effect for TIE and argue that the forms studied were not susceptible for this kind of intervention and that "the structural effect overrode that of TIE" (p. 608).

Another feature of linguistic forms which has been suggested as affecting noticing is the complexity of linguistic items (Philp, 2003; VanPatten, 1996). Uggen (2012) refers to two dominant views in the SLA literature regarding the way the complexity of the linguistic forms could affect learners' noticing. The first view, premising on Schmidt's noticing hypothesis, states

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that the complexity of the target form may induce learner's noticing of the form; that is, a more complex form may be more salient and, therefore, more probable to be attended to and acquired (DeKeyser, 2005). The second view is based on the general cognitive theory proposing that a more complex structure demands learners' more attentional resources and may lead to cognitive overload. Therefore, considering the limited processing capacity assumption and the Primacy of Meaning Principle (VanPatten, 1996), learners may not notice a complex structure since most of their resources are exhausted by attention to meaning and cannot be allocated to the complex form.

However, few studies have empirically investigated the potential effect of the complexity of linguistic items on noticing. Uggen (2012) examined whether a morphologically complex structure, the past conditional, could trigger more noticing and consequently lead to more L2 learning than the less complex one, the present conditional. The participants in Uggen's (2012) study were thirty English learners classified into a control group and two experimental groups. The participants in the experimental groups were required to produce written outputs eliciting the present or the past conditional, but the participants in the control group were not provided with the opportunity for producing an output that demanded the use of the target structures. Noticing was measured through underlining during a reading activity and a stimulated recall interview. The findings challenged the adequacy of the limited capacity assumption in that the more complex structure was noticed more than the less complex structure. The effect of structural complexity on noticing is not yet established and more empirical studies are needed.

1.5. The present study

As mentioned above, there is a general consensus that noticing facilitates L2 learning. Thus, providing learners with optimal conditions for noticing linguistic features could be helpful for L2 learning. However, the pedagogical interventions used to promote learners' noticing of linguistic features have not always been successful. Some of the studies that failed to show that the intervention could increase the experimental groups' level of noticing referred to the mediating effect of a number of factors as one of the explanations for the failure (see Han et al., 2008, for example, for the explanations on the failure of TIE in promoting noticing). Also, in a number of studies, some differences were found between learners' levels of noticing, but these differences were not related to the applied intervention; accordingly, it was concluded that some other factors

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might have affected noticing. Thus, establishing the potential effects of these mediating factors is crucial to ensure the successfulness of the noticing-promoting interventions.

Generally, the studies on noticing-promoting interventions have rarely examined the effect of internal and external mediating factors on noticing. This study aims to partially fill this gap in the literature on noticing by examining the potential effects of two factors that were suggested to mediate noticing. A small number of studies have explored whether the L2 proficiency level affected learners' noticing of linguistic forms, as mentioned above, but the results have been inconclusive; thus, more studies are needed to clearly establish the ways learners' L2 proficiency level might affect noticing. Also, few studies have examined whether or not the complexity of linguistic forms affected noticing. This study explores the potential effects of learners' L2 proficiency level and the complexity of the target structures on noticing in an implicit input condition aimed at promoting noticing. Accordingly, the following null hypotheses are investigated:

- Ho1: The complexity of the English RCs does not have any statistically significant effect on the learners' noticing.
- Ho2: L2 proficiency level of the learners does not have any statistically significant effect on the learners' noticing of the English RCs.

2. Method

2.1. Participants

The participants were freshmen majoring in English Translation and English Literature at Payam Noor University of Sari and Islamic Azad University of Ghaemshahr, Iran. Intact classes were selected, and no randomized selection of participants was made. The participants included both male and female, and their ages ranged from 18 to 34. They were similar in their educational programs. University students were selected since the purpose was to study L2 learners who had initial familiarity with the target structures. As Jourdenais (1998) argues, implicit input condition

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is more likely to be beneficial to learners who already have some initial familiarity with the target forms. The target structures had been introduced to the participants at high school, but the assumption was that they had not fully mastered the structures. To assess the participants' knowledge of the target structures, a test of English RCs, including a receptive section and a productive section, was administered to the participants. The participants who scored higher than 90% or less than 10% were excluded from the data analyses. Also, the participants who did not attend either a testing session or a text exposure session were not considered in the data analyses. Finally, one hundred and thirteen learners participated in the study. A summary of the participants' characteristics and grouping is provided in Table 1.

2.2. Instrumentation

2.2.1. Reading texts

A number of short authentic reading texts, each including instances of one or more types of RCs, were used in this study. Care was taken to expose the participants to an equal number of each RC type throughout the study. The length of the reading texts was between 90 to 250 words, depending on the number of RCs each text included. The longer texts were divided into two coherently meaningful sections and the participants were exposed to one section at a time so that they would be provided with texts of similar length in each exposure. The Smog formula was used to measure the readability of the reading texts. The readability indexes for all of the reading texts ranged from Smog Index=60 (Smog grade level=6) to Smog Index=70 (Smog grade level=7). That is, all of the reading texts were either easy to read or fairly easy to read. In order to ensure that the participants comprehended the texts, they took reading comprehension tests. The participants in all groups answered more than 90% of the comprehension items correctly.

Table 1. *Participants' Characteristics and Grouping*

Proficiency Level	**N**	**Sex**
Low	38	*Male/female*
Mid	37	*Male/ female*
High	38	*Male/ female*
Total	**113**	

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2.2.2. Note-taking

Noticing was measured through note-taking (Cho, 2010; Izumi, 2002; Izumi et al., 1999; Izumi & Bigelow, 2000; Song, 2007) in the present study because of the relative advantages of note-taking. First, note-taking is an online measure; thus, it is less likely to be influenced by memory decay compared with offline measures. Second, note-taking is compatible with reading activity, and it does not interfere with the task (Izumi, 2002). Finally, according to Izumi, the measure is precise to the extent that it excludes the items that are not attended to. However, the weakness of note-taking is that it may not include all the items that are attended to due to its physically demanding and time-consuming nature.

2.2.3. Tests

The participants' English proficiency level was examined as an independent variable potentially affecting noticing. Accordingly, KET was administered, and the participants were classified into one of the High, Mid or Low proficiency groups. The reliability of the reading part of KET was computed, and the 55 reading items enjoyed the reliability of .79. Also, two experienced EFL teachers rated the writing part, and the interrater reliability was 93%.

Furthermore, a test of English RCs was developed to evaluate the participants' knowledge of the targeted structures. This test included two parts: the grammaticality judgement (GJ) task which assessed the participants' receptive knowledge and the sentence combining (SC) task which assessed their productive knowledge of RCs. GJ and SC tasks are two more frequently used tasks in studies on RCs. The test was first administered to a group of 8 learners who were representative of the target population. After revising some items and eliminating others, the final test was piloted in another group of 19 freshmen majoring in English. The internal consistency of each section of the test was calculated separately using Cronbach's alpha. The GJ test enjoyed a reliability of .79, and the SC test possessed a reliability of .87.

The SC task included 15 items; each type of RC was represented by three items. Each item provided two sentences to be combined using the relevant RC. The GJ task included 20 items. Each item was a statement including a RC. Each type of RC was represented by four GJ items,

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one of which included the correct form of the relevant RC, and the other three items included erroneous RCs.

English RCs were used as the target structures in the present study. Different types of RCs have been identified both syntactically and semantically. Syntactically, RCs are classified according to the head noun they modify:

1. Subject (Sub): The man **who** bought the house is coming.
2. Direct Object (DO): I know the man **whom** you saw yesterday.
3. Indirect Object (IO): The girl **whom** you gave the pen to is my friend.
4. Object of Preposition (OP): I know the man with **whom** you talked.
5. Possessive (Pos): The man **whose** house is over there is from Japan.
6. Object of Comparison (OCOMP): The man **whom** you are taller than is over there.

The first five types of the above-mentioned RCs were investigated in this study. The level of the complexity of RCs was examined as an independent variable potentially affecting noticing. The assumption was that the cognitive complexity that the participants might have while they were processing more complex RCs would make these clauses more salient. Thus, more complex RCs were assumed to attract the participants' greater attention compared with the less complex ones.

The universal order of difficulty in the acquisition of RCs identified in AHH (Keenan & Comrie, 1977) was taken as the measure of complexity of the RCs in the present study. AHH received considerable empirical support in L2 literature (e.g., Eckman, Bell, & Nelson,1988; Gass, 1981; Pavesi,1986, as cited in Doughty, 1991). AHH is based on typological markedness (Doughty, 1991). The cross-linguistic study by Keenan and Comrie (1977) showed that the languages varied in the noun phrases that were accessible to relativization. They proposed the hierarchy as Sub< DO < IO < OP < Pos < OCOMP. According to their noun phrase accessibility hierarchy, RCs in which the relative pronoun functions as the subject of RC (Example 1) are universally the easiest or most accessible. The order of difficulty continues down the hierarchy in that RCs in which the relative pronoun functions as the object of comparison are the most difficult ones (Example 6).

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2.3. Procedure

As mentioned above, all participants took the test of English RCs in order to exclude the participants who did not qualify to be included in the data analysis. First, the participants took the GJ test. They were required to read the statements in the GJ test and indicate whether the statements were grammatical or ungrammatical. Also, they were asked to mark and correct the erroneous parts of ungrammatical sentences. Then, the participants took the SC test. They were required to combine two sentences provided in each item by attaching the second sentence to the first one. Based on the participants' test scores, some of the participants were excluded from the study.

Then, the participants who qualified to be included in the study took the proficiency test. Based on their scores on the proficiency test, the participants were assigned to one of the High, Mid or Low proficiency groups. More specifically, the participants who scored equal to or lower than 30 out of 60 formed the Low proficiency group (N=38) while those who scored between 31 to 40 were considered the Mid proficiency group (N=37), and the rest of the participants scoring higher than 40 formed the High proficiency group (N=38).

A week after administering the tests, the participants in all three groups were given a number of authentic reading texts including instances of different types of RCs in 8 sessions, over 3 weeks. The purpose was to present the target structures implicitly and examine the participants' noticing under the implicit input condition. More specifically, the study explored the extent to which noticing of the target structures was related to the participants' L2 proficiency level and the complexity of the target structures. The participants received the reading texts through the following schedule based on the complexity of RCs, starting with the least complex one and finishing with the most complex one:

- 1st session: subject type of RC
- 2nd session: direct object type of RC
- 3rd session: indirect object type of RC
- 4th session: subject, direct object, and indirect object types of RC
- 5th session: object of preposition type of RC
- 6th session: possessive type of RC
- 7th session: object of preposition and possessive types of RC

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- 8th session: all types of RC

The participants followed the same procedure to carry out the reading activity in all sessions. In each session, first the participants were provided with note sheets, and they were asked to read the input text and take note on any word that they considered important or helpful to comprehend the text. Then, they were required to carry out the reading comprehension task. Note-taking was modeled on a short sample text in the first session to familiarize the participants with note-taking.

After the last session, the participants' notes on the reading texts throughout the 8 exposure sessions were examined for the number and type of RCs noted. Following the literature on note-taking (Cho, 2010; Izumi, 2002; Izumi et al. 1999; Izumi & Bigelow, 2000; Song, 2007), the note score of each participant was computed through dividing the total number of words he/she noted by the number of the target structure-related words in his/her note-taking. Then, a percentage score was calculated in order to minimize individual variation in the amount of note-taking. Words related to the target structures included head nouns, relative pronouns, and prepositions. Each of these words was counted separately. If all the three words in an RC were noted down by a participant, they were counted as three instances of noticing the RC.

3. Results

3.1. Probing the first null hypothesis

According to the first null-hypothesis, the complexity of the English RCs does not have any statistically significant effect on the learners' noticing. Noticing different types of RC by all learners participated in the study, regardless of the group they were in, was examined. A non-parametric Friedman's test was employed for comparing the sample's means ranks on noticing Sub RC, DO RC, IO RC, OP RC, and Pos RC. As Table 2 shows, OP RC (MR = 3.88) had the highest mean rank on note-taking, followed by the Pos RC (MR = 3.42), DO RC (MR = 2.75), IO RC (MR = 2.72) and Sub RC (MR = 2.23).

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Table 2. *Mean Ranks; Noticing of RCs*

	Mean Rank
Subject	2.23
Direct Object	2.75
Indirect Object	2.72
Object of Preposition	3.88
Possessive	3.42

The results of Friedman test (χ (4) = 81.09, p = .000) (Table 3) demonstrates that there were significant differences among noticing types of RC. Thus, the null-hypothesis stating that the complexity of the English RCs does not have any statistically significant effect on the learners' noticing was rejected.

Table 3. *Friedman Test; Note-Taking*

N	113
Chi-Square	81.092
df	4
Asymp. Sig.	.000

The results of the post-hoc tests (Table 4) demonstrate:

A: A significantly higher mean rank was found for noticing OPRC (MR = 3.88) than noticing Sub RC (MR = 2.23) (p = .000), DORC (MR = 2.75) (p = .000), IORC (MR = 2.72) (p = .000), and Pos RC (MR = 3.42) (p = .040) by the participants.

Table 4. *Post-Hoc Comparison Tests; Noticing of RCs*

	Subject	**Direct Object**	**Indirect Object**	**Object of Preposition**
Direct Object	0.040			
Indirect Object	0.005	0.294		
Object of Preposition	0.000	0.000	0.000	
Possessive	0.000	0.000	0.000	0.040

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B: A significantly higher mean rank was found for noticing Pos RC (MR = 3.42) than noticing Sub RC (MR = 2.23) (p = .000), DORC (MR = 2.75) (p = .000), and IORC (MR = 2.72) (p = .000) by the participants.

C: A significantly higher mean rank was found for noticing DORC (MR = 2.75) than noticing Sub RC (MR = 2.23) (p = .040) by the participants.

D: No significant difference was found between participants' mean ranks on noticing DORC (MR = 2.75) and noticing IORC (MR = 2.72) (p = .294).

E: A significantly higher mean rank was found for noticing IORC (MR = 2.72) than noticing Sub RC (MR = 2.23) (p = .005) by the participants.

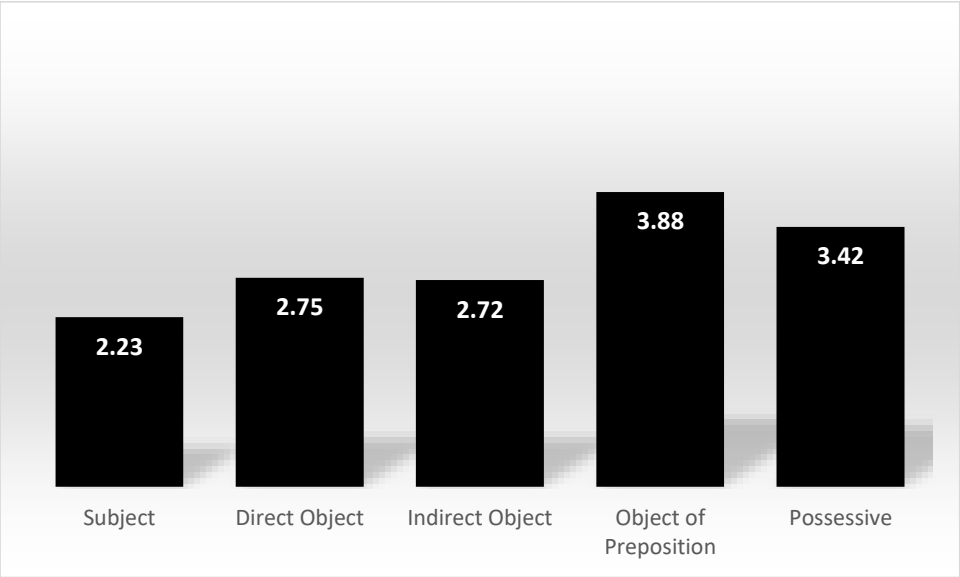


Figure 1. Noticing of Different Types of RCs

3.2. Probing the second null hypothesis

According to the second null hypothesis, L2 proficiency level of learners does not have any statistically significant effect on their noticing of RCs. A non-parametric ANCOVA, the Quade method, was run to test the second null hypothesis because the assumption of normality was not retained.

Table 5 shows the mean ranks and median scores of the three proficiency levels on the note-taking of all types of RCs. The results indicated that the High proficiency group (MR = 62.21) had

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the highest mean rank on the note-taking of RCs, followed by the Mid (MR= 58.99) and the Low (MR = 46.86) proficiency groups.

Table 5. *Mean Ranks and Median Scores; Note-Taking of RCs across L2 Proficiency Levels*

	Group	N	Mean Rank	Median
Note-Taking	*Low*	38	46.86	34.00
	Mid	37	58.99	43.00
	High	38	65.21	45.50
	Total	113		

The results of non-parametric ANCOVA (F (2, 110) = .978, p = .379) (Table 6) showed no significant differences among the three groups' mean ranks on the note-taking of RCs. Therefore, the second null hypothesis, L2 proficiency level of learners does not have any statistically significant effect on their noticing of RCs, was supported.

Table 6. *Quade Nonparametric Analysis of Covariance; Note-Taking of RCs by Proficiency Levels*

F	DFH	DFE	P Value
0.978	2	110	.379

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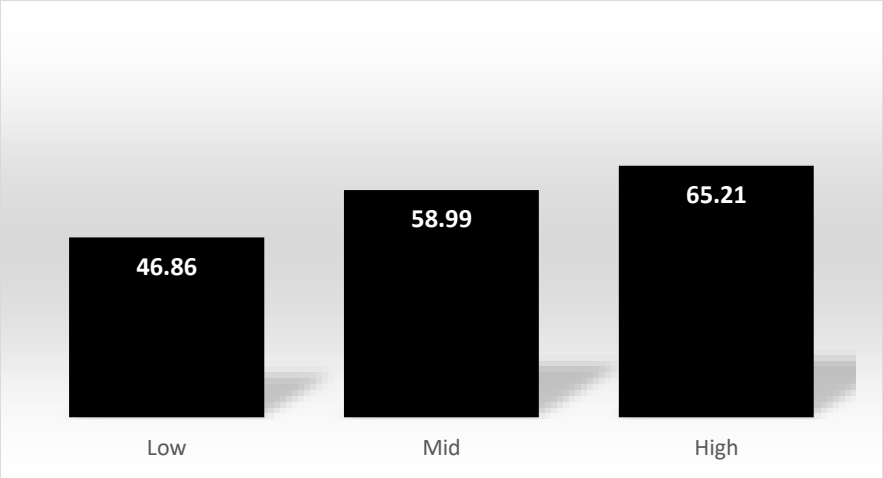


Figure 2. Mean Ranks on Note-Taking of RCs by Proficiency Levels

4. Discussion

The first null hypothesis postulated no significant impact of the complexity of RCs on learners' noticing of RCs. To examine null hypothesis 1, noticing different types of RCs by all the participants was examined. The findings rejected the first null hypothesis and indicated differences in the types of RCs noticed by the participants, except for IO and DO types of RC. The Subj type of RC showed the lowest mean rank of being noticed by the participants while OP type of RC demonstrated the highest mean rank of being noticed by the participants. Thus, the results suggest that the complexity of RCs positively affects learners' noticing of RCs, i.e., the more complex the RC, the greater the learners' noticing of that RC. The findings are in line with a similar effect found by Uggen (2012). According to Uggen, the participants reported greater noticing of the more complex target structure than the less complex target structure.

However, the ordering of noticing different types of RCs found in the present study, Sub< DO = IO < Pos < OP, did not exactly align with the universal ordering of difficulty of RCs proposed by Keenan and Comrie (1977), Sub< DO < IO < OP < Pos. While the least complex RC was the least noticed one, the most complex RC was not the greatest noticed one. This might be accounted for by reference to the difference between complexity and difficulty. Although the Pos type of RC was identified as the most complex RC in the AHH proposed by Keenan and Comrie, it was not perceived as more difficult than OP type of RC by the participants.

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Another explanation considers a structural feature of OP RC, i.e., the prepositions accompanying the relative pronouns at the beginning of this type of RC might have improved its saliency. Accordingly, the participants might have perceived OP RC as more salient than Pos RC.

The findings of the present study challenge the adequacy of limited processing capacity assumption about the link between structural complexity and attention. From an information processing perspective on attention, in case L2 learners are limited-capacity processors, attention to complex structures might overload the learners' cognitive capacity, which negatively affects the learning process. In other words, the complex structures were expected to be less noticeable as they were assumed to be cognitively more demanding. However, the present study provided counter-evidence in that the participants reported greater noticing of the more complex structures.

On the other hand, the findings of the present study support the view of relationship between the complexity of the target structure and attention that is based on Schmidt's noticing hypothesis. The participants' greater noticing of the more complex structures suggests that they perceived more complex structures as more salient.

Also, the participants' greater noticing of the more complex structures can be interpreted in the light of noticing the gap (Schmidt, 1990). The participants might have paid more attention to the more complex structures probably because they perceived the complex structures as more problematic. The results of the test on the target structures at the beginning of the study showed that most of the participants did not do well on the items that represented the more complex structures. Thus, it can be claimed that the complexity of the target structures might have triggered learners' noticing of their linguistic deficiency in the target structures.

The literature on the complexity of the linguistic features largely deals with the link between complexity and L2 instruction. While some studies view implicit instruction as more effective for complex linguistic features than for simple features, others consider explicit instruction to be more effective for developing complex linguistic features, with the exact relationship between complexity and instruction remaining unclear (Housen, 2014). Regarding the difficulty that L2 learners have in acquiring complex linguistic features, the findings of the present study suggest that this difficulty may not relate to learners' lack of attention to complex features, as more complex structures in this study were found to be more salient to the learners. Accordingly, the

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source of the difficulty of learning complex linguistic features could be tracked in such other areas as learning conditions and individual learner differences (Housen & Simoens, 2016).

The second null-hypothesis postulated no significant effect of learners' L2 proficiency level on their noticing of RCs. The findings on note-taking supported the second null-hypothesis. Although the results indicated greater noticing of the target structures by the High proficiency group, followed by the Mid and the Low proficiency groups, the differences among the groups in noticing the RCs were not statistically significant.

The findings of the study on the effect of L2 proficiency level on noticing contradict the studies that found a significant positive effect for L2 proficiency level (e.g., (Hanaoka, 2007; Leeser, 2004; Peace, 2019; Philp, 2003). However, the results of the study are in line with the findings of Takahashi (2005) and Tajeddin and Ebadi (2011) in providing evidence only for a nonsignificant relationship between proficiency and noticing.

Despite Philp's (2003) assumption, the increased automaticity as a result of repeated practice did not benefit the more proficient participants to notice more instances of the target structures while compared with the less proficient ones. The little difference found among the participants of the High, Mid and Low proficiency groups in noticing the target structures might be explained with regard to the other concept that Philp (2003) referred to as the reason for the potential effect of L2 proficiency level on noticing, that is, learner readiness in terms of the learner's prior knowledge and familiarity with linguistic items. All the participants in the present study had already been familiar with the target structures. Thus, it can be claimed that the participants' prior knowledge of the target structures overrode the automaticity needed for paying attention to higher order aspects of input processing; and as a result, the less proficient participants reported as much instances of noticing the target structures as the more proficient ones.

In addition, the findings run counter to those of Schmidt (1990), VanPatten (1996), claiming that learners with higher proficiency levels can devote more processing to language form. It is implied in VanPatten's model of input processing (1996) that learners with a higher proficiency level are expected to process linguistic forms more easily considering that more proficient learners do not have to struggle with processing meaning as much as less proficient learners do.

However, the little effect of L2 proficiency level on the participants' noticing in the present study may also be explained by referring to VanPatten's input processing model. As the input texts

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used in this study were easy or fairly easy to read, the less proficient participants as well as the more proficient ones probably did not have to struggle with the meaning, and they could allocate their attentional resources to the form. This argumentation has also been referred to by Leeser (2004) as the explanation for the difference he found between the less proficient learners' and the more proficient learners' noticing. The findings of Leeser's study revealed that the lower proficiency learners' focus was primarily on the most meaning-bearing elements of the dictogloss passage; thus, he concluded that the less proficient learners in his study might have been struggling just to extract meaning from the passage. Accordingly, it can be claimed that when the input is comprehensible, the difference in proficiency level might not be a determining factor of noticing; rather, such other factors as optimal learning condition and/ or appropriate pedagogical intervention are essential to ensure noticing.

Also, the findings of the study regarding L2 proficiency level can be interpreted in the light of the learning condition. As Schmidt (1990) asserts, learners can choose to focus their attention on the content or form, and their attention can be directed to notice certain linguistic features. The learning condition in the present study might have been successful in directing all the participants' attention to the target structures, regardless of their proficiency level. In other words, learners' noticing might depend more on the learning condition than their proficiency level.

Another explanation for the little effect of the L2 proficiency level may relate to the length of the exposure to the target structures. The participants' rather long exposure to the target structures in the present study, 8 sessions, might have triggered all the participants' noticing of the structures to a same degree, regardless of how much linguistic knowledge they had.

In sum, the findings of the study suggest that in case L2 proficiency level is proved to be a determining factor of noticing, the potential negative effect of the low proficiency level on noticing the linguistic features can be controlled. Providing learners with optimal condition for noticing seems likely to override the potential negative effect of the low proficiency level. As the findings of the study suggest, in optimal condition for noticing, the input is comprehensible to all learners and appropriate noticing-inducing pedagogical intervention is applied**.**

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5. Conclusion

The study provided evidence for the effect of an external factor, i.e. the complexity of the target structures, on noticing in that greater noticing was found for the more complex structures compared with the less complex ones. However, no significant effect was found for the learners' L2 proficiency level on noticing the target structures.

This study extended the line of research on attention, empirically investigating two factors that were suggested to mediate learners' noticing of linguistic forms. Knowing what mediates learners' attention to formal aspects of language, practitioners could more usefully help learners in developing their interlanguage. However, the cognitive factor examined in the present study was found to be a minimal determining factor for the learners' attention to form. A pedagogical implication of the little effect of L2 proficiency on noticing can be that learners from all levels of proficiency seem to benefit from noticing-promoting conditions to a same degree. Thus, teachers and material developers can provide optimal conditions of promoting noticing for all learners in a particular classroom, regardless of their proficiency levels, and, in this way, help all of them develop their interlanguage competence, based on Schmidt's (1990) premise that noticing, at least, facilitates learning.

Also, knowing what mediates learners' attention to formal aspects of language can help teachers and material developers in their decision-making and providing appropriate learning conditions. Based on what was found in this study, it can be suggested that the complexity of the structure is a determining factor of noticing the structure, at least for the structures examined in the study. The less complex structures seem to be perceived as less salient by learners; thus, teachers might wish to benefit noticing-inducing interventions in order to promote noticing of the less complex structures, and, in this way, facilitate learning of the structures.

Another implication regards the difficulty that learners have in acquiring complex linguistic features. Although providing learners with noticing-triggering conditions can be beneficial for developing their competence of linguistic features with various levels of complexity, the findings of the present study suggest that a more important issue regarding acquiring complex linguistic items might be helping learners in further processes needed for learning after they have noticed the forms in focus, given that the complex structures were found to be salient to the participants.

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Finally, various internal and external factors can potentially mediate the success or failure of noticing-inducing interventions; therefore, teachers following focus-on-form programs need to take into account these factors and their interaction with the applied noticing-inducing interventions in order to ensure learners' noticing and, as a result, learning of the forms in focus. Different linguistic forms, different L2 learners and different learning conditions might call for incorporating different noticing-inducing interventions.

As with any study, the present study faced some limitations that need to be acknowledged. First, exploring the impact of the complexity of the target structures, five types of RC were studied in the present study; therefore, it was not possible to provide more time for participants to be exposed to each type of RCs to facilitate learning of the target structures. Also, the methodology used for collecting data on noticing might face the constraint of incompleteness in that the measure might not include all the noticed items. However, it can be argued that when participants report some words, at least some attention is given to the reported words (Izumi, 2002).

As the present study is among the first studies that have empirically investigated how complexity of target structures mediate noticing, more studies are needed to provide a clearer picture of the issue. Future researchers are invited to explore the impact of the complexity of the target form on noticing, examining other linguistic forms in other L2 learning contexts. Future research can also explore the potential relationship between other structural characteristics, such as the communicative value and redundancy of target structures, and noticing.

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